Overseas Countries and Territories: Environmental Profiles

FINAL REPORT

PART 2 – DETAILED REPORT

SECTION C – NORTH ATLANTIC REGION

Consortium

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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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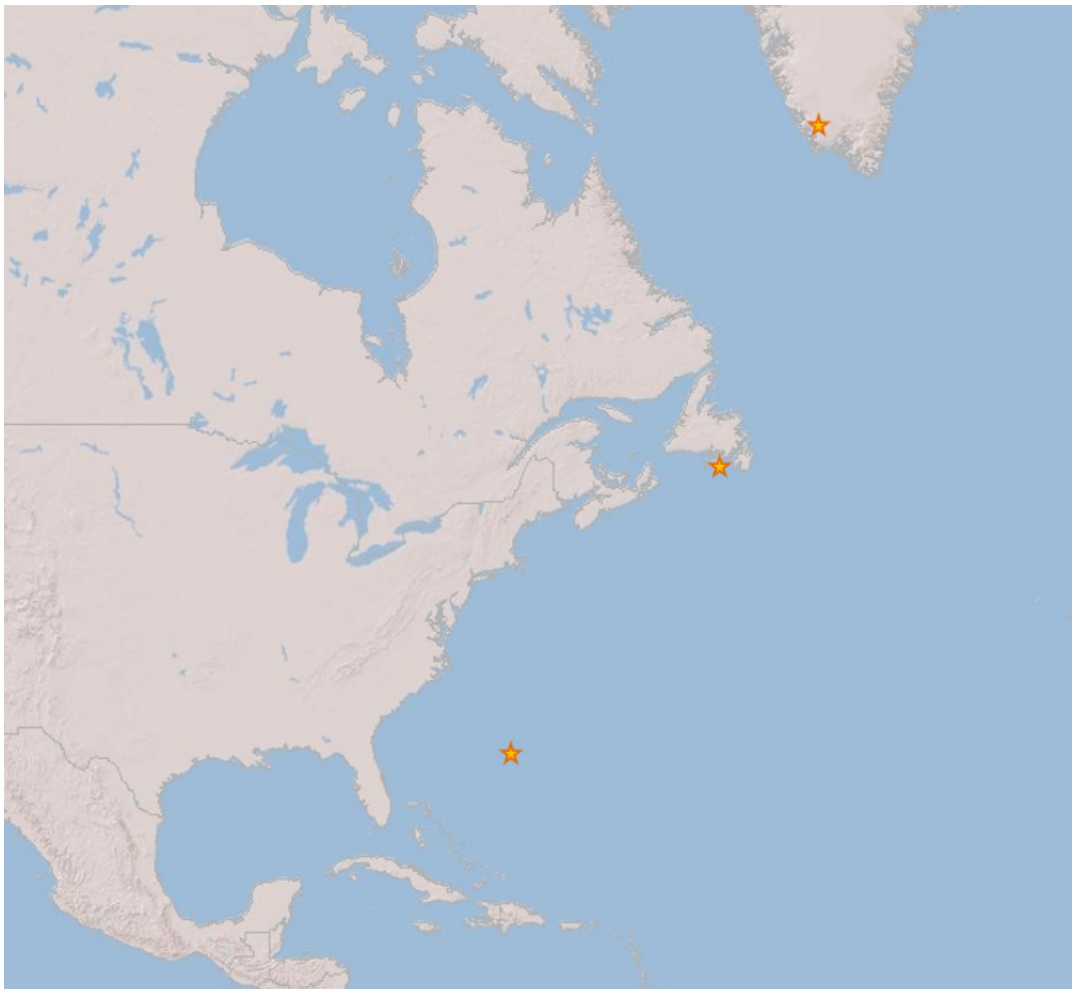
REGIONAL ENVIRONMENTAL PROFILE

NORTH ATLANTIC



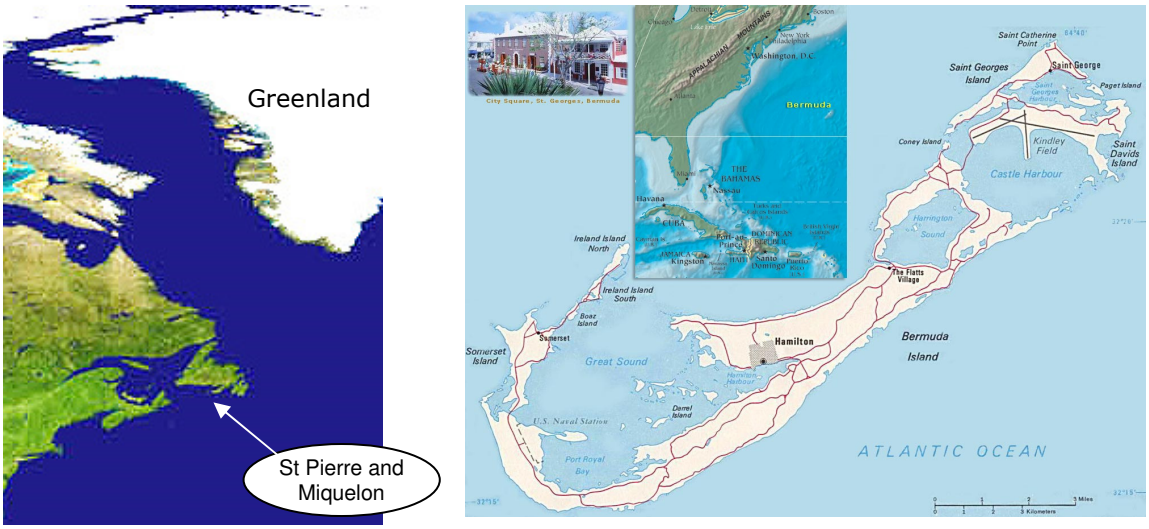
1 INTRODUCTION

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

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

2 DESCRIPTION OF THE REGION

The North Atlantic region here refers to a residual category of three OCTs - Greenland (linked to Denmark), Saint Pierre and Miquelon (linked to France) lying in the (cold) North (West) Atlantic, and Bermuda (linked to UK). These three OCTs are geographically and geologically part of North America, but linked to EU Member States.



Left: the two OCTs and Canada. Right: Bermuda and its position in relation to USA (source: www.america-atlas.com).

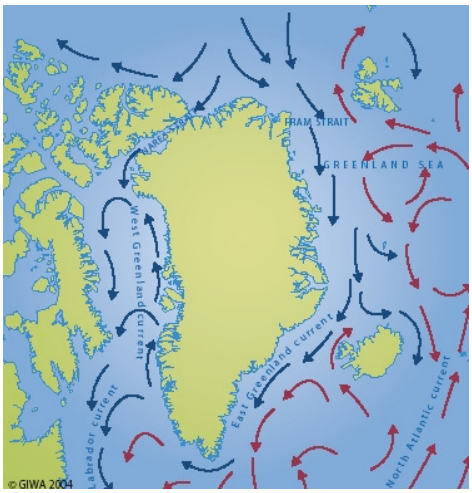
The other (non-OCT) territories which can be regarded as forming part of this region are Iceland and the Faroe Islands (also associated to Denmark).

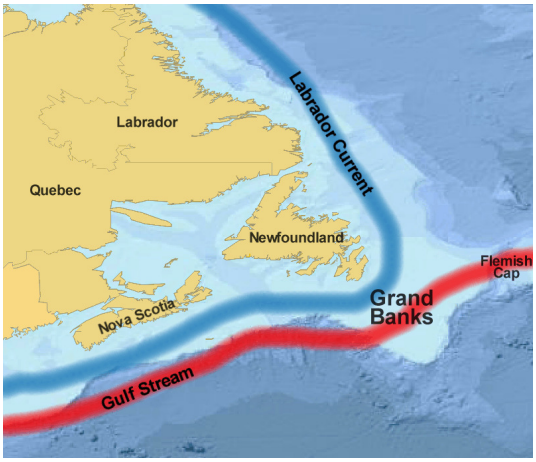
Bermuda has just become a Party of the Overseas Association Decision in January 2014. Bermuda consists of a group of over 150 islands and islets. It lies isolated about 1000 km off Cape Hatteras, eastern coast of USA at latitude 32ºN, having a sub-tropical climate under the influence of the Gulf Stream. Often mistaken as a Caribbean island, Bermuda lies over 1,200 km to the north of the nearest Caribbean island. Bermuda enjoys high self-government[2].

Both Greenland and Saint Pierre and Miquelon are located in areas where warm and cold currents meet each other and conditions are created for rich fishing grounds. On the Grand Bank near Saint Pierre and Miquelon the sea is relatively shallow, ranging from 25 to 100 m in depth. The cold Labrador Current

1 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.
2 http://www.bermuda-online.org/colonial.htm

mixes with the warm waters of the Gulf Stream and, given the shape of the ocean bottom, nutrients are lifted to the surface.





Left: currents around Greenland (blue = cold, red= warm) from GIWA (2004). Right: Currents around Saint Pierre and Miquelon (Wikipedia).

2.1 KEY FACTS AND STATISTICS:

Key facts and statistics for OCTs in the North Atlantic region						
OCT	**Land area (km²)**	**EEZ (km²)**	**Population**	**inhab/km²**	**GDP/cap (€)**	**Illiteracy rate**
BM	53.6	464,940	64,237	1,200	84,381	2%
GL	410,000*	2,353,703	56,282	0.03 (0.14 in ice free area)	27,500	4.2%
SPM	242	12,344 km²	6,314	26	28,327	1%
* Ice free. Total area: 2.2 million km²						

This group of OCTs presents two extremes. Greenland is the largest OCT, and has the lowest population density of all OCTs and indeed of all inhabited countries in the world (0.14/km² for ice-free lands). In turn Bermuda is one of the smallest OCTs and has one of the highest[3] population density of the world, besides one of the highest GDP per capita.

Much of Greenland is covered by ice, the majority of the inhabitants are Greenlanders living in towns and settlements along the coastal areas, and is projected to decline[4]. The population on SPM came from Europe (Basque, Breton and Normand fishermen), increased slowly between 1945 and 1999 (at 1.2% per year), then dipped, to return to the 1999 level at the end of 2011. About 65% of Bermudians have African descent; the population of Bermuda has grown 4% from 2000 to 2010 and the share of Bermudians in the total population stood stable at 76%.[5]

Economy					
OCT	**Financial**	**Fisheries**	**Tourism**	**Hydrocarbon/Mineral**	**Other**
Bermuda	●		⭘		
Greenland		● 1st	● 2nd	⭘	Public Administration Hydrocarbon / Mining is increasing importance.
SPM	○	⭘	⭘	○	Administration and trade (1st), construction
○ Unimportant ⭘ Artisanal / incidental / mainly for tourists ⭘ Moderate activity ● Major activity * Important for own consumption					

3 The 8th according to http://mecometer.com/topic/population-density/

4 According to Greenland statistics, the total population count is over the next 20 years projected to decline from todays 56,282 persons to 55.900 in 2020 and 54.800 in 2030.

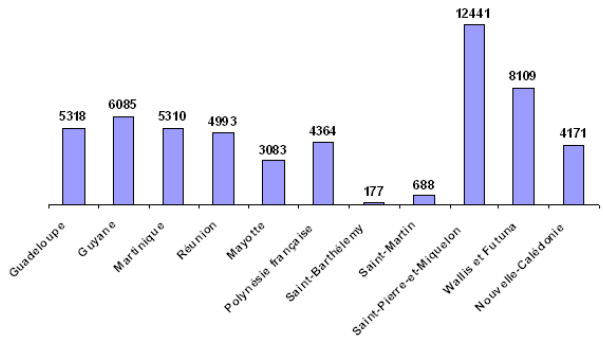
5 Bermuda Department Statistics http://www.gov.ai/statistics

Bermuda's main pillars of the economy are offshore finance (especially reinsurance) accounting for 25% of GDP in 2012[6] and tourism 15% to 20% depending on sources. There are more than 15,300 Bermuda-based international companies, 2,650 local companies, 430 overseas partnerships and 940 other non-resident companies[7]. Nearly every Fortune 500 company has some link to Bermuda[8]. In insurance and reinsurance, Bermuda has an industry capital base exceeding US$ 35 billion and gross premiums of US$ 24 billion. It ranks with Lloyds of London and New York as a global leader[9] Tourism accounts for 20% of Bermuda's overseas earnings, and a significant proportion of the jobs. There are few natural resources and little manufacturing activity, most products are imported, including 80% of the food. The global financial crisis has hit Bermuda, 10 of the 15 economic sectors are experiencing reduction of activity, particularly manufacturing, construction and electricity generation. The GDP has been showing negative growth since 2009 and in 2012 fell 1.4%, and unemployment is growing from 4.5% in 2009 to 8% in 2012[10]. About 11% of the households earn below the low-income level of $ 36,000[11]. Although the value seems high it is considered as poverty line in Bermuda, as the cost of living is one of the highest in the world due to level of imports and the heavy import duty levied on all goods that are imported[12].

For Greenland, fishing is an important source of income, it represents 87% of all exports and around 1,200 people are employed in fishing, while people employed in other industries (including fisheries processing) range to 4,900[13], not including construction, wholesale, manufacturing, public administration and transportation. Hunting is also important. More than 92 thousand seals were hunted in 2012 (in previous years the number has been ranging to 150 thousand), over 12,000 animals (80% reindeer), including musk oxen and 130 polar bears, are hunted each year. All specimens caught must be reported. Furs and sealskins are exported. Tourism is growing and is the second source of revenue after fisheries. In Greenland Hydrocarbon and mineral exploitation is assuming higher importance. In March 2014, there were 17 active non-exclusive prospecting licences and 22 active exclusive licences for exploration and exploitation of hydrocarbons in the limits of Greenland's economic zone[14], the number of exploration licences in 2009 amounted to 13[15]. In 2011 there were 75 mining exploration permits and 4 exploitation permits[16]. According to the Ministry of Industry and Mining, in the beginning of 2014 no mines are in production but before 2019 it is expected that 3 to 5 mines will be in operation. In the last half of 2013 the British company London Mining was granted an exploitation licence for iron ore at Isua and in the first half of 2014 the Vancouver based company True North Gems received an exploitation licence for rubies. In March 2014 a Council Regulation enabled the inclusion of Greenland in the Kimberley Process through the EU. The Kimberley process is an internationally acknowledged initiative that seeks to stem the flow of conflict diamonds and will ease the export of diamonds.

6 Bermuda Department of Statistics
http://www.govsubportal.com/images/Cabinet_Office/Dept_of_Statistics/Docs/GrossDomesticproduct/GDP%202012.pdf
7 UK FCO, 2012, The Overseas Territories Security, Success and Sustainability
(https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/12249/ot-wp-0612.pdf)
8 http://www.abic.bm/business-bda/environment.html
9 UK FCO, 2012, The Overseas Territories Security, Success and Sustainability
10 http://www.royalgazette.com/article/20130413/NEWS/704139988
11 Bermuda Census 2010, (http://unstats.un.org/unsd/demographic/sources/census/2010_phc/bermuda/Bermuda_new.pdf)
12 http://www.bermuda-attractions.com/bermuda2_0000be.htm
13 Greenland in figures 2013, http://www.stat.gl/publ/en/GF/2013/pdf/Greenland%20in%20Figures%202013.pdf
14 Data from the Ministry of Industry and Mineral Resources.
15 Greenland in figures 2013, http://www.stat.gl/publ/en/GF/2013/pdf/Greenland%20in%20Figures%202013.pdf
16 In 2007 there were 63 exploration permits (Greenland in figures 2013).

Budgetary support per capita from France in 2011 (€)[17]



In Saint Pierre and Miquelon agriculture and fisheries sectors produce less than 1% of national income, while administration and trade account for 60%. The fisheries sector was hit by the collapse of the cod fishery[18] and imposed lower fishing rights and quotas. This collapse also caused the collapse of fish processing industries, and it is estimated that together they adversely impacted 3,000 people on the islands with the closure of two more fish processing factories in 2011; the export of fish and fish products continues to diminish. Currently SPM is the largest (of all French OCTs) recipient of budgetary support from France. Aquaculture has been stimulated with subsidies since 2002, for scallops (coquilles St-Jacques) and codfish.

Tourism is seen as a possible further source of income, but access to these territories is costly and the season short. There were 7,200 visitors to Saint Pierre and Miquelon in 2012 and an increase from cruise ships compared to previous years. The mixing of the cold and warm currents in the Grand Banks area of Saint Pierre and Miquelon often causes fog, which affects security at sea.

3 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FOR GLOBAL BIODIVERSITY

The Newfoundland–Labrador supports large colonies of seabirds such as northern gannets, shearwaters and sea ducks. On Saint Pierre and Miquelon the sand isthmus between the islands was bought by the French nature institute CELRL[19] (and is now protected) and the salt lagoon (Grand Barachois) is now a Ramsar site. The marine mammals of Saint Pierre and Miquelon include the seals, dolphins and whales. The silver fox has disappeared due to hunting and one bird species is endangered.

In Greenland, musk ox, polar wolf, lemming, Artic hare and reindeer are the main land mammals. Marine mammals include polar bear, walruses, seals and whales.

Endemism and other wildlife values in the North Atlantic region							
Territory	**Endemism**						**Other notable aspects of wildlife (threatened species, etc.)**
	Birds	**Reptiles, amphibs.**	**Insects**	**Plants**	**Fresh-water fish**	**Terrest. invert.**	
BM[20]	2	1	41	16	3	53	About 6% of the endemic species are critically endangered, 3% are possibly extinct and 10% is rare.
GL[21]	0	0	0	27	0	0	Many mammals like beluga whales, common seals, walruses, and polar bear are on IUCN 'vulnerable' species list.
SPM	0	0	0	0	0	0	Due to proximity to Canada, no endemic species. 4 plants and two bird species on IUCN red list. Silver fox has disappeared because of hunting. Cod over fished.

17 http://www.senat.fr/rap/r10-308/r10-3081.html
18 The Grand Bank off Newfoundland used to be the richest cod waters of the world, but overexploitation led to a moratorium on cod fishing in 1992.
19 Conservatoire de l'Espace Littoral et des Rivages Lacustres
20 Sterrer, W. 1998. How many species are there in Bermuda? 1998. Bulletin of Marine Science 62 (3): 809-840. (Values for birds differ from those ar RSPB datazone http://www.birdlife.org/datazone)
21 The Biodiversity of Greenland– a country study
(http://www.natur.gl/fileadmin/user_files/Dokumenter/Tekniske_rapporter/Biodiversity_of_Greenland.pdf)

Biodiversity - number of recorded species					
OCT	**Birds**	**Land mammals**	**marine mammals**	**Fish**	**Plants**
BM[22]	345	7	36	434 (10 endemic)	1,079
GL[23]	58	8	22	150	515
SPM	322 (incl. 2 endangered)	7	8	3	385

Bermuda's has 34 species of hard coral species and 24 species of soft coral, and coral coverage is higher in comparison to many Caribbean reefs that have experienced significant losses of corals over the past 10 to 20 years due to diseases, coral bleaching, coastal development and over-fishing. The average annual value of the coral reef ecosystem amounts to $ 722 million[24].

Extent of habitats in the North Atlantic region						
OCT	**Mangroves**	**Scrubland**	**Wetlands**	**Forest**	**Polar habitat**	**Remarks**
BM	◘		◘	◘		Bermuda is densely populated and only small areas of natural habitat survive. About 10% of the total land area of Bermuda is forest or woodland, inland peat marshes cover about 48ha, and mangrove swamp amounted to a total of 16.7 ha[25].
GL	○	◘	○	◘	●	80% of GR is covered by ice. Dwarf trees in southern coast areas. In sunniest valleys birch trees, forest-like brush in many areas.
SPM	○	◘	●	◘	○	About 1,000 ha of wetlands (Grand Barachois). The archipelago has a boreal forest, but 37% of its surface has been destroyed in the last 50 years[26]. The introduced deer on the island of Miquelon-Langlade have been preventing forest renewal.
● Extensive		◘ Some		○ None		

The creation of protected areas is not backed up by legal provisions in St Pierre and Miquelon. Greenland has yet to conclude a national strategy for monitoring protected areas, and to develop management plans for specific areas.

Implementation of protected areas in OCTs in the North Atlantic region				
	Terrestrial		**Marine**	
OCT	**number**	**ha**		**Remarks**
BM[27,28]	90	8	101 / 151 km^2	There are 29 areas that have been declared 'no-take' Fisheries Protected Areas under the Fisheries (Protected Areas) Order 2000 and two seasonally protected areas (the South western Area and North eastern Area). The Department of Conservation Services manages 13 Nature Reserves while the Department of Parks owns 75 Amenity Parks, 10 coastal marine areas, and 10 Recreational Parks; in addition, there are 45 Nature Reserves that are owned between the Bermuda National Trust and the Bermuda Audubon Society that have been donated to the NGO or purchased as private land for preservation[29]. There are 7 Ramsar sites.
GL	7*	873,325	4[30] / 99,175 km^2	Largest national Park in the world + 11 other protected areas. 12 Ramsar sites.
SPM	4		1[31] / (6km^2)	The four land protected areas and one maritime are hunting and wildlife reserves. The lagoon Le Grand Barachois has been proposed as a Ramsar site.[32]
* marine and terrestrial				

22 Sterrer, W. 1998. How many species are there in Bermuda? 1998. Bulletin of Marine Science 62 (3): 809-840. (Values for birds differ from those ar RSPB datazone http://www.birdlife.org/datazone)

23 The Biodiversity of Greenland– a country study (http://www.natur.gl/fileadmin/user_files/Dokumenter/Tekniske_rapporter/Biodiversity_of_Greenland.pdf) (Values for birds differ from those ar RSPB datazone http://www.birdlife.org/datazone)

24 Total economic Value of Bermuda's Coral Reefs (www.conservation.bm)

25 http://www.tamug.edu/cavebiology/beckis/overseas.htm

26http://spn.mnhn.fr/spn_rapports/archivage_rapports/2011/SPN%202008%20-%2014%20-%20SPN%202008%20-%2014%20-%20rapport%20SPM%202008%20final%202.pdf

27 Protected areas of Bermuda. Retrieved from http://www.eoearth.org/view/article/155383

28 Bermuda is considering establishing a large no-take Marine Protected Area, on the outer ring of its EEZ Bermuda Blue Halo project - http://www.bermudabluehalo.org

29 Alison Copeland (2011), Bermuda in UK Overseas Territories and Crown Dependencies: 2011 Biodiversity Snapshot, Pelembe, T. and Cooper, G.eds, Joint Nature Conservation Committee, Peterborough, UK,

30 http://www.protectedplanet.net/countries/84

31 http://www.onml.fr/onml_f/Les-aires-marines-protegees

32 Still not on the updated list http://www.ramsar.org/cda/en/ramsar-documents-list-annotated-ramsar-16400/main/ramsar/1-31-218%5E16400_4000_0__retrieved April 2014.

4 ISSUES AND THREATS

4.1 INTRODUCTION

The main environmental issues and threats to the territories are:

Main environmental challenges and problems in OCTs in the North Atlantic region				
OCT	**Challenge / problem**	**Severity**	**Short description**	**Situation 2007**
BM	Biodiversity	Severe	The main pressures causing terrestrial biodiversity loss are development and invasive species. Invasive rats, birds and plants species are destroying native biodiversity. The potential for introduction of invasive species remains high due to permeability of ports of entry (manpower shortages) and informal smuggling activity. Land development for both housing and tourism, has resulted in significant loss of habitat (particularly woodland) and destruction of terrestrial species. In the marine the invasive lionfish population is expanding, particularly in deeper waters, with unknown impacts. The country also lacks preparedness and capacity in response to zoonotic disease outbreak.	n.a
	Climate change	Moderate	Significant threats including rising sea level, the intensification of hurricanes and coastal erosion will eventually force major infrastructure investment as part of an adaptation strategy. Bermuda's airport and causeway are two examples of highly vulnerable infrastructure whose status has been diminished by the effects of climate change[33].	n.a
	Waste and wastewater	Severe	It is known that pollutants emanating from the marine infill site near the airport into the marine environment and there is a need to divert the many metal scrap that are currently disposed in it. There is a need to solve the issue of the final disposal of the 700 x 20ft containers of waste Asbestos locations. This issue requires a decision to be made on burying at an existing quarry or at a new marine infill.	n.a
	Anthropogenic pressures	Severe	The continuously increasing size of cruise ships forces channel widening and other major infrastructure investments. High population density and overdevelopment are responsible in turn for the following: Very small amount of open space and arable lands remaining due to the constitutional right of the landowner to develop their land; Heavy traffic causing air pollution and suspected toxins from road runoff; Faecal and chemical contamination of groundwater and the inshore waters is – the extent and intensity of which is unknown and unstudied; Eutrophication of swamps and ponds from farm runoff - _Lack capacity to adequately control pesticide/chemical use; Very limited penetration of renewable energy – high per capita GHG emission.	n.a
GL	Climate change	Priority	Adaptation to climate change is a priority and focus is on both challenges and opportunities. Sea ice is decreasing, ocean is acidifying, and this will have consequences for the marine and terrestrial biodiversity. Opportunities for transport, mining, agriculture, hydropower, and unknown for fisheries.	Severe
	Waste	Severe	Waste management is currently considered to be one of the main environmental problems in Greenland. The municipalities and the Government of Greenland have taken initiatives but more is needed. Low density and physical fragmentation of the population makes modern waste management difficult. The chosen solution (incinerators in various communities) can contaminate local environment (dioxins, heavy metals, etc.).	Attention reqd.

33 Glasspool, A. F., 2008. The Impact of Climate Change on Bermuda. Report Prepared for the Bermuda National Trust. pp. 190

Main environmental challenges and problems in OCTs in the North Atlantic region				
OCT	**Challenge / problem**	**Severity**	**Short description**	**Situation 2007**
	Wastewater	Moderate	Bucket toilets, still used in parts of the towns and in almost all settlements in Greenland, has been considered a problem for many years with respect to uncontrolled spreading of nutrients, diseases and potential pollution issues. Discharge of wastewater to the ground or to open sewer is considered a problem. Discharge of untreated sewage into the sea is not considered a major concern, but steps are to be taken towards mechanical treatment of sewage of wastewater from some of the major cities.	Not indicated
	Trans boundary pollution of the Artic environment	Moderate	The Arctic Ocean drains many rivers in Eastern Europe, Central Asia and North America, besides radionuclides and other substances travel in the atmosphere. There is contamination by POPs (persistent organic pollutants) and heavy metals which enter the food chain. Some radionuclide are also a concern. Health risks to marine mammals and inhabitants with a heavy dietary dependence on hunted animals.	Moderate
SPM	Nature conservation	Severe	Important nature areas are not protected. Forest areas has been lost and are not rejuvenation due to introduced Virginia deer population	Moderate
	Climate change	Moderate	More frequent and strong storms and rising sea level may affect coasts and the submerged low-lying lands.	Not indicated
	Waste	Severe	2 open landfills. Illegal waste dumping along the coast includes dangerous and toxic waste. Plan 2009-2014 to develop and implement new waste management system (with many partners) is evolving (slowly). Popular opposition against plans for incineration. A surplus of hydrocarbons was exported to Canada in 2008 (85,000 litres cost € 25,000). Waste from fish processing diminishing but problem not resolved.	Moderate
	Water consumption	Attention reqd.	High levels of water consumption. Improved water catchment, management of rivers, dam renewal needed. Loss of water as pipes freeze, break and leak.	Moderate
	Impacts from (future) oil and gas industry	Attention reqd.	Possible seismic effect and risk of spills. No oil spill contingency plan despite the fact that the islands are in an area of oil tanker movement.	Moderate

Greenland plays a crucial role in the global climate change. The ice-cap that covers four-fifths of the island contains nearly 3 million km^3 of water (an estimated 9% of the world's freshwater). This is equivalent, if it were all to melt, to a rise in sea level of 7 metres worldwide. The impact of climate change on the region is therefore of global as well as local interest. The interchanges between the global climate and the Arctic system are such that the region is more sensitive to climate change than Antarctica, and impacts are already making themselves felt. According to IPPC (2013)[34] the average rate of ice loss from the Greenland ice sheet has very likely substantially increased from 34 Gt/yr over the period 1992 to 2001 to 215 [157 to 274] Gt/yr over the period 2002 to 2011. Of the (high confidence) 2.8[35] mm/yr of global mean sea level rise between 1993 and 2010, Greenland ice sheet has been contributing 0.33 mm/yr. The annual mean Arctic sea ice extent decreased over the period 1979 to 2012 with a rate that was very likely in the range 3.5 to 4.1% (0.45 to 0.51 million km^2) per decade, while the sea ice minimum (perennial sea ice) is very likely decreasing in the range 9.4 to 13.6% (0.73 to 1.07 million km^2) per decade. The spatial extent has decreased in every season, at an increased rate in every successive decade since 1979 (high confidence). On a global level the impact will not only be sea-level rise, but also on the global thermohaline ocean circulation due to the large flux of freshwater into the world's oceans, decreasing the density of water that currently sinks. The IPCC estimates that it is very likely that the Atlantic Meridional Overturning Circulation (AMOC) will weaken by about 2050. This would lead to further disruptive effects for climate, ecosystems and marine life. However, the phenomena are not yet fully established by science[36]. There may be some decades when the AMOC increases due to large

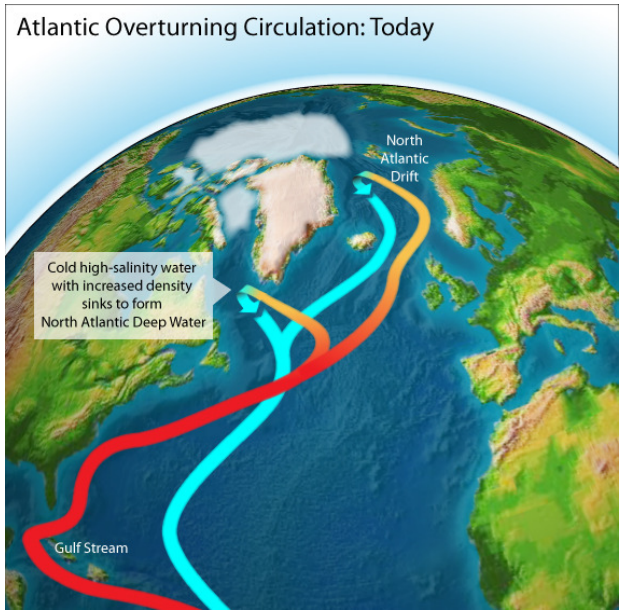
34 Climate Change 2013: The Physical Science Basis, Summary for Policymakers (https://www.ipcc.ch/report/ar5/wg1/)

35 Global sea level rise 2.8 [2.3 to 3.4] mm yr = 1.1 [0.8 to 1.4] mm/yr thermal expansion due to warming + 0.76 [0.39 to 1.13] mm/yr changes in glaciers + 0.27 [0.16 to 0.38] mm/yr Antarctic ice sheet + 0.38 [0.26 to 0.49] mm/yr land water storage + 0.33 [0.25 to 0.41] mm/yr Greenland ice sheet. (IPCC, 2013)

36 Some scientists argue that a slowdown in thermohaline circulation should bring on a cooling tendency of at most a few degrees across the

natural internal variability and it is very unlikely that the AMOC will undergo an abrupt transition or collapse in the 21st century for the scenarios considered.

More locally, climate change affects the size and composition of fish stocks (turbot like cold waters, cod may benefit from warmer waters), very important in this economy so heavily based on fishing. The reduction in sea ice may have profound effects on species such as seals (for which this is their habitat) and polar bears which predate them. This in turn would affect the way-of-life and livelihood of indigenous people for whom hunting is important. A melting of the permafrost could also have an effect on infrastructure and buildings, some of which depend for their structural integrity on this permafrost. Arctic warming may open new navigational possibilities, provide access to new areas along the Greenland coast, ease access to mineral resources and is already having a positive impact on farming. Melting of ice is also increasing the hydropower potential which is an important factor since 85% of energy is used for heating.



Warm surface waters sink in the waters surrounding Greenland, forming the AMOC. Source: Skeptical Science retrieved from The Carbon Brief Blog

In both Saint Pierre and Miquelon and Bermuda the effects of climate change will be felt due to sea level rise and more frequent and stronger storms, which will cause further erosion of coasts and the submergence of low-lying lands. Changes in sea temperature will be mostly felt in SPM; these will probably affect nutrients and fish catch, as the Gulf Stream is mostly a wind driven current bringing warm waters from lower latitudes.

On a more immediate scale, waste management poses problems in all the three OCTs. Greenland has a dispersed population and the distances between towns are very large. In this way each town is like an isolated place. SPM number of inhabitants is similar to the population of the second largest town in Greenland[37]. Solutions need to be found for small scale waste, for reducing the amount of waste generated, to valorise the waste and for waste streams to be shipped off of the OCTs.

In Saint Pierre and Miquelon lack of water has led to plans to conserve water and improve water catchment. The Goeland water dam was renovated in 2009. The current problem is that considerable supply water is being lost due to old pipes freezing, breaking and leaking. Better materials and cold weather technology are needed for the supply network. There are also concerns about the pollution of rivers.

In Greenland and Bermuda the problem is more related to wastewater. In Greenland the dwellings have either traditional water flush toilets or bucket toilets. Those who have water flush toilets in the larger towns are either connected to a sewer or the blackwater is stored in a holding tank outside the residence, while the greywater is discharged directly to the terrain, which is considered a problem. Bucket toilets are still used in parts of the towns in Greenland and in almost all settlements. This particular toilet solution has been considered a problem for many years with respect to uncontrolled spreading of nutrients, diseases and potential pollution issues. In Bermuda, there is also direct discharge to the ocean, which in some cases is affecting bathing water. A simple case of a tourist contamination can cause severe damage to the tourist industry.

North Atlantic, which would serve to mitigate the warming caused by rising concentrations of greenhouse gases. (https://www.americanscientist.org/issues/issue.aspx?id=999&y=0&no=&content=true&page=5&css=print

37 http://en.wikipedia.org/wiki/List_of_cities_and_towns_in_Greenland#Towns_with_more_than_1.2C000_population

The Arctic is very sensitive to pollution coming from distant sources. The POPs are transported to the Arctic by regional and global physical processes, and are then subjected to biological mechanisms that lead to the high levels found in certain species. POPs substances other than those included in the LRTAP Protocol and Stockholm Convention may be at or approaching levels in the Arctic that could justify regional and global action. In the Arctic, mercury is removed from the atmosphere and deposits on snow in a form that can become bioavailable. Some of the deposited mercury is released to the environment at snowmelt, becoming bioavailable at the onset of animal and plant reproduction and rapid growth. There are some indications of a trend of increasing mercury levels in marine birds and mammals in West Greenland. Cadmium levels in some seabirds is high enough to cause kidney damage. Certain regions of the Arctic contain elevated lead levels in the environment because of past or current use of lead shot by hunters as well as leaded fuel. During 2014 Greenland is banning[38] the use of lead shot, like other countries have done. Dramatic reduction in the deposition of atmospheric lead has occurred in Arctic regions where the use of leaded gasoline is banned. There is continuing uncertainty about the amount of radionuclides present at a number of sources and potential sources in the Arctic. However, compared with other areas of the world, the Arctic contains large areas of high vulnerability to radionuclides. In general, levels of anthropogenic radionuclides in the Arctic environment are declining, except for technetium-99 and iodine-129. This situation is matter of concern as it causes damage to biodiversity and directly to human life (cancer, neurological disorder, fertility, etc.).

In Bermuda, invasive species are a problem. Lionfish is the main marine problem in Bermuda, while on land 23 out of the 100 world's worst invasive alien species occur. With the melting of ice, the Greenlandic countryside will be far more susceptible to introduced species in the future than it is today. So if importing and planting species takes place without any control, this could lead to problems that happen elsewhere.

5 ENVIRONMENTAL GOVERNANCE

5.1 INSTITUTIONS

Summary of environmental management administration in the North Atlantic OCTs		
OCT	**Summary of government administrative capacity**	**NGOs**
BM	The Department of Conservation Services is responsible for species and habitat management and research, and is the coordination centre for the Bermuda NBSAP. The Department of Parks manages, Bermuda National Parks System sites. The Departments of Planning is responsible for the formulation of the Development Plans and for development control and enforcement also of building codes. Environmental Protection is responsible for fisheries, vet services, species imports, and air and water monitoring. Environmental Health is responsible for vector control and environmental hygiene (waste, wastewater). DEP – Fisheries wardens are responsible for enforcement of the Fisheries Act 1972, associated regulations and any marine aspects of conservation legislation.	There are over 20 environmental charities in Bermuda focused on topics including animal welfare, gardening and horticulture, sustainability, historic and open space preservation, environmental education, litter control and invasive species management. Several NGOs are focused on specific species or groups of species. They typically engage in public awareness, education and fundraising activities, as well as special projects, events and collaborations. Several NGOs are significant landowners, managing a network of protected areas. Advocacy and public education: Greenrock, Bermuda National Trust, Bermuda Environment and Sustainability Taskforce, Keep Bermuda Beautiful. BIOS is an NGO engaging on research.

38 Since April 2014 prohibition of selling lead-shot and from October 2014 illegal to use.

GL	Ministry of Environment and Nature, *inter alia*, is responsible for environmental, conservation and climate change policy. The Ministry of Fisheries, Hunting and Agriculture is responsible for fisheries policy and for agriculture. The Environment Agency for Mineral Resources Activities under The Ministry of Environment and Nature is responsible for environment protection under The Mineral Resources Act. Climate and Energy Office of the ministry of environment is responsible for administering the contract with the company Nukissiorfiit, Greenland's Energy that supplies water, energy and heating. Solid waste is dealt by the municipalities. Greenland Institute of Natural Resources (GINR) is a body of monitoring and research advising the Government on sustainable use of the living resources in and around Greenland as well as protecting the environment and securing the biological diversity Engineering and Land planning department of Ministry of Housing manages land and planning law and coordinates regional planning, and is also responsible to emergency preparedness.	Not so much information can be found on Greenland's NGOs. The NGOs more actively involved in environmental issues are: Inuit Circumpolar Council Urban Greenland Transparency International Greenland
SPM	Decentralised (French governmental) services deal with aspects of the environment and a Directorate (DTAM) deals with the environment. Also a territorial service (MNE).	A few environmental NGOs, e.g. AIRPURSPM

5.2 POLICIES, STRATEGIES, PLANS, AWARENESS AND MONITORING

Bermuda and SPM are making progress in developing an appropriate policy framework needed to manage their environment although clear environmental policy frameworks with budgets and allocated responsibilities have not yet been established in the territories.

OCT	Sustainable development	Environment	Biodiversity	Climate change	Spatial planning	Marine/ fisheries	Disaster risk reduction	Other	Remarks[39]
BM	✓		✓			+/- Marine spatial plan being prepared		✓	Strategy for the Sustainable Use of Living Marine Resources; Agriculture strategy; 2011 Energy White Paper.
GL			+/- being prepared	+/- being integrated in other strategies				✓	Greenland Energy Strategy and Plan of action 2008-2015; Oil and mineral strategy 2014-2018; Biodiversity Conservation strategy is being elaborated.
SPM	✓	✓	some	✓				✓	There are two development plans (SDS and PASE) with chapters on the environment. Once a year Environment week. Territorial and local level websites, new information material made by MNE and DTAM. Some legislation for protecting species, rules for fisheries, forestry and hunting, maritime pollution. Concerning EIA, SPM applies French legislation which provides notably 2 important laws: La "Loi sur l'eau" (EIA for infrastructural projects near water: e.g. dams, bridges, airports etc.) and rules on location of polluting industries (e.g. agriculture, oil, quarrying, fish processing etc.).

39 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

5.3 LEGAL FRAMEWORK

The OCTs cannot sign MEAs in their own right. But OCTs can take on the responsibilities of an MEA if the associated sovereign state (in this case: Denmark, 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.

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

OCT	MEAs Party	Remarks[40]
BM	Bermuda has been included in the UK's ratification of 17 MEAs: CITES, CMS, Ramsar, World Heritage, UNFCCC, Kyoto Protocol, Montreal (Ozone), MARPOL	CMS Sharks MOU singed by the UK and extended to Bermuda CITES enacted 1976, with updated legislation 2006. Merchant Shipping Regulation (on oil pollution, non-oil pollution, air pollution, pollution by garbage).
GL	Participates, but not fully implemented / compliant with CBD, Ramsar, Whales Party of World Heritage, CITES, LTRAP, Oslo, MARPOL, London, Ozone, Basel, OPRC, ESPOO	
SPM	CBD, CITES, Ramsar, Whales World Heritage, UNECE, Oslo	All OCTs associated to France report on biodiversity, as part of France's implementation plan under CBD. St Pierre and Miquelon follows France in all French environmental obligations, including MEAs, but no mention of such obligations in national plans or legislation. The lagoon Le Grand Barachois has become a Ramsar site.

There is a number of regional agreement to which each of the territory is part of.

OCT	Agreements
BM	Participates at the International Commission for the Conservation of Atlantic Tunas (ICCAT) under the UKOT banner since 1995. No financial support is provided by either the UK or ICCAT. If the UKOTs are unable to send a delegation, a member of the UK delegation will usually speak to the interests of the OTs[41].
GL	OSPAR-Convention, Oslo Convention, Nordic Environmental Protection Convention, Copenhagen Agreement, Joint Commission on Narwhal and Beluga, Northwest Atlantic Fisheries Organisation.

Territorial legislation covers the following areas:

	BM	GL	SPM
Conservation of species	✓	✓ birds, narwhal, beluga, polar bear, walruses	
Sites and habitats	✓ regulations on protected areas and on activities within them	✓	
Terrestrial and marine development control	(1974 rules for land) Process ongoing for marine		
SEA and EIA	Weak - Consultation process- via Dept of Planning Guidance Note GN106	✓ EIA although SEA are being produced	
Integrated Pollution Prevention and Control		+/- Executive order for environmental approval of heavily polluting enterprises	
Air	✓	+/- Executive order for use of motor vehicles	
Ozone	✓		
Water and wastewater	+/-	+/- Executive order for	

40 CBD = Convention on Biological Diversity
CITES = Convention on International Trade in Endangered Species of Wild Flora and Fauna
Ramsar = Ramsar Convention on Wetlands
World H= UNESCO World Heritage sites
LTRAP = Long-Range Transboundary Air Pollution Protocols on Persistent Organic Pollutants and Heavy Metals, in the framework of the United Nations Economic Commission for Europe.
Whales= International Whaling Commission
Oslo= Oslo Convention on Polar Bears
+/- = participates, but not fully implemented / compliant

41 According to Bermuda officials, this is often overshadowed by the need for the UK to maintain a united front with the European delegation

	outdated legislation (1975, 1991)	potable water quality and monitoring of water supply systems	
Waste (which waste types: oils, clinical, construction and demolition) Landfills	+/- outdated legislation (1987)		
Noise	Weak (only via Health and Safety regulations)		
Hazardous substances (chemicals)	Weak (clean air rules 1993)	+/- Executive order for use of lead shot	
Remediation	✓ Bermuda's Risk Based Corrective Action (RBCA) Guidelines		
Forest use, hunting	Weak (only hunting birds)	✓	Yes
IUU fisheries	✓		
Other relevant sectorial legislation with environment related requirements	Energy act (does not mention renewable energy or energy efficiency)	Mineral resources Act	
Remarks	Overall legislation is outdated	Legislation needs strengthening to meet international obligations	There are no legally protected areas (a few are managed). There is some legislation for fisheries, forestry, hunting, protection of birds, but not specifically related to MEAs.

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	OCT members	Other members	Remarks
Arctic Council and AEPS-Arctic Environmental Protection Strategy	GL	Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, USA	**Created** with the signing of the Ottawa Declaration on 19 September 1996 **Goal**: high-level forum for political discussions on common issues to the governments of the Arctic States and its inhabitants, involving all the Arctic states, and with the active participation of its Indigenous Peoples. **Task**: Each member country has prepared a strategy for the Arctic. The Council is composed of 6 working groups: Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), Sustainable Development Working Group (SDWG). The groups have prepared, among others, Arctic Climate Impact Assessment, Arctic Biodiversity Assessment, Arctic Acidification Assessment, Effects of POPs and mercury, etc. CAFF has established the International Murre Conservation Strategy and Action Plan that aims at facilitating circumpolar implementation of initiatives to conserve, protect and restore murre populations in the Arctic. Murres are among the most numerous and widespread of Arctic seabirds, and play important roles in the food webs of Arctic marine ecosystems and in the lives of people in coastal communities.

Name	OCT members	Other members	Remarks
NAFO- North West Atlantic Fisheries Organisation OPANO in French	EU FR for SPM DK for GL	EU, Bulgaria, Canada, Korea, Cuba, USA, Iceland, Japan, Norway, Russia, Ukraine	**Created** in 1978 as part of the Convention on Future Multilateral Cooperation in the Northwest Atlantic Fisheries. **Goal**: optimum utilization, rational management and conservation of the fishery resources of the Convention Area (outside EEZs). **Tasks**: Research, NAFO fisheries regulations, TACs and quotas, Conservation and Enforcement Measures for NW Atlantic.
NASCO- North Atlantic Salmon Conservation Organization	DK for GL	EU, Norway, Russian Federation, USA Canada, Denmark	**Created** in 1984 as part of the Convention for the Conservation of Salmon in the North Atlantic Ocean. **Goal**: conservation, restoration, enhancement and rational management of salmon stocks of the Convention area, taking into account the best scientific evidence available to it. **Activity**: prohibits fishing for salmon in most parts of the North Atlantic beyond 12 nautical miles from the coast, creating a large protected zone or 'sanctuary', free of targeted fisheries.
ICCAT- International Commission for the conservation of tuna-like fish in the Atlantic	FR for SPM UK (for OTs)	47 : incl. EU	**Created** as an Inter-governmental fishery organization in 1969, under the International Convention for the Conservation of Atlantic Tunas. **Goal**: responsibility for the conservation of tunas and tuna-like species in the Atlantic Ocean and its adjacent seas. **Tasks**: compile statistics, coordinate research, assess stocks, propose and advice on management measures, publications.
NAMMCO- North Atlantic Marine Mammal Commission	GL	Denmark, Norway, Iceland and the Faroe Islands	**Created** in 1992 and an International body. **Goal**: Conservation, management and study of marine mammals in the North Atlantic. **Tasks**: coordinate recommendations for further scientific research, review hunting methods for marine mammals in member countries, make proposals for conservation and management with respect to stocks of marine mammals within its mandate.
JCNB- Joint Commission on Narwhal and Beluga	GL	Canada	**Established** in 1991. **Aim**: to responsibly manage the shared stocks of narwhal and beluga that migrate between Canadian and Greenlandic waters. **Tasks**: The Commission reviews reports from meetings of the JNBC and NAMMCO scientific working groups, including estimates of current population size and trends, stock definition, current and historical harvest and other impacts. Based on these reviews, the Commission makes recommendations, on the conservation and management of narwhal and beluga, to the appropriate authorities of both countries. The Commission is comprised of three working groups: Scientific Working Group, Traditional Knowledge Working Group, and User to User Working Group. Meetings are held once every two years.
ICES- International Council for the exploration of the sea		20 countries incl. Belgium, Canada, Denmark, France, Netherlands, USA	**Created** in 1902, in Denmark, it is the oldest intergovernmental organisation in the world concerned with marine and fisheries science. **Goal**: exchange of information and ideas on the sea and its living resources, and promotion and coordination of marine research. **Tasks**: network of 4000 scientists, gives advice to members and international regulatory bodies (incl. EC) on protection of marine environment and fisheries conservation.
SCOR- Scientific Committee on Oceanic Research		32	**Goal**: promotes cooperation of scientists in planning and conducting oceanographic research and promotes capacity building for marine scientists in developing countries and countries with economies in transition. Approximately 200 scientists participate in SCOR activities on a voluntary basis at any given time.
(to be) Sargasso Sea Commission	Bermuda	Azores, Monaco, USA, UK	Funded: not yet. The Declaration on Collaboration for the Conservation of the Sargasso Sea was signed in 12 March 2014. **Goal**: to minimize the adverse effects of shipping and fishing in the area.

6.2 RELEVANT REGIONAL INITIATIVES AND PROJECTS

The concept of a North Atlantic OCT region is a rather artificial one. Each of the territories is linked to a different MS. Travel between the territories is extremely difficult, and this alone places a practical limitation on their cooperation.

St Pierre and Miquelon is neighbour to the much larger Canada and regarding many environmental issues Canada is the most important international partner. These include fisheries issues, marine pollution prevention (oil, waste, air from shipping). Similarly Greenland has much more in common, environmentally, with its Arctic Council partners, which also include Canada. Bermuda is mostly cooperating with USA and UK and other Sargasso Sea Commission stakeholders, namely Azores, Monaco (USA and UK are also parties of the Commission).

There are a number of areas of common interest which the territories share by virtue of their small populations and non-sovereign status, but these are issues which are perhaps better addressed in the framework of OCTA as a whole, rather than at the level of the North Atlantic region.

Bermuda is considered to be developed and wealthy based on per capita GDP. However, its isolation results in a very high cost of living which contributes to this by inflating salaries and the Government is not as well funded as might be assumed based on this metric. Bermuda is ineligible for many international grants and MEA-associated funds, either because of its OCT statute or because the environmental funding is tied to development goals. The one pot of UK funds earmarked for the UKOTs (Darwin Plus fund) is small and competitive, and a larger proportion goes to more economically stressed (or aid dependent) OCTs.

6.3 Recommendations for cooperation in the environment between the European Union and the North Atlantic OCTs

This section considers recommendations at the level of the North Atlantic region. Recommendations with regard to individual OCTs are made at the end of the individual OCT environmental profiles. Part 1 of this report contains recommendations at the overall and interregional levels.

We identified the following issues

Issues	**Severity**
Climate change	Moderate for the three
Waste	Severe for the three
Wastewater	Severe in Bermuda, moderate in Greenland
Biodiversity loss due to anthropogenic pressure	Issues of different severities in the three OCTs. Invasive species, infrastructures development, lack of chemicals control, pollution, oil and mining preparedness

It is possible to identify best practices that can be expanded or replicated in other OCTs in the region:

Actions	**Comment**
Sustainable development	Bermuda has established a Sustainable Development Plan and has established a Sustainable Development Department (SDD) within the Cabinet Office within the Bermuda Government to promote and facilitate public and private sector implementation of the SDP, to monitor, record, analyse and report on commitments in the SDP; to evaluate current and planned policy initiatives; to recommend appropriate changes to policy initiatives; and to provide administrative support to the SD Roundtable. There is also a dedicated website and the SDP is evolving.
Biodiversity knowledge and conservation	In addition to other existing local monitoring efforts, the Greenland government is piloting a natural resource monitoring system called Piniakkanik sumiiffinni nalunaarsuineq (Opening Doors to Native Knowledge), whereby local people and local authority staff are directly involved in data collection, interpretation and resource management. The promotion of locally relevant knowledge and local management actions will contribute to effective local conservation actions.
Climate change	Saint Pierre and Miquelon has set up since 2009 a complete measuring and monitoring system of various natural phenomena (erosion, waves, rising sea levels) to better manage the effects of climate change. The system is framed by scientific partnerships with France and Canada, and it continues to improve. SPM is both contributing to the global climate monitoring and is being supported by research and means for its own planning.

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Improve climate change resilience	Increase research and integrate results in development	Climate change in the Arctic, and in Greenland is prone to have regional and global consequences that need to be researched even further. SPM has installed capacity to monitor climate. Bermuda occupies an important location in the Gulf Stream and has a well-established Bermuda Institute of Ocean Sciences.	10 years	OCTs governments, Greenland and Bermuda research centres, and EU Universities		OCTs are willing to cooperate	Horizon 2020
	Activities						
	Promote research in those subjects in which the OCTs have a comparative advantage, namely the North Atlantic ocean and atmosphere circulation; Study the different impacts of climate change in fisheries in each of the OCTs and establish possible interactions between them; Identify needs and set up conditions for adequate climate monitoring; Identify priority policies and strategies in each OCT according to the major foreseen impacts of climate change – namely on marine biological resources; Obtain agreements to change the policies and strategies, and integrate climate change in other policies.						

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Improve waste management	Develop waste management systems within each territory and in the region	Solid waste management is a problem with different characteristics throughout the territories.	5 years	OCT governments, OCT utilities companies			EDF, LIFE, Horizon, Private funds
	Activities						
	Engage on measures to reduce the marine litter or its impacts on biodiversity and promote regional or global agreements. Marine litter requirements should be part of fisheries licences, and awareness raising campaigns should also involve international shipping companies. Engage on international agreements for the trans boundary shipment of waste to suitable waste management/recycling facilities off OCTs. This is already the case of Bermuda, but SPM and Greenland can do the same with neighbouring countries. Due to their geographic locations, the three territories can cooperate both on research and on awareness raising regarding the pollutants in the ocean, long range trans boundary pollution with chemicals, heavy metals, and radionuclides. This cooperation should also involve non-OCTs States in the region. Study the several options and strategies for waste valorisation through recycling and waste to energy methods – including cost-efficiency analysis, assessment of human resource capacity, strategic environmental assessment, etc. There are similarities between SPM and smaller towns of Greenland, Bermuda is a larger city and can study other solutions. Organise a structured business dialogue with the stakeholders (public, private, and civil society) and decision makers of each OCT in order to fix realistic plans (ready to be implemented) on different waste streams in order to achieve valorisation of waste, and to manage more efficiently some sorts of hazardous waste.						

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Integrated Coastal Zone Management	Develop and implement coastal zone management plans	There are pressures on coastal zones in all OCTs. Wastewater being dumped to the ocean without treatment, pressure of development, areas of high biological importance not designated, or with not adequately managed.	5 years	OCTs governments Regional Cooperation			EU WB and Regional or Multilateral Development Banks Private sector
	Activities						
	Involve and coordinate the various public, private civil society (environment, land, fishing, police, defence, ports, tourism, rural development, local authorities) to assess the uses and pressures of the coastal zone and coastal waters, as well as their potentialities. In each OCT, develop a study on the potential economic and environmental risks in coastal areas including climate change and assess what are the priority issues regarding legal framework and the financing needs both for investment as for running costs (e.g. wastewater is an important pressure in these OCTs and solutions require further research and fund mobilization for investment), involve private sector, promoting green and blue economy. Generate more data on the ecosystems and species worth to protect. Develop studies on income generating activities in the coastal areas, with a view also to support activities at sea. Conduct workshops to discuss options Bermuda could export the Marine Spatial Planning (MSP) methodology, which contributes to the optimization of use for the inshore and offshore waters, to other OCTs (particularly in the North Atlantic and Caribbean). Develop the plan of integrated coastal zone management integrating the several uses and the needs for protection, and take into account prospective scenarios and climate change. Draft legislation necessary to implement the plan, harmonize legislation with the international environmental obligations (MEAs) extended to the territories. Elaborate management plans for the protected areas. Promote co-management, eco-tourism, renewable energies, wherever possible. Engage on European and worldwide awareness raising campaigns for fund mobilisation and tourist attraction as ways to ensure long time financing.					

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Reduce dependency on fossil fuels and GHG emissions	Establish conditions for the penetration of renewable energies and promotion of energy efficiency	About 70% of Greenland electricity comes from renewable energy. For SPM and Bermuda, the penetration of renewable energies is very weak. Energy for house heating is one of the main consumptions in Greenland and SPM, and energy efficiency is rather low. The renewable energy potential in Greenland and Bermuda theoretically allows for the use of electric cars.					
	Activities						
	Promote sharing of experiences, and know-how within OCTA members. Assess the renewable energy potential in Bermuda and in SPM, as well as electric grid conditions. In the case of Greenland the majority is controllable hydropower. Assess energy efficiency issues in Greenland and SPM, particularly those connected to heating Study the most appropriate renewable energies (RE) solutions, and the most appropriate energy efficiency (EE) solutions, taking into account the initial cost and the cost of operation, the feasibility of local maintenance and repair – engage private sector and increase local expertise on RE and EE solutions. Review the institutional framework so that energy can be dealt in its integrity – electricity, fuels, etc. and taking into account environment and climate change concerns. Implement this measure at both territorial and regional level. Establish appropriate regulatory framework, enabling involvement of private sector, and establishing the adequate safeguards for energy safety and security. Assess if the promotion of electric cars is adequate in the territories and what is required for the implementation of electric cars. Particularly in Bermuda, this could ease other problems such as air and soil pollution. This is a long-term action, as prior to this there is a need to reform the energy sector.					

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AMAP-	http://www.amap.no/	Arctic Monitoring and Assessment Programme
Arctic Council	http://www.arctic-council.org	
CCC- Cod and Climate Change	http://codresearch.org/Relevant_Publications/ICES_CM_2003-C-11_WG_CCC.pdf http://www.globec-canada.mun.ca/globec/index.html www.codresearch.org	On cod in the North Atlantic
ICCAT-	http://www.iccat.es/	International Commission for the conservation of tuna-like fishes in the Atlantic Ocean
ICES-	www.ices.dk	International Council for the Exploration of the Sea
NAFO-	http://www.nafo.int/	North West Atlantic Fisheries Organisation
NAMMCO-	http://www.nammco.no/	North Atlantic Marine Mammal Commission
NASCO-	http://www.nasco.int/	North Atlantic Salmon Conservation Organization
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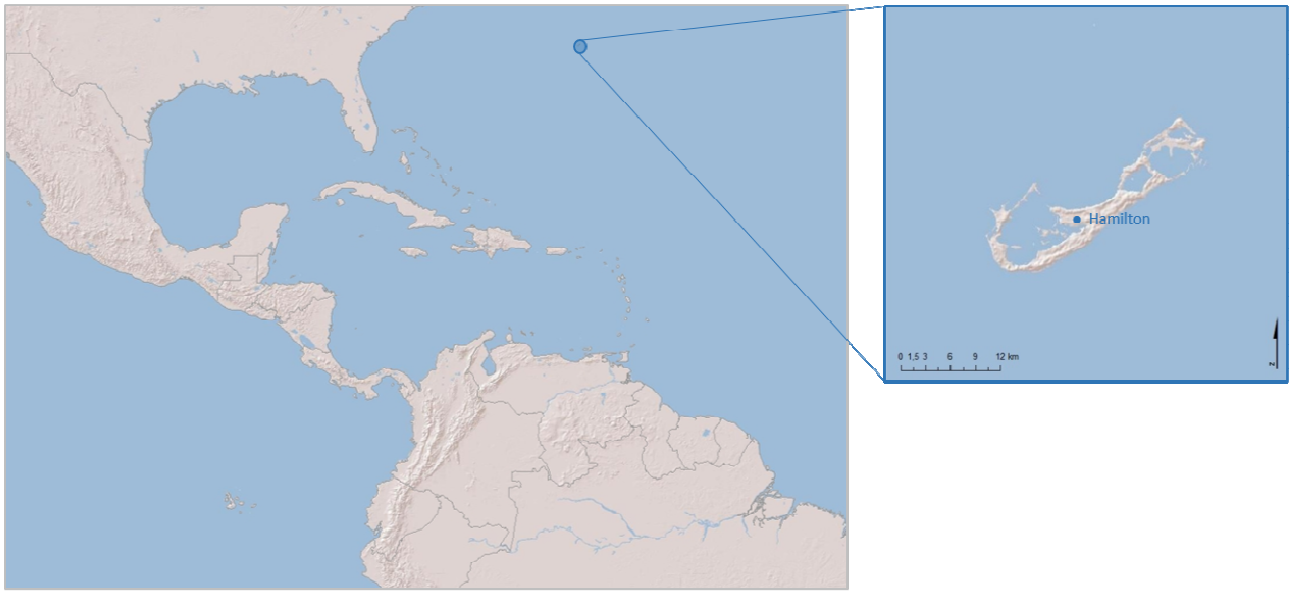
IFRECOR – Initiative Française pour les récifs coralliens	http://www.ifrecor.nc

ANNEX A :

BERMUDA

ENVIRONMENTAL PROFILE

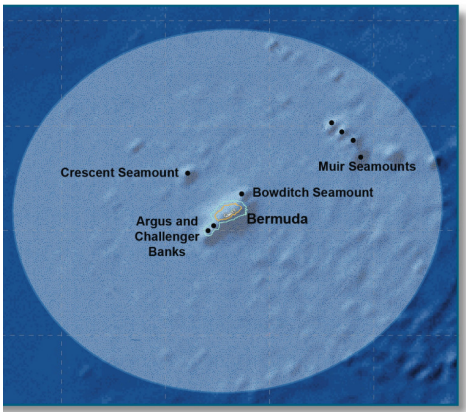
BERMUDA



SUMMARY

Bermuda consists of a group of over 150 islands and islets. It lies isolated in the western Atlantic Ocean 965 km off the eastern coast of USA. The six main islands comprising Great Bermuda are connected by causeways and bridges to form a continuous area of 53.6 km^2. Influenced by the Gulf Stream, the climate is sub-tropical, mild throughout the year with yearly average precipitation of 1400 mm. Water resources are limited and there is high dependence on rain catchments. Bermuda has one of the highest population densities[1] in the world. It is estimated that over 50% of Bermuda's land area is developed, while a further 17% comprises areas such as golf courses, residential and public gardens, lawns and playing fields. Remaining undeveloped arable land is mostly private, limiting expansion of agriculture. Bermuda has also one of the highest GDP per capita of the World, mainly due to offshore finance. But living costs are very high, and 11% of households are under national poverty level. At least 4,597 marine and 3,702 terrestrial species have been recorded in Bermuda, of which about 3% are endemic. About 6% of the endemic species are critically endangered, 3% are possibly extinct and 10% are rare; two-thirds of endemic species inhabit caves and their status is unknown. Bermuda is playing a key role on the establishment of a Sargasso Sea Commission and debates the creation on a non-take marine protected area in the outer rim of its EEZ. Main environmental challenges are limited land, anthropogenic pressures and invasive species. Bermuda has been able to develop a sound waste management system but water and wastewater are still problematic. Vulnerable to climate change, particularly sea level rise and stronger and more frequent hurricanes, Bermuda has a high GHG (and pollutants) emission per capita, as is still to increase independence from fossil fuels.

1 BACKGROUND INFORMATION



Source: Bermuda's Economic Exclusive Zone and its future, 2013

Name of territory	Bermuda
Region	North Atlantic
Land area	53.6 km^2
Exclusive economic zone	464 940 km^2
Population	64,237 (2010 census)
GNP/capita	$84,381 (2012)[2]
Literacy rate	98%
Unemployment rate	7% (2013)
% below low-income line	11% of households under $36000/per year

1 http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_by_population_density
2 Bermuda Department Statistics http://www.gov.ai/statistics/NA_Publi_11.htm

Bermuda consists of a group of over 150 islands and islets. It lies isolated in the western Atlantic Ocean at latitude 32º 19' N and longitude 64º 46' W giving it a sub-tropical climate. The closest point of land is Cape Hatteras, North Carolina, which is 965 km (570 miles) to the west. Often mistaken as a Caribbean island, Bermuda lies over 1,200 km (746 miles) to the north of the nearest Caribbean island.

There are six main islands comprising Bermuda: Somerset Island, Ireland Island, St. George's Island, St. David's Island and Boaz Island, and Bermuda (also called Great Bermuda and Main Island). The islands are connected by causeways and bridges to form a continuous fishhook-shaped landmass that stretches approximately 21 miles in length that averages less than a mile across, with a total area of 53.6 km^2.

The limestone islands of Bermuda are founded on a volcanic seamount which rises 4,270 m from the floor of the Atlantic Ocean, originating through two periods of volcanic activity occurring approximately 110 million and 33 million years ago respectively. The truncated top of the volcano is now submerged deeper than 60 m below sea level. It is buried by reefs and sandy limestone sediments composed of the skeletal remains of shallow water marine organisms. The hilly islands of Bermuda, perched on the southeasterly edge of the submerged volcano, are old windblown dunes composed of limestone sands now hardened. Bermuda has a 'layer cake' geology of fossil soils deposited during low sea level conditions (cold periods), alternating with limestone dunes that were built at high sea levels (as it is nowadays).

Thanks to the warming effects of the Gulf Stream, the climate is sub-tropical, mild throughout the year. From late May to October temperatures ranges 23ºC to 29ºC and humidity is high at 85%. In the remaining of the year temperature is about 17 and drop to 10ºC. Year. Bermuda receives an average annual rainfall of 55.5 inches (1,410 mm) which tends to be fairly evenly distributed throughout the year. Bermuda Weather Service indicates that from 1609 to the present day, devastating storms affect the Island every six to seven years. The hurricane season is from May through November, with an average of one storm passing within 180 nautical miles of the Island every year.

The island of Bermuda has one of the highest population densities[3] in the world. According to the 2010 Census of Population & Housing[4], the population has grown 4% from 2000 to 2010; the Bermuda-born population made up 67% of the population, compared to 29% non-natives, and 79% of residents had Bermudian status. Offshore finance (especially reinsurance) and tourism are the main pillars of the economy. Tourism accounts for 15 per cent of Bermuda's overseas earnings. There are few natural resources and little manufacturing activity.

There are more than 15,300 Bermuda-based international companies, 2650 local companies, 430 overseas partnerships and 940 other non-resident companies, many with a global business empire. They include subsidiaries of 75% of the Fortune 100 and their European equivalents. In insurance and reinsurance, Bermuda has an industry capital base exceeding US$35 billion and gross premiums of US$24 billion. It ranks with Lloyds of London and New York as a global leader.

The global financial crash has hit Bermuda particularly hard. Bermuda GDP is experiencing consecutive negative growth since 2009, and in 2012 GDP fell 1.4%. Although Bermuda enjoys the fourth highest per capita income in the world, studies reveal that there are two distinct paces in economy, one connected to international business and another for the remaining activities - no Gini coefficient has been computed for the country. The drop in GDP is reflected in continued job losses and business closures. Ten of the fifteen industries experienced lower economic activity, with the strongest impacts felt in the manufacturing, construction and electricity generation industries. Public debt is around US$ 1.4 billion.

3 http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_by_population_density
4 http://unstats.un.org/unsd/demographic/sources/census/2010_phc/bermuda/Bermuda_new.pdf

2 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FOR GLOBAL BIODIVERSITY

Bermuda's flora and fauna, both marine and terrestrial, has been shaped by repeated sea level fluctuations of nearly 150 metres amplitude during the ice ages, which alternately favoured shallow marine or terrestrial ecosystems. This has not promoted the existence of endemic species.

At least 8,301 species have been recorded in Bermuda of which 4,597 are marine and 3,702 are terrestrial. About 3% of the species are endemic. The status of almost two-thirds of Bermuda's endemic species is unknown, as a large proportion of these species inhabit marine caves that are difficult to access. About 6% of the endemic species are critically endangered, 3% are possibly extinct and 10% are rare.

Bermuda is home to the northernmost examples of tropical ecosystems such as coral reefs and mangroves. These are naturally stressed owing to their northern location, and are therefore unusually vulnerable to anthropogenic disturbance.

Of the 60 species of hard coral species and 50 species of soft coral found in the Caribbean, Bermuda has respectively 34 and 24 coral species. But Bermuda's coral coverage is higher in comparison to many Caribbean reefs that have experienced significant losses of corals over the past 10 to 20 years due to diseases, coral bleaching, coastal development and over-fishing. The average annual value of the coral reef ecosystem amounts to US$ 722 million.

Of the 50 species of seagrass worldwide, four are present in Bermuda, the most common being the turtle grass (*Thalassia testudinum*), manatee grass (*Syringodium filiforme*) and shoal grass (*Halodule bermudensis*).

Bermuda hosts several inland marine ponds that are rare worldwide. These ponds support a very high biodiversity of marine and brackish-water organism. The ponds are very vulnerable to pollution run- off from the land and they have traditionally been used as trash dumps. Walsingham Pond is the best example of an inland marine pond in Bermuda.

Harrington Sound is an inland saltwater sound that has ecological characteristics that make it unique in the world. It supports several unique marine habitats and has a very high biodiversity of marine life.

Bermuda has two species of mangrove, the red mangrove (*Rhizophora mangle*) and the black mangrove (*Avicennia nitida*). Hungry Bay supports the largest mangrove swamp in Bermuda and is 2.9 ha (7.2 acres) in size. In recent years, the invasive Brazil or Mexican pepper (*Schinus terebinthifolius*) has been encroaching on the back of mangrove swamps and has become a serious menace. Development for the construction of wharves, harbours, jetties and other marine structures has also resulted in the destruction of mangroves.

Out of the 100 of the World's Worst Invasive Alien Species, 23 of these occur in Bermuda. It has been estimated that invasive alien species are responsible for 39% of all native species extinctions since 1600. Also, whilst 12% of all continental animals are threatened by alien invasions, this rate increases to 31% on islands like Bermuda. Typical alien animal species considered to be invasive to Bermuda include the feral chicken, house sparrow and red-eared slider terrapin. Common plants from the invasive alien species group include the Brazil pepper, Chinese fan palm and casuarina tree. Not every alien species creates problems and several non- invasive exotic species such as oleander, hibiscus, cardinals and whistling frogs provide colour and variety, whilst others like honey bees and onions have added economic benefits.

Bermuda is considering[5] creating a marine reserve in the outer waters[6] of Bermuda's EEZ. This is because of Bermuda's position in the unique Sargasso Sea ecosystem and an interest in increasing

5 http://www.sdbermuda.bm/marine-reserve/consultation-on-establishing-a-marine-reserve

6 Bermuda's Exclusive Economic Zone and its Future, Government of Bermuda, Sustainable Development Department, September 2013 http://www.sdbermuda.bm/Uploaded%20Files/130917%204644_SD%20Book%20Final%20_Web.pdf.pdf

protection for a portion of the Sea that is under the Island's jurisdiction. Most of the activities such as swimming, diving, snorkelling, boating, other tourist activities and even fishing, take place fairly close to shore. Most future economic activities in the marine environment, such as ocean energy generation or aquaculture, are also likely to occur in inshore areas. While regulatory measures are in place for activities in the outer waters of the Island's EEZ, establishing a "no-take" marine reserve in Bermuda's offshore waters would extend full protection to the area so designated. Depending on the size of the reserve, it could become one of the world's largest marine life sanctuaries. Bermuda would also be able to lead an international initiative to gain better protection for the international waters of the wider Sargasso Sea, beyond the waters of their own EEZ.

3 STATE OF THE ENVIRONMENT

3.1 OVERVIEW

Bermuda's small size, high population density and half million visitors per year inevitably cause stress on the environment. It is estimated that over 50% of Bermuda's land area is developed, while a further 17% comprises areas such as golf courses, residential and public gardens, lawns and playing fields. Today, most development occupies what used to be Upland Forests, Coastal Upland Forests and Upland Valley habitats in pre-settlement times. Just over one-third of original Upland Forests remain whilst only one-quarter of original Upland Coastal areas survive and practically no Upland Valleys remain. Only one-third of peat marshes survive from pre-settlement times.

Bermuda is home to a number of endemic species but there is an increase threat to terrestrial habitats and species through land development. Though Bermuda's coral reefs are generally considered to be relatively healthy, with apparently low levels of bleaching observed on an annualized basis, they are thought to be at 'high risk'. Efforts to enhance the scale of quantitative assessment using sophisticated remote sensing tools began with the 2012 revisions to the outsourced Marine Environment Programme.

The status of most of Bermuda's terrestrial habitats has remained fairly constant in recent years. This is mostly because much of the habitat was destroyed historically and the examples that are left are in protected areas (e.g. peat marshes). Many habitats, like mangroves, are now protected from future destruction, but the potential for restoration and creation of new habitat is also very limited. The conservation status of species which do not lend themselves to a recovery programme (such as the endemic cave fauna) has not improved.

Ex situ measures to protect threatened species and prevent biodiversity loss have increased in recent years. For example seed from a number of threatened plants was conserved for long-term storage at the UK Kew Millennium Seed Bank in 2007. Off-island breeding and husbandry programmes now exist for 6 threatened species.

Propagation efforts for a number of Bermuda's threatened plants have increased significantly in recent years. Stocks of nursery-raised plants are now available for habitat restoration projects and for sale to the public. Associated public awareness campaigns have led to an island-wide improvement in the status of some rare plants.

A biodiversity protection initiative within a climate change adaptation project has been undertaken in response to the threats of sea level rise, hurricane damage, flooding and coastal erosion. The first Cahow Translocation Project begun in 2004, was completed in 2008 with the establishment of a new breeding colony of this endangered seabird.

The adverse impact of invasive alien species on land is considered to be the single largest threat to the Island's native biodiversity. Invasive species management has improved, with programmes now in place

for red-eared slider terrapins, feral chickens, pigeons, crows and lionfish. Bermuda's marine environment has been largely unaffected by invasive alien species, the exception being lionfish. A lionfish taskforce secured a Darwin Award in 2012 through the work of a partnership between two Government departments (Environmental Protection and Conservation Services). Actual field research into trapping strategies began in 2013.

Without rivers or fresh water lakes, Bermuda depends on regular rain for fresh water. Fresh Water is a limited resource that needs to be carefully managed – there are episodes of water scarcity and droughts (as in May 2009) in which water demand is not satisfied[7]. All private dwelling units and apartment complexes must by law have their own water tanks to collect and store rainfall, mandated in size by local building and planning regulations. There are more than 21,000 water tanks. The quality of tank water depends largely on how well the property owner maintains the water system including the roof and tank. Rainwater that goes from the sky into a water tank is not purified like treated water. If the roof is dirty or pipes from the roof are rusted or corroded or leaking, this affects the water.

As rainwater at a volume of 1.4 million gallons overall yearly is nowhere near sufficient to satisfy the demand, Bermuda relies on supplementary sources/distribution. There are five licensed water producers. Three can be described as small private companies, which distribute water exclusively by truckers. On the other hand, the two largest producers - the Bermuda Government and Bermuda Waterworks - respectively supplied 22% and 3% of their water by truckers, in 2008, with the remainder being supplied by mains[8]. It is to notice that there are portions of the island not served by the water supply network. Some commercial and domestic properties have wells, to supplement the rainwater supply, but they can be used only for flushing and washing purposes. There are over 3,000 such wells licensed by the Health Department of the Bermuda Government. Routine periodic tests are made to ensure standards are maintained to protect public health.

The largest groundwater lens is in Devonshire Parish - where there are three reservoirs at Prospect supplying about 750 million gallons. Other lenses are in St. George's Parish, Southampton Parish and Sandys Parish. The capacity of the system is limited by the amount of water that can be taken out of the ground to sustain the lenses maximum daily extraction of ground water is limited to 2.2 million gallons per day. Extraction of ground water in Bermuda averages 1-2 million gallons per day and more during dry weather. The production of drinking (treated abstracted water) quality water is 1.1 million gallons a day. King Edward VII Memorial Hospital uses more than 25% of all Bermuda Government-produced water. A recent study[9] refers that Bermuda Government's ground water abstraction and treatment facilities involve high losses, high salinities and low output, this besides using ground water for peaking purposes as opposed to base load and eschewing full exploitation of available ground water resources. There are plans to commission a new desalinator with a 2,273 m^3/day capacity on the North Shore (Devonshire Parish), but the debate on the need for this instead of improving efficiency of groundwater abstraction/treatment has delayed the decision.

Wastewater is mainly disposed of via ocean outfalls, cesspits and septic tanks/boreholes. In 2008 a new 2,273 m^3/day membrane bioreactor tertiary WWTP was installed at Dockyard in the West End. In 2013 The West End Development Corporation continues to actively expand the existing sewer main to pick up more households and developments that were either previously discharging to cesspits, septic tanks or old secondary sewage treatment systems, and has completed the extension of sewer main approximately 2.5km to the south to the Boaz Island housing development[10]. The treated wastewater is also further treated using UV light and chlorine dioxide with dye indicator added and is recycled to many of the developments on the sewer main for toilet flush water.

7 Arguably this is due to poor management of water supply, cf. Rowe, M. P., 2010, BERMUDA'S WATER SUPPLY PART II Supply, Demand and Capacity. The Government of Bermuda, Ministry of the Environment

8 Water distribution network.

9 Rowe, M. P., 2010, BERMUDA'S WATER SUPPLY PART II Supply, Demand and Capacity. The Government of Bermuda, Ministry of the Environment

10 It was previously connected to a 227 m3/day WWTP that had reached the end of its serviceable life.

Seabright outfall off south shore has been one of the most used ways of releasing raw sewerage or screened water (*i.e.* preliminary treatment). But starting from May 2014, all of the raw sewage from the hospital (i.e. 454 m^3/day) will be treated to a tertiary standard in a below-grade wastewater treatment plant (WWTP). A study to address the cost and size of treatment plant to address the remaining 2273 m^3/day of screened wastewater that also passes to the Seabright outfall from Hamilton was completed in 2010, but the estimated cost of $70M will be re-evaluated in light of the current capital and civil costs required to complete the hospital tertiary grade WWTP – meanwhile screened wastewater from Hamilton continues to be discharged at Seabright outfall. Another wastewater outfall discharging 136 m^3/day of primary treated wastewater from the sewer main in St David's is in the process of being converted to a tertiary grade membrane bioreactor WWTP by the end of 2014 with connection to deep-sealed borehole. The remaining 250 m^3/day of untreated raw sewage are discharged by a marine outfall. Some hotels have their own WWTP or deep-sealed borehole.

Bermuda has established solutions for waste management that may constitute examples for the Caribbean OCTs. In 2012 about 1,600 tonnes of waste was recycled, 15,000 tonnes of horticultural waste was composted, 55,400 tonnes of waste was incinerated to generate electricity and 10,000 tonnes of waste was land-filled[11].

A Recycling Programme has built a Material Recycling Facility (MRF) in 2007 to separate the steel, aluminium and glass from the wastes received. In 2012/2013 fiscal year Bermuda exported: 23 tons aluminium, 69 ton steel, 37.5 ton E-Waste, 81 ton air conditioners and 366 ton batteries to the US. The Hazardous Waste facility also adds to this recycling programme collecting and exporting 20ft container amounts of used motor oil (11 containers/year), transformers (4 containers per year) and fluorescent tubes and bulbs (1 container per year).

Large scale Windrow Composting takes place at Marsh Folly, Pembroke, transformed from a waste dump that served all of Bermuda from 1949 until 1994. The current system of open air composting is problematic as it requires a great deal of space and has undesirable environmental impacts such as odour, dust, and poor aesthetics. There are plans for In-vessel composting as this method produces compost on a faster time scale and takes up less land area.

All construction debris and other bulky waste items such as cars and white goods[12] are disposed of at the inert marine landfill site close to the airport (the Airport Waste Management Facility). Vehicle batteries and air conditioners are moved to the MRF. The Environmental Authority has recently requested that RFP's be created by Public Works to encourage local enterprise to create a business to recycle metal goods (e.g. white goods and vehicle bodies) and to export the remainder out of Bermuda. The site also receives other types of waste[13] and a strategy (including recycling and export off island) is being devised to improve the situation.

All other waste is incinerated in the Tynes Bay Waste to Energy Facility which for 2012 equated to 55,458 ton of total waste. Continual monitoring of the stack emissions for opacity and gases is provided under its operating licence with annual isokinetic stack analysis to monitor for lower concentration pollutants such as dioxins and furans and polyaromatic hydrocarbons. Replacement of the existing steam turbine (3.8MW) with a larger 7.9MW system to utilise greater amounts of waste heat will be completed in 2014. It is expected[14] that this energy will be sufficient to run the installation, a nearby reverse osmosis water treatment plant, and export an annual energy production of 37 GWh, or 5.7% of the energy generated by BELCO in 2008. A mechanical breakdown of equipment used for cutting down and shredding larger items such as construction waste and wood pallets before they reach the Tynes Bay incinerator has resulted in a

11 2013 Environmental Statistics Compendium, Department of Statistics, Cabinet Office of the Government of Bermuda.

12 White goods are heavy consumer durables such as air conditioners, refrigerators, stoves, etc., which used to be painted only in white enamel finish. http://www.businessdictionary.com/definition/white-goods.html#ixzz31bfXDNPL

13 The Airport Facility can receive cars, bikes, scrap metal, white goods, rubble or stone, PVC plastic, clean soil, e-waste (TVs, computers, etc), tyres.

14 2011 Bermuda Energy White Paper: A National Energy Transition, Department of Energy of the Ministry of Environment, Planning and Infrastructure Strategy.

towering mountain of backlogged trash. One possibility is to ship back to the USA wood pallets back on returning container vessels.

Even with these systems in place, there is a need to find ways of restricting the 67,000 tons of waste generated each year on the Island. The government is working with the corporate and restaurant sectors to conduct waste audits. Data generated from these waste audits is being applied in businesses as a means to minimize waste – namely by associating wasteful consumption patterns with costs for the business and for the environment.

Since 2006 a total of 309 registered fuel storage tanks have been decommissioned and removed from either above-ground or under-ground locations to the requirements of Bermuda's RBCA guidelines. Removal of these tanks has been primarily driven by Esso Bermuda (partly by Rubis Ltd) looking to remove environmental liabilities from their register.

Remediation of the asbestos and lead contaminated buildings at Morgan's Point (the ex-US military base) has started under contracts placed by the office of project management and Procurement in Government in 2012 and is expected to complete in 2014. But it is yet to be decided what to do with the containers. Removal of considerable underground pipe work and 8 underground fuel storage tanks (each 5000 m^3) has been completed in 2013. Addressing the pollution associated with a jet fuel groundwater plume and the waste oils etc. previously dumped into Bassett's cave will also commence in 2014.

Besides the energy produced in Tynes Bay Incinerator Bermuda is 100% dependent on the importation of fuel for transport and electricity production requirements. However, there are opportunities for the development of renewable energy sources and research has started on this.

3.2 MAIN CHALLENGES

In 2005, the Environmental Vulnerability Index[15] indicated Bermuda as Extremely Vulnerable**,** even with significant information gaps as only 52% of topics were covered. The most pressing issues identified were high population density, average SO_2 emissions on a small and low land (< 50 m). On biodiversity number of known species that migrate outside the territorial area at any time during their life spans (including land and all aquatic species) / area of land; Number of endangered and vulnerable species per 1000 km^2 land area (IUCN definitions), Another aspect of concern is the increase of rainfall in the last 5 years as compared with 30 years average.

15 http://www.vulnerabilityindex.net/EVI_Country_Profiles.html

Currently the most significant issues are:

Challenge / problem	Severity	Short description
Anthropogenic pressures	Severe	The continuously increasing size of cruise ships forces channel widening and other major infrastructure investments. High population density and overdevelopment are in turn responsible for the following: - Very small amount of open space and arable lands remaining due to the constitutional right of the landowner to develop their land; - Heavy traffic causing air pollution and suspected toxins from road runoff; - Faecal and chemical contamination of groundwater and the inshore waters is occurring although its extent and intensity are unknown and unstudied; - Eutrophication of swamps and ponds from farm runoff, and lack of capacity to adequately control pesticide/chemical use; - Very limited penetration of renewable energy (there are no large scale alternative energy generators) and high per capita GHG emission due to fossil fuel consumption.
Biodiversity	Severe	The main pressures causing terrestrial biodiversity loss are development and invasive species. Invasive rats, birds and plants species are destroying native biodiversity. The potential for introduction of invasive species remains high due to permeability of ports of entry (manpower shortages) and informal smuggling activity. Land development for both housing and tourism, has resulted in significant loss of habitat (particularly woodland) and destruction of terrestrial species. In the marine the invasive lionfish population is expanding, particularly in deeper waters, with unknown impacts. The country also lacks preparedness and capacity in response to zoonotic disease outbreak.
Water and wastewater	Severe	There is a situation of water scarcity in Bermuda which in part is due to water loses, water treatment inefficiencies, and poor planning of water mobilization and distribution. Increasing the water availability through desalinator plants will not completely solve the problem. Although efforts are being done on wastewater treatment, the majority of piped wastewater continues to be discharged as raw sewerage or screened water into the sea, affecting the marine environment. Wastewater from a large proportion of the households and commercial buildings still ends up in cesspits and septic tanks/boreholes causing pollution on soil and groundwater.
Waste	Moderate	Much progress has been achieved on waste management, and currently the main concerns are the airport marine infill and historic waste. It is known that pollutants emanating from the marine infill site near the airport end up in the marine environment. Wastes that are currently disposed and can be valued include metal scrap, tyres, and electronic waste. On removing the asbestos from the old military base, the current need is for a decision regarding the final disposal of the 70 x 20ft containers of waste Asbestos; options being studied are burying at an existing quarry or at a new marine infill.
Climate change	Moderate	Significant threats including rising sea level, the intensification of hurricanes and coastal erosion will eventually force major infrastructure investment as part of an adaptation strategy. Bermuda's airport and causeway are two examples of highly vulnerable infrastructure whose status has been diminished by the effects of climate change[16]. Besides, Bermuda presents high per capita GHG emission albeit some research and development work is ongoing for mitigation measures.

16 Glasspool, A. F., 2008. The Impact of Climate Change on Bermuda. Report Prepared for the Bermuda National Trust. pp. 190

4 ENVIRONMENTAL GOVERNANCE

4.1 CONSTITUTION

Bermuda is a largely self-governing territory with a high degree of control over its own affairs. Bermuda's Parliament first met in 1620 as a Britain's territory and its Parliament, which first met in 1620, is the oldest legislature in the Commonwealth outside the British Isles.

The Government of Bermuda consists of a Governor, a Deputy Governor, a Cabinet, and a Legislature based on two legislative chambers – a Senate and a House of Assembly. The Governor retains responsibility for external affairs, defence, including the armed forces, internal security and the police. The House of Assembly is comprised of 36 elected members and sits for a term of five years, unless dissolved earlier. Each of the 36 constituencies of Bermuda is represented by one member in the House. A Boundaries Commission is appointed every seven years to examine and, if necessary, to revise the boundaries of the constituencies. The Senate is comprised of 11 members appointed by the Governor. Five members of Senate are appointed on the recommendation of the Premier, three members are appointed on the recommendation of the Leader of the Opposition, and the three remaining Senators are appointed as Independents. The full Senate elects a President and a Vice-President from among the Independent Senators.

The party who wins the most seats at a general election, or who has the support of a majority of members in the House of Assembly, forms the Government. The leader of the majority party is asked by the Governor to form a Government (i.e. a Cabinet). The largest minority party becomes the official opposition with its own leader and "Shadow Cabinet". The Cabinet is responsible to the Legislature. The last General Election was held in December 2012.

4.2 REVIEW OF CURRENT INSTITUTIONS

The Ministry of Health and the Environment comprises several departments and agencies, namely Department of Environmental Protection, and Environmental Health unit within Department of Health.

The Ministry of Public Works is responsible for the management of all public lands, public water supply and public sewage schemes. Within the Ministry of Health and Environment, Environmental Protection is responsible for management of groundwater resources, environmental impact assessment, elaboration and enforcement of environmental law and standards, marine resources and fisheries, vet services, species imports, and air and water monitoring. The Marine Resources Section of the Environmental Protection Department includes the fisheries management (3 staff) and promotion of aquaculture, and Fisheries Enforcement Section (5 fisheries wardens). It works with other Government Departments towards Marine Spatial Planning. Currently understaffed and under budgeted, has limited ability to gather additional scientific data on which to base more adaptive fisheries management.

Environmental Health & Safety and Health Service (34 staff) assures the provision of safe potable water supplies and safe bathing areas, monitors indoor and outdoor air pollution; approves plumbing, sewage, water supply and environmentally safe conditions in all premises through controls of planning and building development; is responsible for vector control and environmental hygiene; Ensures standards and promotes improvement in public, private and workplace venues through control in areas such as hazardous materials, noise, nuisance, building fitness and operations safety; manages the central Government Laboratory Services which performs analysis of water, food and dairy products for bacteriological and chemical quality, among others.

The Department of Conservation Services (50 staff) performs ecology assessments and marine heritage assessment of proposed development; undertakes monitoring & research on biodiversity, habitat, recovery of protected species, invasive species, Historic wrecks & Ocean Health; GIS mapping of marine

and terrestrial habitats, protected species and invasive species. This besides environmental education and promotion of ecotourism.

Regarding the departments of Ministry of Public Works, The Department of Parks is responsible for enhance and maintain an island-wide system of National Parks including the Railway Trail.

The Water & Wastewater Section role is to provide a potable water supply to around 850 metered outlets and a septage receiving facility for waste sludge. The current[17] Government water supply system produces nearly 1 million m^3 each year by abstracting from fresh and brackish ground waters. The section operates and maintains four water treatment plants at various locations across Bermuda, abstracting from three lenses for distribution. The section also maintains a septage receiving facility for waste sludge at Tynes Bay.

Water distribution is also undertaken by private utility companies, such as the above referred Bermuda Waterworks. There is no body explicitly charged with responsibility for coordinating national water supply in Bermuda, and this has resulted in decisions being made in isolation, unsupported by comprehensive consultation and investigation.[18]

The Waste Management Section is responsible for the safe disposal of all household and commercial waste and recycling in Bermuda. Waste Management collects garbage and recyclables from residents (excluding the cities of Hamilton and St. George's) and take it to the Tynes Bay waste to energy facility, to the material recovery facility (MRF) for processing and either shipping abroad or use on island, and to the Marsh Folly Composting Facility. The Waste Management Section is also responsible for the operation of the airport landfill, and of the Marsh Folly composting facility. The Section also has responsibility for the processing of special waste, both household and commercially generated waste, which is shipped off the island for reprocessing and/or disposal. The Section is also responsible for the public awareness of waste management issues and enforcement of the newly revised Waste and Litter Control Amendment Act 2011.

The Departments of Planning is responsible for the formulation of the Development Plans and for development control and enforcement also of building codes.

The Sustainable Development Department[19] (SDD) is located in the Cabinet Office within the Bermuda Government. Its mandate is to promote and facilitate public and private sector policy making that is compatible with the Bermuda Government's Sustainable Development Strategy and Implementation Plan (SD Plan). In consultation with the Sustainable Development Roundtable, the SDD also generates awareness, understanding and encourage compliance with the social, economic and environmental themes and actions contained in the SD Plan. The Sustainable Development Roundtable (SDRT) is a body appointed by the Premier. The SDRT was formed to ensure broad community representation and engagement. Its main role is to act as an advisory body to the Government of Bermuda and, through the Sustainable Development Department (SDD), to make constructive recommendations to the Premier as well as Cabinet on specific policies and actions to enable sustainable development for Bermuda and her people. The SDRT recommendations are based on the Bermuda's Sustainable Development Strategy and Implementation Plan (SD Plan).

The Bermuda Government established the Department of Energy under the Ministry of Education & Economic Development to take the lead in meeting both the challenges of Bermuda's own need for energy and its responsibility to set an example for the rest of the world. The Department of Energy's strategic Goals are to: Ensure a secure energy supply in terms of both quantity and cost; reduce fossil fuel dependency; and encourage greenhouse gas emissions reductions related to energy. An Energy Commission was established in accordance with Energy Act 2009, and meets regularly. BELCO is the sole

17 http://www.gov.bm/portal/server.pt?open=512&objID=930&&PageID=233088&mode=2&in_hi_userid=2&cached=true - accessed in May 2014

18 Rowe, M. P., 2010, BERMUDA'S WATER SUPPLY PART II Supply, Demand and Capacity. The Government of Bermuda, Ministry of the Environment.

19 http://www.sdbermuda.bm

supplier of electricity in Bermuda. Although it generates environmental pressures such in the form of air exhaust emissions, heat, noise and groundwater pollutants, BELCO is the first organisation in Bermuda to achieve a achieved the Environmental Management System ISO14001 in 2010. Since 2010 it has been audited twice per year (internally and externally). Over the past few years demand at BELCO has decreased which is associated with a reduction in the populace and some businesses.

4.3 POLICY, STRATEGY, PLANS, PROGRAMMES

The table below summarises the main policy instruments adopted to date:

Policies	**Comments / detail**
Sustainable Development Plan (2008)	Addresses issues such as Increasing overdevelopment and associated loss of open space; Is Bermuda rural, urban, or both, and how do we preserve our heritage and unique character without comprising our ability to adapt to residents' needs?; Is enforcement of Environmental and Planning legislation effective?; How do we protect the marine and terrestrial environment and our natural resources?; Do we have the environmental data we need? ; What do we do with Morgan's point[20]?
Biodiversity strategy and action plan (BSAP, 2003)	The planned revision of the BSAP will remove items relating to waste, economics, energy, consumer behaviour etc., which are now addressed in the Sustainable Development Plan. Besides there are Strategy for the Sustainable Use of Living Marine Resources, Protected Species Recovery Plans, Nature Reserve Management Plans, Invasive Species Control Plans There are also Invasive species management plans, for feral chicken, feral pigeons and red-eared slider terrapins.
Strategy for the Sustainable Use of Living Marine Resources 2010 (developed from the 2005 White Paper on The Marine Environment and the Fishing Industry in Bermuda)	The goal of this Strategy is to provide a blueprint for managing Bermuda's marine resources over the next 15 years so as to encourage a sustainable and economically viable fishing industry, promote healthy marine ecosystems, and ensure that the interests of all those who have a stake in the marine environment are represented. The strategy themes are: Management of Fish Stocks, Management of the Commercial Fishery, Management of the Non-commercial Sectors, Spatial Management, Investigating New Harvest Opportunities including investigating a new fishery for the invasive Pacific lionfish, Increasing Local Seafood Production Through Aquaculture, Post-harvest Handling of Seafood Products, Legislation and Policy, Enforcement, and Outreach
Energy White Paper.(2011)	Sets the policy and a 9 year plan through which Government will reduce fossil fuel dependency, establish greater energy security and reduce greenhouse-gas emissions below 10 metric tonnes CO_2 equivalent per capita by 2020. The targets are: to reduce electricity consumption 20% below 2008 levels by 2020 through energy conservation, energy efficiency and non-electrical renewable energy technologies; obtaining 30% of total electrical energy requirements from renewable energy resources by 2020; to reduce greenhouse gas emissions from local transportation 30% below 2008 levels by 2020. The white paper establishes that the whole community has a role to play in realising the goals outlined in the white paper**.**
Agriculture strategy 2014	Acknowledges that expanded agricultural production would be more likely achieved if there are new entrants to the sector who are willing to embrace capital intensive technologies that would allow crops production on hardscapes or marginal lands. With the overwhelming majority of undeveloped land zoned arable being privately owned, the potential for an expanded agriculture sector is lessened. Land use is a highly complex and controversial area of policy making which elected governments approach with apprehension, as any significant policy change is considered likely to release great public resistance.

A National Invasive Species Strategy is being prepared by the Department of Conservation Services and is expected in March 2015.

Marine Spatial Planning (MSP) work has begun. A Cabinet 'for information' paper was submitted in 2013 to advise government of a collaborative effort to advance MSP that involved the University of California, Santa Barbara. This would contribute to optimization of use for the inshore and offshore waters around

20 A former US Navy base, returned to Bermuda but leaving Bassett's Cave with an estimated 520,000 gallons of oil and several tons of raw sewage, besides further 55,000 gallons of jet fuel pumped underground 60 m away.

Bermuda. Advancing the groundwork for mariculture and MSP could be accelerated with additional technical /financial resources.

4.4 LEGAL FRAMEWORK AND ENFORCEMENT

In relation to environmental protection, management and biodiversity conservation, the UK Government has signed or acceded to the following Multilateral Environmental agreements which were subsequently extended to Bermuda:

MEA	Remarks
Protection of the World Cultural and Natural Heritage Convention	Bermuda included in UK ratification – May 1984
RAMSAR	Bermuda included in UK ratification - 1976
CITES	Bermuda included in UK ratification – 1976. Enacted 1976, with updated legislation 2006.
Migratory Species	Bermuda included in UK ratification – 1985 CMS Sharks MOU singed by the UK and extended to Bermuda
Cartagena/Nagoya	Not extended to Bermuda
Climate Change	Kyoto extended 7th March 2007. UKs 1993 ratification of UNFCCC was extended to Bermuda
Ozone	Montreal Protocol 1976 extended
POP and PIC	There is not any specific legislation in Bermuda on Persistent Organic Chemicals. POP's of concern can be targeted though the Clean Air Regulations 1993 which lists Controlled Chemicals that require import and export permits and through its enabling structure can be applied to all pollutants of concern. Also many of the pesticides, herbicides and algicides listed on the Stockholm convention dirty dozen are prohibited from import under the yet to be enacted Pesticide Act.
MARPOL	MARPOL 73/76 Annexes I – VI; Merchant Shipping (Prevention of Air Pollution from Ships) Regulations 2005; Merchant Shipping (Prevention of Oil Pollution) Regulations 2010; Merchant Shipping (Prevention of Pollution - substances other than oil)(Intervention) Order 2004; Merchant Shipping (Prevention of Pollution by Garbage) Regulations 2005; Merchant Shipping (Prevention of Air Pollution)(Limits) Regulations 2004
Conventions on Tuna	Bermuda has participated in ICCAT under the UKOT banner since 1995. No financial support is provided by either the UK or ICCAT. If the UKOTs are unable to send a delegation, a member of the UK delegation will usually speak to the interests of the OTs, but this is often overshadowed by the need for the UK to maintain a united front with the European delegation ICCAT
Others relevant	Hamilton Declaration Marine & Ports Authority (dumping) Regulations 1967

Although the Convention of Biological Diversity has not been extended to Bermuda, the government has worked over the last 10 years to bring about legislative changes necessary to fully comply with the CBD. Bermuda contributed to the UK's 4th National Report to the CBD secretariat in 2009.

The main relevant local legislation[21] for environmental protection and management in Bermuda is identified in the table below:

Legislation	Comments / detail
Development and Planning Act 1974 and the associated regulations	Form the development control framework and mandate the implementation of development plans and local plans (Bermuda Plan 2008; City of Hamilton Plan 2001).
Protected Species Act 2003 (Protected Species Order 2012), Endangered Animals and Plants Act 2006, Protection of Birds Act 1975, Bermuda National Parks Act 1986	The legislative framework for species protection is robust. The site protection framework has strong elements e.g. The Bermuda National Parks Act 1986 allows for the establishment, designation and maintenance of national parks as well as regulation of activities within the parks. A main gap is legislation on invasive species.

21 A complete list of these can be found in Copeland, A., (2011). Bermuda (pp18-35) in UK Overseas Territories and Crown Dependencies: 2011 Biodiversity Snapshot, T.Pelembe and G. Cooper (eds). May 2011, UK Joint Nature conservation Committee.

Fisheries Act, 1972 and Fisheries Regulations, 2010	Provide for fisheries management, protection of certain species, and the designation of marine protected areas. Addresses IUU fishing and provides for a fine of $150,000. However, capacity for enforcement is limited to radar observations
Clean Air Act, 1991, Clean Air Regulations, 1993, Clean Air Rules, 1993	Associated are Clean Air Regulations 1993, Clean Air Rules 1993 Aerated Wastewater Treatment plants are also regulated through Operating Licences under this act. Controlled Chemicals listed in the Clean Air Regulations 1993 and the (soon to be applied) licencing of refrigerant handlers requirement of Clean Air Rules 1993 allow to implement the Montreal Protocol 1976. The list of Controlled Chemicals that require import and export permits and through its enabling structure can be applied to all pollutants of concern including POP.
Water Resources Act 1975	Sets rules for water rights for abstraction wells and disposal boreholes. Pump out requirements of septic tanks connected to disposal boreholes is regulated through the conditions to the Water Rights. There are also Plumbing & drainage regulations and Water Storage Regulations
Waste and Litter Control Act, 1987	Bermuda's Risk Based Corrective Action (RBCA) Guidelines provides procedures, reporting and clean-up standards for pollution spills to land (Industrial, residential and close to water table) and water (groundwater, surface water and seawater).
Occupational Safety and Health Regulations, 2009	It contains requirements on noise, exposure to hazardous substances and implements some SEVESO requirements, but it is limited to the working environment.

Overall legislation seems outdated. EIA requirements are weak e.g. Special Development Orders have no EIA requirement and SEA regulations are lacking. The Bermuda Ombudsman recently set out recommendations for strengthening EIA procedures especially in relation to SDOs to increase public involvement/accountability.

Many of the pesticides, herbicides and algicides listed on the Stockholm convention dirty dozen are prohibited from import under the yet to be enacted Pesticide Act.

Several activities require permits: Wastewater discharge requires Water Right under the Water Resources Act 1975 from the Environmental Authority: water use from groundwater requires Water Right under the Water Resources Act 1975 from the Environmental Authority. The Clean Air Act 1991 also requires some permits: a Construction Permit is necessary to set up of a Controlled Plant; Operation of a Controlled Plant requires an Operating Licence from the Environmental Authority under the Act; Import or export of a Controlled Chemical requires an Import/Export Permit from the Environmental Authority.

There are a few cases of environmental crimes taken to court. The judicial system appears to be becoming more sensitive to the environment in recent years, with some important convictions on key points and realistic fines levied. However, according to the Department of environmental protection (DEP) enforcement systems need improving.

4.5 MONITORING

Bermuda Institute of Ocean Sciences (BIOS) is contracted by the DEP and the DoH's to monitor - including equipment selection, measurement and data analysis and reporting - ambient air (Air Quality Programme - AQP), and the marine environment and benthic ecology (Marine Environmental Programme-MEP).

DoH monitors the microbial status of marine waters at the shoreline. It also monitors drinking water.

DCS undertakes monitoring programmes for protected species most notably the Bermuda petrel, longtail, seagrass monitoring as part of its benthic habitat assessment, mapping and monitoring program.

The Bermuda Zoological Society (BZS) working under contract with DEP and others operate a surface water and pond sediments toxicology research programme.

At Tynes Bay installation continual monitoring of the stack emissions for opacity and gases is provided under its operating licence with annual isokinetic stack analysis to monitor for lower concentration pollutants such as dioxins and furans and polyaromatic hydrocarbons.

4.6 Environmental awareness

One of the key issues highlighted in the State of the Environment report[22] is the need to raise the public's awareness of the issues and threats posed by certain human activities on the environment and to present opportunities and ways for people to modify their behaviour and lifestyle. This was restarted in 2014 by the DEP: "The public's lack of understanding of the significance and implications of threats – exacerbated by the lack of good, quantitative data in many instances – can account for some of the observed apathy and lack of commitment at a grass roots level."

Non-Government Organisations (NGOs) play an important role in raising awareness, as does the Bermuda Government's Department of Conservation Services. A number of publications have been written for the wider public highlighting the threat posed by invasive species, whilst local expositions such as the Annual Exhibition and the Eden Project and the biennial Environmental Youth Conference, have been used as platforms for further raising awareness.

Fliers on the species listed on the Protected Species Act (with the exception of cave fauna) were created in 2012, targeted at high-school aged children and adults. A selection of these are online. Fliers on a number of invasive species have been drafted and several are online, with emphasis on those frequently confused with indigenous species. The new Bermuda Plantfinder website that has been launched will ultimately provide information on all plants in Bermuda. Charities, e.g. Greenrock partnering with government on green schools, KBB – similar initiatives and partnerships with Public Works (Waste Mgt).

Information instruments include: Brochures - issued by mail to existing licence holders; Website; Advertisements in the local newspaper; Formal advertisements in the Gazette as part of the Construction Permit process under the Clean Air Act 1991.

Bermuda BlueHalo is an initiative supported by government lead Sargasso Sea Alliance, as well as by institutes, foundations and NGOs which aims at creating the reserve in the outer ring of Bermuda's EEZ.

There are about 21 NGOs and Charities working on environment in Bermuda. Examples Bermuda National Trust, Bermuda Audubon society, Greenrock, KBB, BEST. Many have education activities and environmental stewardship roles. Some NGOs (e.g. BNT, BEST) function as environmental watchdogs, challenging real or perceived environmental abuse by the private sector. Most international NGOs deal directly with local NGOs as a line of communication, but no large projects are ongoing.

4.7 Funding for the environment

The Government operates a consolidated fund to which all Government revenue (including permits and fines) contributes and from which all Government business is funded. The Minister of Finance, and the line ministers dealing with environmental related issues (namely Health and the Environment and Public Works) decide the amounts allocated to environment.

Government Departments cannot earmark funds for particular projects, as any generated amounts go into the consolidated fund. This means that funds generated through environmental user fees (e.g. fishing licences, water rights, clean air permits) do not go towards managing the resources that are being used. This is a barrier to mobilizing funds for the environment via user fees or taxes like those commonly employed in many jurisdictions. This prevents application for external funding and grants unless there is a partner to receive the funds.

22 http://www.conservation.bm/publications/projects-reports/state%20of%20the%20environment%202005.pdf

Bermuda was able to establish a number of successful public/private partnerships to fund environmental work, such as the ongoing relationship between HSBC and the Department of Conservation Services to restore Cooper's Island.

A number of local environmental NGOs have raised significant funds from the local community and corporate donors for environmental work. Some NGOs receive government funding.

5 INTERNATIONAL COOPERATION

Bermuda is part of ICCAT and is leading efforts to promote better management of fisheries in the Sargasso Sea. Bermuda is also leading the process of establishing the Sargasso Sea Commission, with the Azores, Monaco, USA, and the UK.

Upon the request of Bermuda, the territory has not been part of the Overseas Association Decision implementing Part IV of the EC Treaty. Therefore it was not eligible to receive funding from EU. Bermuda was however entitled to participate in the Partnership Meetings involving British OCT's. Bermuda has opted to be included in the 2013 Overseas Association Decision, and therefore became eligible for regional initiatives as other high GDP per capita OCTs.

Bermuda has successfully received grant funding on a number of previous occasions from overseas sources for biodiversity projects. Some examples are:

Name	Budget	Funding Source	Type of funding
Lionfish control Initiative	$269,000	UK Darwin + Bermuda Government	Grant supplemented by local Government funds
Agriculture Strategy		UK-based grants	
Protected Species Recovery Plans		UK-based grant	

It is the opinion of Bermudian environmental officers that when competing for funds such as the UK funds earmarked for the UKOTs (Darwin Plus fund), Bermuda starts with the disadvantage in relation to other countries due to its high GDP per capita and development level.

Bermuda has also partnered with overseas academic institutions to leverage their capacity and funding to address research needs and make progress on environmental issues such as marine spatial planning.

6 CONCLUSIONS AND RECOMMENDATIONS

Bermuda consists of a group of over 150 islands and islets. It lies isolated in the western Atlantic Ocean 965 km off the eastern coast of USA. The six main islands comprising Great Bermuda are connected by causeways and bridges to form a continuous area of 53.6 km^2. Influenced by the Gulf Stream, the climate is sub-tropical, mild throughout the year with yearly average precipitation of 1400 mm. Water resources are limited and there is high dependence on rain catchments. Bermuda has one of the highest population densities[23] in the world. It is estimated that over 50% of Bermuda's land area is developed, while a further 17% comprises areas such as golf courses, residential and public gardens, lawns and playing fields. Remaining undeveloped arable land is mostly private, limiting expansion of agriculture. Bermuda has also one of the highest GDP per capita of the World, mainly due to offshore finance. But living costs are very high, and 11% of households are under national poverty level. At least 4,597 marine and 3,702 terrestrial species have been recorded in Bermuda, of which about 3% are endemic. About 6% of the endemic species are critically endangered, 3% are possibly extinct and 10% is rare; two-thirds of endemic species inhabit caves and their status is unknown. Main environmental challenges are limited land, anthropogenic pressures and invasive species. Bermuda has been able to develop a sound waste management system but water and wastewater are still problematic. Vulnerable to climate change, particularly sea level rise and stronger and more frequent hurricanes, Bermuda has a high GHG (and pollutants) emission per capita, as is still to increase independence from fossil fuels.

Bermuda has established solutions for waste management that may constitute examples for the Caribbean OCTs. In 2012 about 1,600 tonnes of waste was recycled, 15,000 tonnes of horticultural waste was composted, 55,400 tonnes of waste was incinerated to generate electricity and 10,000 tonnes of waste was land-filled[24].

Bermuda is also setting through its leadership in a multi-national partnership, the Sargasso Sea Alliance, aiming to bring greater protection to the vast Sargasso Sea ecosystem. The Hamilton Declaration, signed in Bermuda in March 2014, assures continued public-private partnering and commits to establishing a Sargasso Sea Commission and Secretariat in Bermuda. This is accompanied by significant national conservation measures. One is the extension of the annual period of closure to fishing of Black Grouper, based on the results of research into the spawning behaviour and residency time of mature fish during the spawning season. Another is the ongoing debate on the establishment of a "no-take" marine reserve in Bermuda's outer EEZ which, depending on the size of the reserve, could become one of the world's largest marine life sanctuaries.

23 http://en.wikipedia.org/wiki/List_of_sovereign_states_and_dependent_territories_by_population_density
24 2013 Environmental Statistics Compendium, Department of Statistics, Cabinet Office of the Government of Bermuda.

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Water, waste and wastewater management	Improve the water, waste and wastewater management and infrastructure	There is a water shortage issue. There are inefficiencies on groundwater mobilization, as well as on treatment and distribution and there are a significant level of water loses. Two major sewer mains provide preliminary screened or raw sewage to outfalls, and there exists significant evidence that the effluent is washing back onto the beaches and shoreline. Improvement of the situation requires improved management and significant investment.	7 years	Bermuda government, private sector			EU and UK for technical assistance; Banks and private sector for investment
	Activities						
	Assess the needs and possibilities for increased water mobilization. Develop water safety plans, catchment management plans, water resource management plans – considering the different uses. Work on cost recovery, and promotion of sustainable use, having in mind access to water of vulnerable people. Organise a structured business dialog with the stakeholders and decision makers in order to fix realistic plans (ready to be implemented) on water distribution and wastewater treatment, on different waste streams in order to achieve valorisation of waste, and to manage more efficiently some sorts of hazardous waste. Develop a national groundwater quantity and quality monitoring network. Improve efforts to address the issue of leakage of water in the public system. Collect experiences from different small island countries on solutions to increase wastewater management when majority of households use septic tanks and cesspits/boreholes. Increase the capacity of wastewater treatment. As significant funding to improve inadequate wastewater treatment is required, make all the necessary studies and design road map for improvement.						

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Promote Blue Growth[1]	Develop policies for benefiting from the potentialities of the ocean and preserve its habitats.	Bermuda is starting Marine Spatial Planning. Cruise tourism and the increasing size of vessels preferred by the cruise industry is one of the most significant stressors on the marine environment, and alternatives are necessary. Fisheries are conservatively managed and impacts are controlled, but more active and adaptive management requires additional resources. Bermuda is a key player in the Sargasso Sea protection and wishes to further increase its importance	7 years	Bermuda government		Political will, availability of funds, availability of staff	EU, UK, Regional Development Banks Private sector
	Activities						
	Support the ongoing Marine Spatial Planning (MSP) work as a contribution to optimize the use of inshore and offshore waters around Bermuda. If it succeeds Bermuda could cooperate with other OCTs on knowledge transfer of the methodology. Research possible income generating activities linked to the ocean, and balance with environmental and climate change concerns: port and logistics services, tourism, energy, fisheries, etc. Develop a marine strategy taking also into account climate change issues. Decide on the outer rim marine protected area and, if positive, prepare all required management tools. In particular assess the potential for energy generation at sea which, if viable, would avoid increasing competition for space inland. Perform a mariculture feasibility assessment to enable government to provide valuable data to prospective investors, including the identification of the sites best suited to sustainable mariculture, integrating business and environmental objectives. Develop a sustainable fisheries and aquaculture/mariculture policy and strategy. Develop a sustainable fisheries regime. Establish a central processing and support facility for local fishers to reduce waste and stabilize prices for migratory pelagic species, contributing to food security, and to facilitate improved data collection and help enforce catch limits and restrictions on certain species. Increase the number of fisheries science officers and wardens to monitor marine environment, enforce legislation, and strengthen adaptative management. Develop a commercial fishery of lionfish as a means of long term control, if feasible.					

1 Accoding to EU's DG Mare Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. It recognises that seas and oceans are drivers for the European economy with great potential for innovation and growth. It is the Integrated Maritime Policy's contribution to achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth (http://ec.europa.eu/maritimeaffairs/policy/blue_growth/)

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Increase invasive species control	Improve biodiversity protection through increased invasive species control and protection of other species	The adverse impact of invasive alien species on land is considered to be the single largest threat to the Island's native biodiversity. Bermuda's marine environment has been largely unaffected by invasive alien species, the exception being lionfish. Invasive species management has improved, with programmes now in place for red-eared slider terrapins, feral chickens, pigeons, crows and lionfish. However, the problem persists due to pressures from development and the limited potential for restoration and creation of new habitat (linked to lack of space).	Long term, but with initial effort 2 years	Bermuda government, NGOs and other civil society organizations		Availability of funding. Capacity to mobilize efforts of different sectors of society	Bermuda Government, Mobilize sponsorships from private sector, international NGOs/Charities
	Activities						
	Develop a national invasive management strategy (Throne Speech initiative 2013) Increase protection of remaining woodland. Set a programme of recovery of 'un-charismatic' endemic species Research into the decline of bees is needed to determine the definitive cause and to respond to the etiology. Increase public participation in invasive plant control. Develop information, education and communication tools to reach persons at all socio-economic strata, including the relationship between environmental damage and human prosperity, and how this aligns with government policy. Develop a training programme for public sector and civil society organizations on societal issues (e.g. role played by economic status and hardship in shaping perceptions about civic responsibility, on need versus responsibility, etc.) to give them adequate accounting in the planning of strategic invasive species control initiatives. Strengthen invasive species legislation and enforcement of the planning act and protected species act.						

ANNEX B :

GREENLAND

ENVIRONMENTAL PROFILE

GREENLAND

SUMMARY

Greenland is a self-governing territory of Denmark, the world's largest island with an Arctic climate, hosting a population of approximately 56,000. Most of the island is covered by the world's second largest ice-sheet (after Antarctica). The island is mainly (88%)[1] inhabited by greenlanders, and the predominant economic activities are fishing and hunting. Climate change is already making itself felt, with impact on people's livelihoods and ways-of-life. Warming of sea and land is making ice-sheet to shrink, seasons are changing and in consequence ecosystems change. South Arctic species are moving north, but northern Arctic biodiversity is prone to become restricted to a few areas. Iconic species as polar bear are suffering from these changes. The melting of the permafrost in some areas may cause problems for the existing infrastructure. Agriculture production is increasing. Transporting routes are expanding. Mining and oil resources are becoming more easily available and exploration cost reduction is boosting commercial interest of foreign private sector. Applicants for exploitation licenses and some exploration licenses are required to conduct full-scale environmental impact assessments and social impact assessments before licenses can be obtained[2]. Another environmental challenge, outside Greenland's direct control, is the widespread presence of transboundary distributed contaminants, in particular heavy metals and persistent organic pollutants in the Arctic environment generally, and in Greenland in particular. Waste management is currently considered to be the major environmental problem in the inhabited part of Greenland; this despite the fact that several solutions being tested, including local incinerators and transport of waste to central incinerators after baling. Short lived climate pollutants (black carbon, tropospheric ozone, methane, and hydrofluorocarbons) represent a relevant challenge to the environment, climate change, and health. Wastewater is also considered a problem, namely collection and management of bags from bucket toilets, and discharge of wastewater to the ground or to open sewer.

1 BACKGROUND INFORMATION

Name of territory	Greenland
Region	North Atlantic
Land area	2,166,000 km^2 (410, 000 km^2 ice-free, 1,756,000 km^2 ice-covered)
Exclusive economic zone	2,353,703 km^2; ice free area 410449 km^2
Population*	56.370 (2013)
GDP/capita*	€27500 / capita (2012)
Literacy rate*	95.78%
Unemployment rate*	9.8% (2012)[3]
% below poverty line	9% of children[4]

* Source: Statistics Greenland http://www.stat.gl

Greenland (Kalaallit Nunaat, Grønland) is the largest island in the world, with 2.166.086 km^2 (4 times the size of France), and is related geologically to North America. Two-thirds of the island lies within the Arctic Circle. It is surrounded by the Arctic Ocean in the north; the Greenland Sea in the east; the Denmark Strait in the southeast; the Atlantic Ocean in the south; and Davis Strait and Baffin Bay in the west.

Most (80%) of the island is covered by the Greenlandic ice sheet: a collection of ice caps and glaciers covering respectively mountains and valleys. In its north-eastern part the Greenlandic ice sheet can be 3 km thick. The thickness decreases towards the ocean, and on the fringes near the west coast it is only a few hundred meters thick. The weight of the ice sheet has depressed the central land area to form a

1 Greenland in Figures 2014, Statistics Greenland
2 Colclough, C. and O. Perera, 2013, Sustainable Development in Greenland: Perspectives from a preliminary stakeholder consultation, International Institute for Sustainable Development
3 Source: Greenland in Figures 2014
4 Children's standard of living in Greenland, Documentation Centre on Children and Youth, Nuuk, 2008

basin, parts of which lie more than 300 m below sea level. Two drilling operations on the highest part of the ice sheet in 1992 and 1993 both reached bottom, with the deepest core measuring 3,053 m from surface to bottom. Studies of the composition of the ice cores have permitted new insights into the climatic history of the last 200,000–300,000 years. The ice moves outward from the centre, entering the sea in walls or debouching in glaciers, of which Humboldt Glacier is the largest and Jakobshavn Glacier the most calf-ice productive. These glaciers calve large icebergs, notably into the Davis Strait, through which they frequently reach Atlantic shipping lanes. The thickness of the ice sheet is slightly increasing, but the surface area as a whole is decreasing as the ice is melting at the fringes, with chunks of ice breaking off the sheet.

More than 50% of the ice-free area of Greenland consists of Precambrian rock, mostly granites and gneisses. Mountain chains run along Greenland's east and west coasts, Mt Gunnbjørn (3700 m) in SE Greenland being the highest peak. The entire coastline of Greenland is deeply indented by fjords. There are many offshore islands, of which Disko, on the west coast, is the largest. The extreme northern peninsula (Peary Land) has no ice sheet but does have local ice caps.

Much of the soil in Greenland is characterised by permafrost, the layer of earth, which is perpetually frozen. Only the surface thaws during the summer. This phenomenon, found in all of northern Greenland and in parts of South Greenland, can make construction difficult, but the integrity of some infrastructure also depends on the permafrost.

Greenland´s ecosystem is influenced by the Arctic climate: low temperatures, low humidity, long dark winters, light summers and permafrost. Large parts of the sea around Greenland freeze over for greater or shorter parts of the year. Normally it is only the western coast, between Sisimiut and Paamiut that remains free of ice all year round. Greenland is located in an area where warm and cold ocean currents meet each other and conditions are created for rich fishing grounds.

Nearly all Greenlanders live on the southwestern coast of the island. The Greenlanders constitute approximately 88 % of the population while the remaining are primarily Danes.

Fishing is the primary industry of the country. Greenland has the legislative and administrative power with regard to the fisheries sector. Fishing for prawns and Greenland halibut is regulated by quotas and by license regulations decided on by the government. These decisions are based on biological advice to ensure a sustainable use of the natural resources of the country. In 2011[5] about 55.2 thousand tons of shrimp and 1.8 thousand tons of crab were caught (in previous years catch of crab has been around 3thT). Besides, 47 thousand tons of fish, of which 23.4 thousand tons of Greenland halibut, 10200 T of Atlantic cod and 10500 of Lumpfish, were caught. More than 3700 whales were hunted in 2011 and about 3100 in 2012 (the number of porpoise whales hunted decreased by 800), the average of last 5 years is about 3000 per year. Royal Greenland Ltd[6] - a company owned by the Greenlandic government - is both the largest company involved in fishing and fish processing in Greenland and the country's largest company with over 2,000 employees around the world, 900 of whom in Greenland.

Greenland has historically been a *hunting* society, and hunting continues to be an important cultural activity. There are some 2000 professional hunters in Greenland and 5000 people hold a recreational hunting permit. Hunting in Greenland requires a professional hunting permit or a recreational hunting permit, both subject to a range of conditions. Hunting is of great importance to the population, especially in the settlements and in outlying districts. The primary targets for hunters are seals, reindeer, muskoxen, birds and arctic char. Approximately 90 thousand seals were caught in 2012[7] (in previous years the number ranged 150 thousand, over 15000 animals (80% reindeer), and including (musk) ox and over 130 polar bears are hunted each year. All specimens caught must be reported. Furs and sealskins are exported.

5 Greenland in Figures 2013 and Greenland in Figures 2014; www.stat.gl
http://www.stat.gl/publ/en/GF/2013/pdf/Greenland%20in%20Figures%202013.pdf
6 http://www.royalgreenland.com/uk/Our-company/Facts-Figures.aspx
7 Greenland in figures 2012

Agriculture is presently of little importance, as only about 1% of Greenland is considered arable. But the growing season is expanding due to climate change – about 3 weeks more than a decade ago in southern Greenland – and cultivated areas of the country are extending and it is becoming possible to grow new crops like few fruit (strawberries) and horticulture (broccoli, cauliflower, cabbage, and carrots). At present, local production accounts for 10% of potatoes consumption in Greenland, but that is projected to grow to 15% by 2020. Production is vulnerable[8], as water deficit is a big problem making irrigation a prerequisite in most fields, and Foehn winds occasionally cause big problems in terms of damaged foliage and a general drying effect. Necrotrophic fungi may benefit from this. Polyethylene sheets protecting crops creates a microclimate which may increase the incidence and severity of some of the pathogens. Livestock is relatively important with over 20200 sheep and 3000 reindeers in 2011. The current goals of the government is to enable better conditions and opportunities for Greenlandic sheep farmers who wish to develop their farming by growing more vegetables and start breeding livestock other than sheep to improve self-sufficiency in Greenland. The only forest in Greenland is in the Qinngua Valley near Nanortalik.

Today, tourism, second only to fisheries, is the most important industry in Greenland, and the tourist industry has potential for growth in the future. This applies both to land-based tourism and the cruise-liner business. Among the benefits of the latter is that even small towns and villages along the coast can be involved in tourism. In recent years there has been a significant growth in the number of tourists coming via Iceland on new routes between Iceland and Greenland. Currently it is the strategy of the government to extend collaboration with the tourist industry in Iceland, in order to sell Greenland as an "add-on"-experience to visits to Iceland. The land-based tourism generates by far the greatest revenue but is currently dependent on only a few markets, primarily the Danish (50% of total international nights spent, followed by USA 8% and Germany).

Greenland has been involved in mining for more than 100 years. Deposits of cryolite, gold, graphite, zinc, and lead, have been exploited. Deposits of rare earth, uranium, copper and iron have also been discovered, but are still waiting to be mined. Since 2000 Greenland has experienced a significant increase in the number of applied for and announced licenses concerning mineral resource activities. For instance the region between Kangerlussuaq and Maniitsoq has emerged as promising for diamonds. Deposits of gold have been discovered in several areas, and there is also potential deposits of among others zinc/lead and molybdenum. In the beginning of 2014 no mines are in production but before 2019 it is expected that 3-5 mine will be in operation. In the last half of 2013 the British company London Mining was granted an exploitation licence for iron ore at Isua and in the first half of 2014 the Vancouver based company True North Gems received an exploitation licence for rubies and saphires. The latter has already commenced construction. In October 2013 Greenland parliament voted to end a decades-long ban on mining for radioactive materials. The decision clears the way for uranium mining. Some major REE deposits had been off-limits because the deposits also contained radioactive material. In March 2014 a Council Regulation enabled the inclusion of Greenland in the Kimberley Process through the EU[9], and this might induce extraction on a larger scale. The Kimberley process is an internationally acknowledged initiative that seeks to stem the flow of conflict diamonds and will ease the export of diamonds.

Greenland is believed to have significant oil resources. The U.S. Geological Survey found in 2001 that the waters off north-eastern Greenland (north and south of the Arctic Circle) could contain up to 31 billion barrels (17×10^9 m^3) of oil and gas. Exploration licenses are issued to several international oil companies with the National Oil Company Nunaoil, which since 2009 has been owned by the Government of Greenland, as a carried partner (12.5% of the revenue). In 2006 a call for licenses applications was held to 8 very large blocks of about 8,000-14,000 km² covering 92,000 km² in West Disko. In 2010, a call for licenses applications in Baffin Bay (west coast) was set for 14 predefined blocks varying in size between about 8,000 km² and 15,000 km² covering a total area of 151,000 km². A total of seven exclusive

8 "Climatic changes and agriculture in Greenland: Plant diseases in potatoes and grass fields" (PDF). IOPscience.
9 http://www.noraregiontrends.org/metals-minerals/metalnews/article/eu-strengthens-ties-with-greenland/87/

licences for exploration and exploitation of oil and gas were awarded[10] to 7 companies and NUNAOIL totaling 70,768 km². On the 25th of March 2014 there were 17 active non-exclusive prospecting licenses and 22 active exclusive licences for exploration and exploitation of hydrocarbons in the limits of Greenland's economic zone.

About two-thirds of Greenland's public expenditure derives from the Danish Government subsidy that is fixed by law at DKK 3.4 billion kroner annually (2009 price and wage levels), through budget support. On 1 January 2010 the Self-Government authorities have assumed the right to utilise the mineral resources found in the subsoil. Revenues from mineral resource activities in Greenland are to accrue to the Self-Government, and have influence on the size of the Danish Government subsidy. The Danish Government subsidy to Greenland is to be reduced by an amount equal to 50 per cent of the exceeding DKK 75 million (€ 10 million) annually[11].

In 2012, about 38% [12] of Greenlanders were employed in the public administration and service sector, 14% in fishing, hunting and agriculture, 12% in wholesale, 10% in transport, construction and business activities occupy each 8% of workers.

2 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FOR GLOBAL BIODIVERSITY

A limited number of species are endemic to Greenland as almost all species present today had to immigrate to Greenland after the last ice age[13]. Endemic species of algae, vascular plants and a single water mite (Hydracarina) have been recorded. A few bird subspecies breed only in Greenland, but winter elsewhere.

Some 500 species of wild plants are found in Greenland. The little plant cultivation that exists is confined to the southwest. Forest-like brush exists in many places. The sunniest valleys in South Greenland have stands of strong, upright birch trees up to 7 m in height. Greenlandic ash and various species of willow, evergreen, fern and several species of herbs also grow in South Greenland. Apart from that, as most places in Greenland have a lower mean temperature in July below 10°C there are only very few and very small trees, which are situated near the head of fjords in South Greenland. Greenland is particularly rich□in lichens, some of which are endemic. Other vegetation includes mosses, heather, crowberry, grasses and sedge.

There occur 210 bird species, constituting by far the majority of fauna species. Greenland has particularly low diversity of terrestrial mammals and fresh-water fish[14]. Nine species of terrestrial mammals are native to Greenland: arctic hare (*Lepus arcticus*), arctic fox (*Alopex lagopus* - white and blue subspecies), arctic wolf (*Canis lupus*), caribou/reindeer (*Rangifer tarandus*), muskox (*Ovibos moschatus*), ermine (*Mustela erminea*), and collared lemming (*Dicrostonyx torquatus*), and the wolverine (*Gulo gulo*)[15]. There are about 125 species of marine fish and 25 species of marine mammal. Marine mammals include polar bear, walruses, various species of seal and whale.

The waters surrounding Greenland vary in primary production levels. Production can be high throughout the summer, with limited production in darker, colder winter months. Zooplankton consists mostly of organisms that are pelagic throughout their life. Crustaceans, especially species of the genus *Calanus* and krill (Euphausiacea), are important in the marine ecosystem. Many fish, fish larvae, birds and marine mammals feed on crustaceans (polar bear, tooth wales and seals are exceptions). Among the pelagic

10 http://www.govmin.gl/index.php/petroleum/exploration-a-exploitation/previous-licensing-rounds/licensing-round-2010
11 www.stm.dk/_a_2957.html
12 Average number of persons per month; Greenland in figures 2014.
13 Forth National Report on the Implementation of the Convention of Biological Diversity of Greenland,
14 http://www.arcticbiodiversity.is
15 http://www.worldwildlife.org/ecoregions/na1112

fishes, polar cod *Boreogadus saida* and capelin *Mallotus villosus* play the most important role in the ecosystem as prey for several predators. Most of Greenland's birds live primarily on a diet of crustaceans and small fish like the capelin.

The Red List for Greenland, published in 2007[16], assessed 115 species/subspecies /populations, including 37 mammals, 65 birds, 3 freshwater fish, 5 butterflies and 5 orchids. Three species/subspecies/discrete populations are categorised as *extinct* (EX) or *regionally extinct* (RE), six as *critically endangered* (CR), three as *endangered* (EN), twelve as *vulnerable* (VU) and twelve as *near threatened* (NT). This leaves 13 mammals, 39 birds, two freshwater fish, four butterflies and four orchids as *least concern* (LC).

The *critically endangered* (CR) species comprise six species/populations of marine mammals: Atlantic walrus (Northwater population *Odobenus rosmarus)*, harbour seal (*Phoca vitulina)*, bowhead whale (Spitsbergen population *Balaena mysticetus)*, northern right whale (*Eubalaena glacialis)*, beluga (*Delphinapterus leucas)* and narwhal (West Greenland population *Monodon monoceros)*. Commercial hunting in previous centuries reduced the population of the northern right whale, and since the termination of the hunt there has been only slight or no recover. The other critically endangered species are all used in Greenland. In recent years sustainable harvest recommendations from international conventions and from the Greenland Institute of Natural Resources have been implemented and abundance estimates for walrus, bowhead whales, beluga and narwhal have been updated. According to Greenland authorities, these four species would not be considered critically endangered if the Red List of Greenland was updated today. The *endangered* (EN) species are Atlantic walrus (West Greenland population), Greenland white-fronted goose (*Anser albifrons flavirostris)* and common guillemot (*Uria aalge)*. The walrus of the West Greenland Population are hunted, and as with the walrus from the North Water, the abundance surveys have been updated and the quotas adjusted since the Red List was published. The white-fronted goose face the potential threat of competition from a rapidly increasing population of Canada geese (*Branta Canadensis)*. The common guillemot has a restricted and localised breeding distribution in Greenland.

The Greenland National Park, covering 956,000 km^2 and established in the north and northeast of Greenland in 1974 is the largest National Park in the world and includes a marine component. It aims at protecting the High Arctic tundra of northern Greenland which is a unique and fragile ecosystem. Cold and in near-darkness for four months in the year, summer temperatures seldom reach 5°C, occurring fauna and flora are adapted to the most extreme conditions, live in survival limits and are very vulnerable to even minor disruptions.

In addition to the National Park, Greenland has 12 Ramsar sites (2 Ramsar sites are within the national park of East Greenland, and the Ramsar site (Kitsussunnguit) is also protected due to a national executive order). Greenland has 12 protected areas (including the national park in East Greenland and the UNESCO world heritage site Ilulissat Icefjord)[17].

16 http://dce.au.dk/udgivelser/udgivelser-fra-dmu/div/2008/abstracts/roedliste_gr_uk/

17 http://naalakkersuisut.gl/da/Naalakkersuisut/Departementer/Natur-og-Miljoe/Naturafdelingen/Oversigt-over-fredede-omraader, http://www.ramsar.org/cda/en/ramsar-documents-list-anno-denmark/main/ramsar/1-31-218%5E16427_4000_0__, http://www.protectedplanet.net/countries/84

3 MAIN ENVIRONMENTAL CHALLENGES

3.1 OVERVIEW

Greenland is a large island with a very low overall population density. Vehicle ownership is low[18] (since there are no roads between settlements), as there is one passenger car or van for every 10.6 inhabitants[19]. There is an issue of low-level but generalised pollution by various contaminants brought into the area from the mid-Northern latitudes and which are accumulating in the food chain. Activities concerning exploration for mineral resources have intensified the last 10 years. According to Greenland's Ministry of Industry and Mineral Resources in spring 2014 there was no mine in production, but most likely at least three mines will go into production during the next five years and likely every second year there will be offshore hydrocarbon exploration drillings.

Climate change is a major environmental pressure. Biodiversity is subjected to the pressures induced by climate change. The years since 2007 have seen less summer sea ice than any previous year in the satellite era, and 2012 set another record low. Warming is also causing loss of permafrost and glaciers, affecting hydrology, vegetation, erosion patterns and other features of terrestrial ecosystems. The distribution of flora and fauna is shifting northwards as the Arctic continues to warm. While low Arctic species are expected to move into the high Arctic, some high Arctic species and ecosystems are expected to disappear or remain only as isolated fragments in higher grounds. In the ocean, loss of sea ice is already affecting the timing and patterns of primary production, altering food webs and reducing the availability of sea ice to walrus and ice seals for resting, molting, breeding and rearing young. The total loss of some key habitats such as multi-year pack ice is expected. In the process of rapid change and transitions, new combinations of species are altering Arctic ecosystems. Besides, climate-induced changes can potentially facilitate increased industrial activity such as mineral exploration and marine shipping. These changes are bringing other stressors to the region. For example, ships discharging ballast water into Arctic seas may introduce invasive species that may outcompete and displace resident species.

According to the Arctic Biodiversity Assessment from 2013[20], although historically overharvest was one of the most common pressures on Arctic wildlife, a wide variety of conservation and management actions have helped alleviate this pressure in many areas to such an extent that populations of many species are recovering. Nevertheless, pressures on other species persist. The progress was possible in part because sufficient knowledge exists to develop effective conservation measures and to build support for those actions. Greenland's effort to increase community-based monitoring[21] with management provides one of the promising stories that is becoming more common in the Arctic.

According to the 2011 Environmental assessment of waste management in Greenland [22] currently all wastewater in Greenland that is collected is discharged untreated to the ocean. In the towns the residents have pressurized in-home drinking water. The dwellings have either traditional water flush toilets or bucket toilets. Those who have water flush toilets in the larger towns are either connected to a sewer or store the blackwater (toilet waste) in holding tanks outside the residence. Routine collection of the bags from the bucket toilets and pumping out of the holding tanks are organized by the municipalities. In the small settlements of Greenland some dwellings have pressurized in-home drinking water while other residents typically obtain water from a community water point. Bucket toilets are used almost exclusively in the settlements. Handling of wastewater from tourist cottages in Greenland is

18 In many EU countries is about one car for each 2 persons (http://data.worldbank.org)
19 Greenland in Figures, 2013
20 http://www.arcticbiodiversity.is/
21 http://www.caff.is/index.php?option=com_content&view=article&id=801&catid=508&Itemid=1578
22 Gunnarsdóttir, R., et al. 2011, Sanitation in the Arctic-Challenges and solutions, in 3rd International Congress Smallwat11 - Wastewater in Small Communities. Towards the Millennium Development Goals (MDG) and the Water Framework Directive (WFD). http://www.smallwat.org/web/seccion/orales.html

another minor challenge[23] since they do not have running water supply and are often remotely located. Some have toilet facilities which all consist of bucket toilets.

The majority of the waste in Greenland is disposed of in open dumps or incinerated in simple small-scale incinerators. There are relatively few environmental regulations that control the emissions of leachate, landfill gas and/or flue gases from incineration. Only some scrap metal and hazardous waste are collected separately and exported to Europe. Significant environmental loads are caused by air emissions from the incinerators and leachate from the landfills[24]. Studies suggest that increased use of incineration, full utilization of the heat production for district heating and separation of hazardous waste probably could improve Greenland's waste management system. Export of waste to Denmark for incineration at modern waste incinerators with advanced flue gas cleaning could also be considered as a means to achieve better environmental performance of the waste management system. The Greenlandic municipalities are currently researching all towns and settlements in order to achieve individual and local solutions. In certain places/areas this might result in transporting waste from settlements to town and in others it might be a better solution to locally treat/dispose of the waste.

Most of Greenland's energy consumption is in the form of electricity and heating. The production of electricity and heating takes place on large, central facilities or at decentralised heat and power plants. Historically, electricity has been generated by diesel-driven power plants, which require costly imports of fossil fuel and are the largest contributor to Greenland's greenhouse gas emissions. During the past two decades Greenland has been replacing its diesel power plants with hydropower plants. In 2010 a new Sisimiut Plant was inaugurated elevating from 40% to 60% Greenland's electricity coming from hydropower. A new hydropower plant has been inaugurated in 2013 in Ilulissat, elevating to 70% the share of hydropower in Greenland's electricity. Some of the plants have sufficient electricity available for district heating, and an increasing part of the heating production is now generated without increased emissions of greenhouse gasses[25]. Heating produced by oil-fired boilers situated in the houses is also used. Many houses are relatively poorly insulated, but a programme is in progress to refurbish and improve the energy performance of the housing stock through bank loans[26].

3.2 MAIN CHALLENGES

The main environmental challenges faced by Greenland and their severity were also identified in the 2006-07 Environmental Profiles. The table below provides the main environmental challenges and a comparison to the situation in 2006/7.

23 Gunnarsdóttir R., 2012, Wastewater Treatment in Greenland, PhD Thesis, DTU Civil Engineering Report R-265 (UK) May 2012

24Environmental assessment of waste management in Greenland: current practice and potential future developments. Waste Manag Res. 2013 May;31(5):502-9. doi: 10.1177/0734242X13482175. Epub 2013 Mar 28.

25 http://www.silap-pissusaa.gl/udledning-og-reduktion/vandkraft.aspx?lang=en

26 http://www.nib.int/news_publications/cases_and_feature_stories/231/nutarsaaneq_to_keep_greenland_s_homes_warm

Main environmental challenges and problems in Greenland			
Challenge / problem	**Severity[27]**	**Short description**	**Situation 2007**
Waste	Severe	Waste management is currently considered to be one of the main environmental challenges in Greenland. The municipalities and the Government of Greenland have taken initiatives but more is needed. Low density and physical fragmentation of the population makes modern waste management difficult. The Greenlandic municipalities are currently researching all towns and settlements in order to make individual and local solutions. Transport of waste resulted more complex than anticipated.	Attention reqd.
Wastewater	Moderate	Bucket toilets, still used in parts of the towns and in almost all settlements in Greenland, has been considered a problem for many years with respect to uncontrolled spreading of nutrients, diseases and potential pollution issues. Discharge of wastewater to the ground or to open sewer is considered a problem. Discharge of untreated sewage into the sea is not considered a major concern, but steps are to be taken towards mechanical treatment of sewage of wastewater from some of the major cities.	Not indicated
Climate change	Priority	Adaptation to climate change is a priority and focus is on both challenges and opportunities. Sea ice is decreasing, ocean is acidifying, and this will have consequences for the marine and terrestrial biodiversity. Opportunities for transport, mining, agriculture, hydropower, and unknown for fisheries.	Severe
Trans boundary pollution of the Artic environment	Moderate	The Arctic Ocean drains many rivers in Eastern Europe, Central Asia and North America. Besides, radionuclides and other substances travel in the atmosphere. There is contamination by persistent organic pollutants (POPs) and heavy metals which enter the food chain. Some radionuclide are also a concern. There are health risks to marine mammals and inhabitants with a heavy dietary dependence on hunted animals.	Moderate

External pressures:

According to IPPC (2013)[28] the average rate of ice loss from the Greenland ice sheet has (very likely) increased from 34 Gt/yr over the period 1992 to 2001 to 215 [157 to 274 Gt/yr over the period 2002 to 2011. Greenland ice sheet has been contributing 0.33 mm/yr to the (high confidence) 2.8[29] mm/yr of global mean sea level rise between 1993 and 2010. Over the period 1979 to 2012 the annual mean Arctic sea ice extent decreased (very likely) at a rate of 3.5 to 4.1% (0.45 to 0.51 million km^2) per decade, while the sea ice minimum (perennial sea ice) is very likely decreasing in the range 9.4 to 13.6% (0.73 to 1.07 million km^2) per decade. The spatial extent has decreased in every season, at an increased rate in every successive decade since 1979 (high confidence). This may have effects on the size and composition of fish stocks (turbot like cold waters, cod may benefit from warmer waters), and may have profound effects on species such as seals and polar bears, and in turn on the way-of-life and livelihood of the Greenlanders. Melting of the permafrost could also have an effect on infrastructure and buildings, some of which depend for their structural integrity on this permafrost. On the other hand, Arctic warming

27 The degree of severity is merely qualitative. Severe means it is a problem throughout the territory, or it is considered top priority by environmental authorities. Moderate means it is a problem needed to be addressed, but which current status or impacts are of a slighter concern than the severe problems.

28 Climate Change 2013: The Physical Science Basis, Summary for Policymakers (https://www.ipcc.ch/report/ar5/wg1/)

29 Global sea level rise 2.8 [2.3 to 3.4] mm yr = 1.1 [0.8 to 1.4] mm/yr thermal expansion due to warming + 0.76 [0.39 to 1.13] mm/yr changes in glaciers + 0.27 [0.16 to 0.38] mm/yr Antarctic ice sheet + 0.38 [0.26 to 0.49] mm/yr land water storage + 0.33 [0.25 to 0.41] mm/yr Greenland ice sheet. (IPCC, 2013)

may open new navigational possibilities, provide access to new areas along the Greenland coast, ease access to mineral resources, increase hydropower potential, and is already having a positive impact on farming.

Besides, Arctic marine waters are experiencing widespread and rapid ocean acidification, not uniform across the Arctic Ocean.[30] Owing to the large quantities of freshwater supplied from rivers and melting ice, the Arctic Ocean is less effective at chemically neutralizing carbon dioxide's acidifying effects, and this input is increasing with climate warming. In addition, the Arctic Ocean is cold, which favours the transfer of carbon dioxide from the air into the ocean. It is increasingly clear from the scientific evidence that immediate cuts in carbon dioxide emissions are essential to slow the acidification of the Arctic Ocean. Ocean acidification will have direct and indirect effects on Arctic marine life. It is likely that some marine organisms will respond positively to new conditions associated with ocean acidification, while others will be disadvantaged, possibly to the point of local extinction (particularly shell building organisms).

Distant source pollution is a reality and this situation is matter of concern as it causes damage to biodiversity and directly to human life (cancer, neurological disorder, fertility, etc.). According to the Arctic Monitoring and Assessment Programme[31], 2011, there are some indications of a trend of increasing mercury levels in marine birds and mammals in West Greenland[32]. Cadmium levels in some seabirds is high enough to cause kidney damage. POPs substances other than those included in the LRTAP Protocol and Stockholm Convention may be at or approaching levels of concern in the Arctic. The Arctic contains large areas of high vulnerability to radionuclides, but in general levels of anthropogenic radionuclides in the Arctic environment are declining, except for technetium-99 and iodine-129. Following the example from other countries, since April 1st. 2014 it has been illegal to sell lead shots in Greenland and from October 1st 2014 it is illegal to use or possess lead shots in Greenland. This measure aims at halting the increase of lead levels in the environment, which were already high due to that practice and to past use of lead fuels.

4 ENVIRONMENTAL POLICIES AND INSTITUTIONS

4.1 CONSTITUTION

On 21 June 2009, the Greenland's Self-Government Act came into force. The Self-Government Act is based on White Paper No. 1497 that was drawn up by the Greenlandic-Danish Self-Government Commission in 2008. On 7 October 2009 Denmark submitted a notification on the Act on Greenland Self-Government to the Secretary-General of The United Nations.

The Greenland's Self-Government Act provides that the Danish government retains responsibility for foreign policy, defence and security policy, the legal and judicial system and monetary policy. Greenland has a 31-member parliament (*Inatsisartut*) and elects two representatives to the Danish Parliament (*Folketing)* by referendum. The block grant from Denmark is transferred to the Government of Greenland.

The Greenlandic Parliament appoints the Premier, whom then appoints the Cabinet of Ministers. The Government is divided into Ministries, headed by a Minister. The Government administration must perform within the frameworks adopted by Parliament in the form of Acts and Appropriations.

In 1989, Denmark passed responsibility for environmental protection to the Home Rule Government, and

30 SWIPA report: http://www.amap.no/swipa/
31 http://www.amap.no/documents/18/technical-reports/17
32 AMAP Assessment 2011: Mercury in the Arctic

in 1992, the Home Rule Government gained jurisdiction over the marine environment around Greenland within the three-mile inshore limit. On 1 January 2010 the Self-Government authorities have assumed the right to utilise the mineral resources found in the subsoil.

Greenland joined the European Community with Denmark in 1972 but withdrew in 1985, and subsequently assumed OCT status.

4.2 INSTITUTIONAL STRUCTURE

The Ministry of Environment and Nature is responsible for environmental, conservation and climate change policy. The Ministry of Fisheries, Hunting and Agriculture is responsible for fisheries policy and for agriculture. On the mineral resources area[33], The Environment Agency for Mineral Resources Activities under The Ministry of Environment and Nature is responsible for environment protection under The Mineral Resources Act.

The Greenland Institute of Natural Resources (GINR) is vested with the responsibility of providing the scientific basis for an assessment of sustainable use of the living resources in and around Greenland as well as protecting the environment and securing the biological diversity, advise the Greenlandic Government in the work of the Institute, and publish results of its research. It is a body of monitoring and research. GINR is managed by a Board of Governors and a Director, and has an attached advisory research committee whose members of the Research Committee are appointed for a 3-year period. The Committee is to advise the Board of Governors on preparation and approval of the Institute´s long-term work programmes, to assess the Institute´s research at appropriate intervals. The institute has a staff of 72 and is divided in Greenland Climate Research Centre, Department of Birds and Mammals, Department of Fish and Shellfish, information office and Ships.

The Environment Agency for Mineral Resources Activities (EAMRA) was established on 1 January 2013. In spring 2014 the Mineral Resource Authority in Greenland consist of, besides of the EAMRA, the "Ministry of Industry and Mineral Resources" and the "Mineral Licence and Safety Authority". The EAMRA cooperates closely with DCE/Danish Centre for Environment and Energy[34] and with the Greenland Institute of Natural Resources, Pinngortitaleriffik[35]. The cooperation implements the provisions of the Mineral Resources Act stating that assessments and decisions of the Mineral Resource Authority regarding environmental issues must be based on assessments and proposals for decisions from one or more scientific and independent environmental institutions.

4.3 POLICY INSTRUMENTS

Information on Greenland's policy and strategic instruments are mainly available in Danish and Greenlandic, as these are the languages used in the central administration. This limits the scope of this section. Among the policy and strategic documents of Greenland are the Energy Strategy and Plan of Action 2008-2015, the Energy Policy Report of 2011, the oil and Mineral Strategy 2014-2018. In 2010 the Government of Greenland adopted the Waste Management Plan 2010-2013 laying down guidelines for the national waste policy. A new strategy on waste management is currently being prepared. Likewise a Biodiversity Conservation Strategy is currently being developed.

Greenland is keen on using ecosystem-based management model that places emphasis on scientific foundation and sustainability to ensure sustainable utilization of living resources, including marine mammals. For this purposes it promotes continuous monitoring with the involvement of the population, and pursues control regimes to counter illegal, unreported and unregulated fishery and hunting.

33 http://www.govmin.gl/index.php/about-bmp/legal-foundation
34 http://dce.au.dk/en/authorities/greenland/
35 http://www.natur.gl/en/

Greenland also commits to strengthen international cooperation on scientifically based management of shared fish stocks and fishery in international waters with a view to promoting consensus on sustainable management plans and allocation formulas for the benefit of all relevant parties, particularly on potentially attractive Arctic high seas not yet covered by the conservation and management systems. Greenland is engaged in the introduction of a special regional form of control for a prudent fishery in large ecosystems in sparsely populated areas where there is no historical data and where it is particularly challenging to collect data and carry out control.

Greenland has invested intensively in renewable energy for more than two decades. With the opening of the 5th hydropower plant in Ilulissat in 2013, 70 % of national electricity supply is covered by renewable energy. According to the Kingdom of Denmark Strategy for the Arctic, 2011–2020 (which also includes Greenland and Faroe Islands), Greenland has a tremendous natural potential for renewable energy, which among other things can be utilised for the development of emerging industry. For example if the aluminium smelting plant in Maniitsoq, currently subject to negotiations between the Government of Greenland and an American company, gets constructed it will be operated solely by hydropower. Greenland aims at developing small-scale solutions for renewable energy to be used in smaller towns and settlements where there is currently no access to hydropower. The Government of Greenland supports development projects within energy efficiency and renewable energy, including micro hydropower plants, and solar and wind power projects that aim at a green and self-sufficient Greenland energy supply. Furthermore, the utilisation of renewable energy in the transport sector is being explored.

Regarding minerals and oil exploitation Greenland policy is to continue the licensing policy and strategy of competitive tenders in the oil and gas sector. Sets of rules will be continually adapted to optimize safety, health, environment and transparency standards through the use and improvement of best available techniques and practices such as Norwegian NORSOK standards. Cooperation with neighbouring countries, the Arctic Council and the United Nation's Maritime Organisation (IMO) for the establishment of an international liability and compensation rules and a convention is ongoing. According to the Kingdom of Denmark strategy for the Artic 2011-2020 Terms and conditions for licenses to exploit must be reasonable for both larger and smaller companies, resilient to fluctuating market conditions as well as simple and easy to administrate for companies and authorities.

According to a recent study on the perceptions of public participation in impact assessment [36] NGOs and associations, industry and individuals in Greenland express general frustration of how public participation is conducted, in particular on EIA. NGOs emphasise a need for public participation to influence decision-making. There is a need for a more specific public participation guideline based on dialogue among stakeholders, with emphasis on the cultural barriers related to power structures and communication.

In turn, the Ministry of Industry and Mineral Resources informs that due to the ever-increasing interest from the public, the Government of Greenland is taking measures to strengthen and to formalise the procedures and form of the consultation processes within the mineral resources sector. Among other measures, the Government will submit a proposal to amend the Mineral Resources Act, which if adopted by parliament, means that a mineral resources company will be required to inform the authorities when it wishes to initiate the environmental impact assessment (EIA) and the social impact assessment (SIA) and an early project draft must be submitted. This draft will be put out to pre-consultation with the relevant authorities, stakeholders and the general public for comments, ideas and proposed changes. In addition, work has been initiated to set up a foundation with the object of improving the participation of affected citizens, local communities and relevant civil society organisations and other relevant stakeholders who are interested in contributing to the public consultation process. The foundation will have an independent board of trustees which will review applications sent to the foundation and must distribute funds on the basis of objective and transparent criteria according to detailed rules. The

36 Perceptions of public participation in impact assessment: a study of offshore oil exploration in Greenland, Anna-Sofie Hurup Olsen and Anne Merrild Hansen, 2014

foundation is expected to be funded through contributions from players in the mineral resources sector and the public sector.

The Greenland's oil and mineral strategy 2014-2018 aims at integrating the environmental regulatory function in the Ministry of Environment and Nature, separating it from the rest of the regulatory function in the area of mineral resources. It also aims at increasing competence of Greenland Institute of Natural Resources on environmental safeguards, monitoring and planning and continue cooperation with the Danish Centre for Environment and Energy. The strategy also envisages more detailed guidelines for the preparation of EIA reports for mining activities in the area of mineral resources.

4.4 LEGAL ASPECTS

Greenland participates in the following MEAs:

MEA	Remarks
UN Biological Diversity Convention	Even though Greenland has not adopted a specific National Biodiversity and Action Plans a range of activities have been carried out for the last 10-15 years both nationally and in regional fora with close links to the targets and goals which would be required in an NBSAP. Among others* by adopting the Nature Protection Act in 2003, developing a red list, identifying marine areas and coastlines vulnerable to oil spills, key habitats, natural resources, migration routes, and the population size and ecology of sensitive species.
UN Framework Convention on Climate Change	Greenland takes part in the international climate negotiations under the UNFCCC as part of Denmark delegation. This is done on the basis of the cooperation agreement[37], signed by Greenland and Denmark in 2012, based on the Act on Greenland Self-Government from 2009. It strengthens Greenland's ability to play an active role in the negotiations.
Ramsar Convention	Greenland has 12 Ramsar sites. Today, the 2003 Nature Protection Act provides a legal framework for implementation. However 3 of the Ramsar sites in Greenland are protected areas. Until now Greenland has not adopted specific management plans however ongoing activities have been carried out to secure the wise use of the Ramsar sites.
CITES	In September 2004, the Greenland Home Rule government approved a CITES executive order, thereby creating a legal framework for a national implementation of CITES. The Institute of Natural Resources, the designated CITES scientific body, assesses the influence of the trade on the wild population as required by the Convention. This work has among others been carried out for the export of narwhal, and resulted in a ban on export of narwhal products from Greenland in 2006.
International Whaling Commission (40 countries)	Minke, fin and other large whales. Greenland has a quota for fin and minke whales under the Aboriginal Subsistence Whaling provision. However Greenland has not provided data on stocks to support the quota. In 2006 the IWC Scientific Committee recommended to the IWC that it dramatically cut the fin whale quota. Greenland responded by agreeing to implement a voluntary limit of 10 fin whales a year. Further recommendations from IWC, Greenland set its own quota of 216 whales per year.
Other Conventions	The following conventions are also extended to Greenland: The International Convention for the Prevention of Pollution From Ships (1973); London Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter; International Convention on Oil Pollution Preparedness, Response and Co-operation (OPCR); Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes; Convention on Long-range Transboundary Air Pollution (LRTAP); Vienna Convention for the Protection of the Ozone Layer; The Convention on Environmental Impact Assessment in a Transboundary Context (ESPOO)

*Greenland has initiated a national project to analyse existing biodiversity hotspots with financial support from DANCEA (The programme of Danish Cooperation for Environment in the Arctic). The project is divided into two phases. First phase is to compile a report (Christensen et al. in prep) that identifies

37 The cooperation agreement is the first example of implementation of §13 in the Act on Self-Government. This paragraph allows for the establishment of cooperation agreements covering multilateral negotiations on international legal agreements that are of particular importance to Greenland

biodiversity hotspots based on available species and ecosystems. This is expected to be published in 2015 and can be a platform to develop possible biodiversity strategy and actions plans.

In July 2004 the Ilulissat ice fjord was appointed World Heritage Site by the UNESCO.

Besides, Greenland is also Party to the following regional agreements:

Regional Agreement	Remarks
OSPAR-Convention	Is the current legal instrument guiding international cooperation on the protection of the marine environment of the North-East Atlantic Work under the Convention is managed by the OSPAR Commission, made up of representatives of the Governments of 15 Contracting Parties and the European Commission, representing the European Union.
Oslo Convention	Multilateral treaty signed in Oslo, November 15, 1973 by the five nations with the largest polar bear populations: Canada, Denmark (Greenland), Norway (Svalbard), the United States, and the Soviet Union. This treaty was brought about due to increased hunting of polar bears during the 1960s and 1970s which led to polar bears being under severe survival pressure from hunters
Nordic Environmental Protection Convention	Signed between the governments of Denmark, Finland, Norway and Sweden, for the urgent need to protect and improve the environment.
Copenhagen Agreement	The 1971 Copenhagen Agreement (revised in 1993) between Denmark, Finland, Iceland, Norway and Sweden, addresses marine oil pollution.
Joint Commission on Narwhal and Beluga/JCNB	Greenland has set quotas for the narwhal and beluga considerably higher than the JCNB recommendations. (Greenland and Canada only))
NAFO: Northwest Atlantic Fisheries Org.	Agreement on fisheries covering the northwest Atlantic outside the 200 nautical mile zones

The most relevant legislation to environmental protection in Greenland is indicated in the table below:

Item of legislation	Comments / detail
Greenland Parliament Act n.º 9 / 2011 on the protection of the environment	It environmental safeguards on planning and execution of activities, such as establishment of buildings and facilities, to avoid to the extent possible, the risk of pollution and other harmful impact on the environment. It also requires that liquids and substances that may pollute the environment and nature are to be used, stored and transported to avoid any kind of pollution. Oil and chemical waste is to be handled and deposited pursuant to the Government of Greenland's executive order no. 29 of 17 September 1993 on oil and chemical waste. The environmental order includes rules for the protection of drinking water resources and related catchment zones that supply drinking water for towns and settlements.
Nature Protection Act (2003)	Allows the government to create regulations on the protection of the living resources, regulate or protect species or stocks, restrict periods where hunting is permitted, set quotas, prohibit catching and hunting or any activity in geographically defined areas as well as work out wildlife management plans.
Executive orders for protection of Species	Executive orders for protection of birds (March 2009); Executive order for protection of narwhal (March 2011), Executive order for protection of beluga (2011); Executive order for protection of polar bears (2006); Executive order for protection of walruses (July 2006)
Order setting hunting quotas	June 2004
Executive order on CITES	September 2004
Mineral Resources Act (2009)	Aims to ensure that activities under the Act are performed in a sound manner as regards safety, health, the environment, resource exploitation and social sustainability and appropriately and according to acknowledge best international practices under similar conditions.
Order of the Greenland Parliament regarding protection of the marine environment (1994)	The order has been altered in 1997 to include Permission to dump organic materials and in 2004 to change the definition of "fish", authority to stipulate regulations for discharge of fish from mother ships and processing vessels and repeal of provisions that are reinstated within the Act on

	Safety.
Executive order for Environmental impact assessment (2013)	Prior to compiling the EIA report, the project owner shall draw up Terms of Reference for research of the potentially affected environmental conditions. The Terms of reference requires the approval by the lime minister of the Environment before work on compiling the EIA report commences. Following the public disclosure of the EIA report, the public is granted a period of eight weeks to comment or respond to the report. Public meeting, hearings or other forms of citizen participation are discretionary ordered by the environment line minister. The types of land based facilities that are always required to submit an EIA report are listed in the statutory regulation annex I. Annex I refers to the international obligations Greenland adheres to as a result of acceding to the ESPOO treaty. Annex II list the types of land based facilities where Naalakkersuisut in each individual case can decide whether or not an EIA report is required.
Executive order for environmental approval of heavily polluting enterprises (2004)	
Executive order for use of motor vehicles (2013)	
Executive order for use of lead shot (2012)	This order ban the use of led shot in 2014
Executive order for potable water quality and monitoring of water supply systems (2008)	
Order of Home Rule regarding lavatories and the removal of night soil and wastewater from sanitation (1993)	The order is currently under revision and a new order is expected during 2014. Wastewater may only be discharged into watercourses, lakes, or the ocean after prior approval by the Ministry of Environment and Nature. A permit may include conditions covering issues such as the amount and composition of the wastewater, set-up, self-regulation, treatment arrangements and time limits. If discharge of wastewater is connected to a business or plant emitting a significant amount of pollutants then an additional permit is required for the environment. Both permits shall be applied for simultaneously.
Statutory regulation regarding packaging materials for beer and carbonated soft drink (2002)	Ensures that the majority of the packaging used for beer and carbonated soft drinks is recycled. It has recently been amended to introduce a deposit and recycling system for cans.

Greenlandic authorities for the environment are responsible for ocean areas that are within three nautical miles from baseline[38,39]. This includes all internal waters such as bays and fiords and all outer ocean areas within three nautical miles from baseline. Beyond the three nautical miles limit, responsibility for the marine environment rests with the Danish authorities. The area beyond three nautical miles is regulated by Danish Royal Order for the enforcement of the Environmental Protection Act for Greenland of 2004. The Ministry of Environment and Nature is currently[40] in the process of rewriting the Greenlandic Marine Environmental Act which is applicable within the area of three nautical miles, as well as working with the Danish Environmental Protection Agency in rewriting the Danish Marine Environmental Act applicable for areas beyond three nautical miles. It is necessary to update the two acts in order to ensure that the regulation is compliant with the development taking place within the field of international pollution control. The new Greenlandic Marine Environmental Act, was expected to be read in the

38 Report to the Public Accounts Committee on Denmark's performance in the Arctic, 2013, http://uk.rigsrevisionen.dk/media/1943111/16-2012.pdf

39 According to Greenland authorities, the term "baseline" is more accurate than "Land" as the "baseline" in several places does not follow the Greenlandic coastline.

40 http://naalakkersuisut.gl/en/Naalakkersuisut/Departments/Natur-og-Miljoe/Miljoeafdelingen/Havmiljoe

Parliament during the fall session of 2014, but due to elections it is now highly possible that it will be in 2015.

4.5 ENFORCEMENT

Since June 2009 the Greenland's Self-Government Act the law enforcement function is handled by the Ministry of Family and Legal and Justice Department. The police in Denmark, in the Faroe Islands and in Greenland constitute one national force, employed directly by the state[41]. This police structure represents a single centralized structure under Bayleys typology[42].

Enforcement seems to pose challenges in a country with the extraordinarily low population density of Greenland. The number of police officers to enforce conservation and hunting regulations is limited. Greenland cannot rely on enforcement and therefore has to rely on legitimacy and consensus.

Greenland authorities undertake the fisheries control operations to ensure that both Greenland, and relevant international fishery regulations are complied with by all vessels in their waters, as well as by Greenland vessels operating internationally. The inspection of vessels and catches at sea is undertaken by the Greenlandic fishing license control (GLFK) Danish Armed. Regional cooperation on inspections remains a priority.

4.6 MONITORING

Environmental quality circumpolar monitoring is mainly carried out in cooperation with other Arctic countries under the auspices of AMAP (Arctic monitoring and Assessment Programme), a working group under Arctic Council, in which Greenland/Denmark participates. Biodiversity monitoring is carried out in cooperation with other arctic countries under the Circumpolar Biodiversity Monitoring Programme (CBMP) – the cornerstone biodiversity programme of CAFF working group of the Arctic Council where Greenland/Denmark act as the Co-chair of the programme.

The Danish Centre for Environment and Energy (DCE) for some years, has mapped areas of particular importance to wildlife in order to assess and mitigate impacts of oil and minerals exploration in Greenland. Data are stored in a GIS-linked database which is the basis for the development of rules and regulations issued by the Minerals Resources Authorities. The DCE also has conducted disturbance studies on geese and caribou to quantify effects and possible habituation. A vegetation mapping project based on satellite images is also of relevance in this context.

Greenland is a hub for extensive climate change research and through a continued focus on climate monitoring and research activities, Greenland contributes significantly to the strengthening of the national and international scientific climate research community. The Greenland Climate Research Centre has a close collaboration with Greenlandic monitoring programmes like ASIAQ, DMI, Ice Service, Greenland Ecological Monitoring Network (GEM), Programme for Monitoring of the Greenland Ice Sheet (PROMICE) and monitoring activities of the GINR.

The GINR's department of Birds and Mammals prepares GINR's scientific advisory material on exploitation and protection of marine mammals, land mammals, birds, and vegetation. The department is occupied mainly with species that are of importance to the community, but the financial limits do not enable the department to maintain continuous investigation programs on all exploited species. The main focus of GINR's Fish and Shellfish department is research and monitoring of fish, shrimp and snow crab stocks in Greenland waters and advice based on survey and fisheries data is provided to the international working groups of ICES and NAFO

41 https://www.politi.dk/en/About_the_police/organisation/
42 http://www.albany.edu/scj/david_bayley.php

In addition to other existing local monitoring efforts, the Greenland government is piloting a natural resource monitoring system called "Piniakkanik sumiiffinni nalunaarsuineq" (Opening Doors to Native Knowledge)[43], whereby local people and local authority staff are directly involved in data collection, interpretation and resource management.

5 INTERNATIONAL COOPERATION

5.1 COOPERATION WITH DENMARK

Cooperation with the Danish EPA (Environment Protection Agency) has been on-going for many years. Activities have included developing technological solutions to specific environmental problems in Greenland, including waste management and ensuring clean drinking water, developing environmental standards for the oil and mining industry, mapping things left behind after earlier exploration for mineral resources, military activities, expeditions, etc., and clarifying and incorporating Greenlandic factors in the preparation and implementation of international agreements and conventions. The initiatives are usually in the nature of pilot or demonstration projects and can, for example, cover physical installations, information activities and administrative tools. Danish EPA also evaluates the sector programme for low-energy housing refurbishment in Greenland based on an agreement between the two governments.

Since 1994 the Danish Government has provided environmental support to the Arctic though a fund called Dancea (Danish Cooperation for Environment in the Arctic). This fund aims at enabling Denmark to meet its obligations in the Arctic Council and other relevant international fora and is implemented in close cooperation with the Government of Greenland and the Government of the Faroe Islands. Since 2005 the fund has enabled projects on: Environment and health, Effects of climate change, Biodiversity and sustainable use of living resources, and Local environmental conditions. In addition, smaller parts of the aid are directed to ensure the Arctic indigenous people's participation in environmental cooperation - including funding for the Indigenous Peoples' Secretariat (IPS) -, activities related to regional cooperation on the protection of the Arctic environment and horizontal dissemination efforts.

5.2 COOPERATION WITH THE EU

Greenland has since its withdrawal from the EU in 1985 had a fisheries agreement with the EU with Protocols laying down the specific terms in a given protocol period. The main objective of the fisheries partnership agreement is to provide the EU with fishing quotas based on sustainable management and scientific advice, and to maintain and strengthen the relationship in fisheries between the EU and Greenland. The Protocol lays down the fishing opportunities for EU vessels, the financial contribution, the categories of fishing activities and the conditions governing these. In the Protocol there is also a possibility for closer economic cooperation in the fishing industry through the possibility of setting up joint enterprises involving companies from both parties. In 2003 a mid-term evaluation of the agreement was completed with the decision to split the overall agreement up in two: a continued fisheries partnership agreement on commercial terms and, a partnership agreement.

The current Fisheries Partnership Agreement between Greenland and the EU, effective from February 2012, covers the period 1.1.2013 to 31.12.2015. The Financial contribution is € 15 M including a financial reserve of 1.5 M€ for additional quantities of species as set out in the protocol. Additional € 2.7 M per year are earmarked for the support and implementation of Greenlandic sectorial fisheries policy.

The EU and Greenland also signed a letter of intent on mineral resources and a joint declaration. The

43 http://www.pisuna.org/uk_index.html

agreement states the EU and Greenland will co-operate in looking for more geological reserves; analysing the infrastructure and investment needed; building competence within Greenland to enable mine exploitation and regulation; and assessing potential environmental and social problems.

Greenland does not have access to the EDF due to the national GDP level. Between 2001 and 2006 Greenland only received funds from the EU within the context of the EU – Greenland fishing agreement. Greenland receives around €25 million per year under the Partnership Agreement between the EU, Denmark and Greenland. The Programming Document for the Sustainable Development of Greenland (PDSD) – agreed and signed in 2007 – identifies education and vocational training as the focal sector for cooperation for the period 2007-13. This amount was used for budget support to the "Greenland Education Programme", which involves a reform of the education and training sector in Greenland. This has been laid down in the "Programming Document for the Sustainable Development of Greenland", adopted by the Commission in June 2007. Although not directly focused on environment, the PDSD states that environmental awareness is likely to increase as a result of improvements in general education levels, whereas the negative effect of student mobility from remote settlements to schools will to some extent be counteracted by efforts to promote e-learning.

For the period 2014-2020, an indicative amount of 217,8M€ is foreseen to continue the Partnership Agreement. The Government of Greenland has requested to keep education and vocational training as the focal sector for cooperation in 2014-2020.

5.3 Other international cooperation on the environment

Environmental cooperation in the Arctic between Canada, Denmark/Greenland, Finland, Iceland, Norway, Russia, Sweden and the USA was formalised in 1991 with the adoption of the Arctic Environmental Protection Strategy (AEPS). In 1996, the Arctic Council was established, due to a wish that cooperation should be extended to include other dimensions of sustainable development. The AEPS environmental cooperation and working groups continue as before under the framework of the Arctic Council. The Council's activities are conducted in six working groups. The working groups are composed of: representatives at expert level from sectorial ministries, government agencies and researchers.

The six Working Groups of the Arctic Council cover a broad field of subjects, from climate change to emergency response: Arctic Contaminants Action Program (ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME), Sustainable Development Working Group (SDWG).

The Sustaining Arctic Observing Networks (SAON) was formally established in January 2012. It is the result of an Arctic Council initiative launched in 2007, in which initial background work for SAON was done by the SAON Steering Group (SAON-SG). The purpose of SAON is to support and strengthen the development of multinational engagement for sustained and coordinated pan-Arctic observing and data sharing systems that serve societal needs, particularly related to environmental, social, economic and cultural issues. SAON also is committed to facilitating the inclusion of Arctic indigenous people in observing activities, in particular by promoting community-based monitoring (CBM) efforts. CBMP is the biodiversity component of the SAON and the official Arctic Biodiversity Observation Network of the Global Earth Observations Biodiversity Observation Network. The CBMP is the cornerstone biodiversity monitoring program of the Arctic Council and is an international network of scientists, government agencies, indigenous organizations and conservation groups working together to harmonize efforts to monitor the living resources of the Arctic. The CBMP activities are structured around the major Arctic ecosystems: marine, freshwater, terrestrial and coastal. Canada has provided the overall leadership for CBMP over the past eight years. In 2013 that leadership was passed to Greenland/Denmark and the United States, with Canada playing an advisory role during the transition. As in the past, sub-components of CBMP, will continue to be led by different countries.

Greenland is also party of:

North Atlantic Marine Mammal Commission (NAMMCO)	International body for cooperation on the conservation, management and study of marine mammals in the North Atlantic. The NAMMCO Agreement, was signed in Nuuk, Greenland on 9 April 1992 by Norway, Iceland, Greenland and the Faroe Islands.
ICES: International Council for the Exploration of the Sea	ICES is a leading multidisciplinary scientific forum for the exchange of information and ideas on all aspects of marine sciences pertaining to the North Atlantic, including the adjacent Baltic Sea and North Sea.
International Murre Conservation Strategy and Action Plan	Aims at facilitating circumpolar implementation of initiatives to conserve, protect and restore murre populations in the Arctic. Murres are among the most numerous and widespread of Arctic seabirds, and play important roles in the food webs of Arctic marine ecosystems and in the lives of people in coastal communities.

In 2010 Greenland's Climate Research Centre began collaborating with the University of Manitoba, and an extensive Greenland- Danish-Canadian climate research collaboration is bringing together a number of the world's leading scientists in climate research in the Arctic. Currently the Arctic Research Centre of Aarhus University has a formal partnership with Greenland Institute of Natural Resources and University of Manitoba, together constituting the Arctic Science Partnership (ASP). Shared laboratories, research vessels and equipment will enable scientists from the three partner institutions to interact closely, and mutually planned educational programmes will facilitate a smooth, reciprocal exchange of students.

6 RECOMMENDATIONS ON FUTURE COOPERATION BETWEEN EU AND GREENLAND

Greenland is a self-governing territory of Denmark, the world's largest island with an Arctic climate, hosting a population of 56,000. The predominant economic activity of Greenland is fishing. Most of the island is covered by the world's second largest ice-sheet (after Antarctica). Climate change is already making itself felt, with positive and negative impacts on nature and on people's livelihoods and ways-of-life. Hence, some observers have argued that Greenland's decision makers are finding a delicate balance between stewardship of the natural environment, improving the domestic skill and knowledge base, safeguarding the island's political and economic autonomy and considering foreign investors' interests in the Greenlandic natural resource potential[44].

Warming of sea and land is making ice-sheet to shrink, seasons are changing and in consequence ecosystems change. South Arctic species are moving north, but northern Arctic biodiversity is prone to become restricted to a few areas. Iconic species as polar bear are suspected to suffer from these changes. The melting of the permafrost in some areas may cause problems for the existing infrastructure. On the other hand new opportunities are emerging. Agriculture production is slowly increasing. Transporting routes are expanding through the Russian territorial waters, the Eastern Siberian Sea and the Barents Sea, drastically reducing shipping times between Asia and Europe, which some observers indicate will have an effect on Arctic geopolitics. Mining and oil resources are becoming more easily available and exploration cost reduction is boosting commercial interest of foreign private sector. Some observers conclude that this situation has caused European Union, China, the United States and other Nordic powers to try to gain preferential access to the country's vast reserves of oil, natural gas and mineral wealth, including gold and uranium. International media run anecdotal evidence on how the exploitation of extractive resources will cause environmental degradation and erode traditional livelihoods[45].

44 Colclough, C. and O. Perera, 2013, Sustainable Development in Greenland: Perspectives from a preliminary stakeholder consultation, International Institute for Sustainable Development

45 http://www.iwgia.org/news/search-news?news_id=937; http://www.mpe-magazine.com/reports/country-risk-greenland; http://rt.com/business/greenland-zero-tolerance-uranium-718/; http://www.ft.com/intl/cms/s/0/3075c3f0-3d42-11e3-9928-

Another environmental challenge, outside Greenland's direct control, is the widespread presence of transboundary-distributed contaminants, in particular heavy metals and persistent organic pollutants in the Arctic environment generally, and in Greenland in particular. The major environmental problem in the inhabited part of Greenland is waste management; this despite the fact that several solutions have been tested, including local incinerators and transport of waste to central incinerators after baling. Short-lived climate pollutants (black carbon, tropospheric ozone, methane, and hydro fluorocarbons) represent a relevant challenge to the environment, climate change, and health. Wastewater is also considered a problem, namely collection and management of bags from bucket toilets, and discharge of wastewater to the ground or to open sewer.

A recent external sustainable development assessment [46] concludes that several governments in Greenland have had sustainable development as a key priority, established environmental and social safeguards based on best international practice[47] and have prioritized compliance monitoring and public participation across the life cycle of extractive projects. The assessment also concludes that there is a need to: increase capacity to better screen investors; to vet the assessments and records provided by them; to articulate terms and conditions on royalties, rents and revenue sharing; to plan for dispute resolution; to increase awareness and preparedness on occupational health and safety, industrial emergencies; and to diversify industrial development and not focus only on the extractive sectors.

Greenland is also a hub for extensive climate change research and through a continued focus on climate monitoring and research activities, Greenland contributes significantly to the strengthening of the national and international scientific climate research community. Since 2013 Greenland/Denmark assure the co-leadership of Circumpolar Biodiversity Monitoring Program (CBMP) - an international network of scientists, governments, Indigenous organizations and conservation groups working to harmonize and integrate efforts to monitor the Arctic's living resources.

The above described conjuncture together with the assessment made in this profile, lead to the following recommendations:

00144feab7de.html#axzz34oA05TRG

46 Colclough, C. and O. Perera, 2013, Sustainable Development in Greenland: Perspectives from a preliminary stakeholder consultation, International Institute for Sustainable Development

47 Requirements under EIA and SSIAs are modelled following best international practice from geographies such as Canada, Norway, Australia and the European Union

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Improve the waste and wastewater management and infrastructure	Improve the waste and wastewater management and infrastructure	Waste and wastewater management continue to be environmental problems. Several waste management solutions have been tested, including local incinerators and transport of waste to central incinerators after baling, but public adherence to the system is limited and there are concerns that severe health problems may arise from incineration. On wastewater the most challenging problem is collection and management of bags from bucket toilets, and discharge of wastewater to the ground or to open sewer	7 years	Greenland government, private sector			EU and Denmark for technical assistance; Banks and private sector for investment
	Activities						
	Organise a structured business dialog with the (public, private and civil society) stakeholders and decision makers in order to fix realistic plans (ready to be implemented) on wastewater treatment, on different waste streams in order to achieve valorisation of waste, and to manage more efficiently some sorts of hazardous waste. Collect experiences from different small island countries on solutions to increase wastewater management and also waste management. Increase the capacity of wastewater treatment in larger towns. As significant funding to improve inadequate wastewater treatment is required, make all the necessary studies and design road map for improvement. Study possible alternative wastewater treatment methods for Greenlandic communities such as dry composting or anaerobic digestion of excreta, collected at household level using dry or water saving toilets, or freezing and thawing[1] Implement best practices for local waste streams. Establish what waste can be valued in Greenland and which has to be exported. Establish economic and finance incentives and/or taxes to reduce the production of waste. Promote public training, education and community-based action, where appropriate, as integral elements of waste management. Develop communication and outreach tools and methodologies to better convey the importance and value of waste separation and recycling. Enhance efforts ☐to clean-up legacy contaminated sites and include contaminant reduction and reclamation plans in development projects. Support the development and implement appropriate prevention and clean up measures and technologies that are responsive to oil spills in the Arctic, especially in ice-filled waters, such that they are ready for implementation in advance of major oil and gas developments.					

1 Gunnarsdottir, R. 2012, Wastewater Treatment in Greenland. PhD Thesis, Villumsen, Arne (Supervisor); Jensen, Pernille Erland (Supervisor); Deinboll Jenssen, Petter (Supervisor). Technical University of Denmark, Department of Civil Engineering, 2012. 176 p. (DTU Civil Engineering Report; No. R-265).

Goal	Action	Baseline situation	Priority and time frame	Implementing entity(ies)	€ and HR Needs	Risks and Assumptions	Possible € sources
Promote Green Growth and Blue Growth[2]	Improve physical and natural resources planning, develop policies and strategies and legislation for benefiting from the emerging economic opportunities, while safeguarding the pristine environment and interests and livelihood of the population.	Climate change is inducing many changes in Greenland both from a natural and from an economic point of view. This calls for a set of reforms and careful planning and capacity building. This is also an opportunity to enhance sustainable development.	7 years	Greenland government		Political will, availability of funds, availability of staff	EU, Denmark, Private sector, Banks
	Activities						
	Incorporate environmental, climate change and biodiversity as well as social concerns into Greenland's policies, strategies and plans for development. Elaborate a sustainable development plan in accordance with the "Greenland's oil and mineral strategy 2014-2018", which besides oil, gas and mining development, includes shipping, fishing, agriculture, tourism, and science. *Spatial Planning* Complete the identification of ecologically and biologically important marine, terrestrial and freshwater habitats areas take measures to strengthen their protection taking into account ecological resilience in a changing climate (such as loss of sea ice, glaciers and permafrost). Promote the integration of Traditional knowledge into the assessment, planning and management of Arctic biodiversity, and active involvement of indigenous peoples in the management and sustainable use of protected areas. Safeguard areas in the northern parts of the Arctic where high Arctic species have a relatively greater chance to survive for climatic or geographical reasons, such as certain islands and mountainous areas, which can act as a refuge for unique biodiversity. Develop guidelines and implement appropriate spatial and temporal measures where necessary to reduce human disturbance to areas critical for sensitive life stages of Arctic species that are outside protected areas, for example along transportation corridors. Engage into Marine Spatial Planning work in order to optimize the use of inshore and offshore waters around Greenland. Elaborate marine strategies addressing the current and future uses and taking into account climate change, and safeguarding important habitats such as polynyas. *Economic Sectors* Continue efforts on hydropower, but also promote smaller scale renewable energies in smaller settlements. Develop and implement, in cooperation with reindeer herders, management plans that ensure the sustainability of reindeer herding and the quality of habitat for grazing and calving. Test new opportunities for agriculture and forestry in Greenland with a view of increasing self-sufficiency in certain products. Develop agriculture strategy. Strengthen planning and management of commercial fisheries both in the EEZ and in international waters under common international objectives that ensure long-term sustainability of species and ecosystems. Assess the new opportunities due to the changing conditions, and re-train						

2 Accoding to EU's DG Mare Blue Growth is the long term strategy to support sustainable growth in the marine and maritime sectors as a whole. It recognises that seas and oceans are drivers for the European economy with great potential for innovation and growth. It is the Integrated Maritime Policy's contribution to achieving the goals of the Europe 2020 strategy for smart, sustainable and inclusive growth (http://ec.europa.eu/maritimeaffairs/policy/blue_growth/)

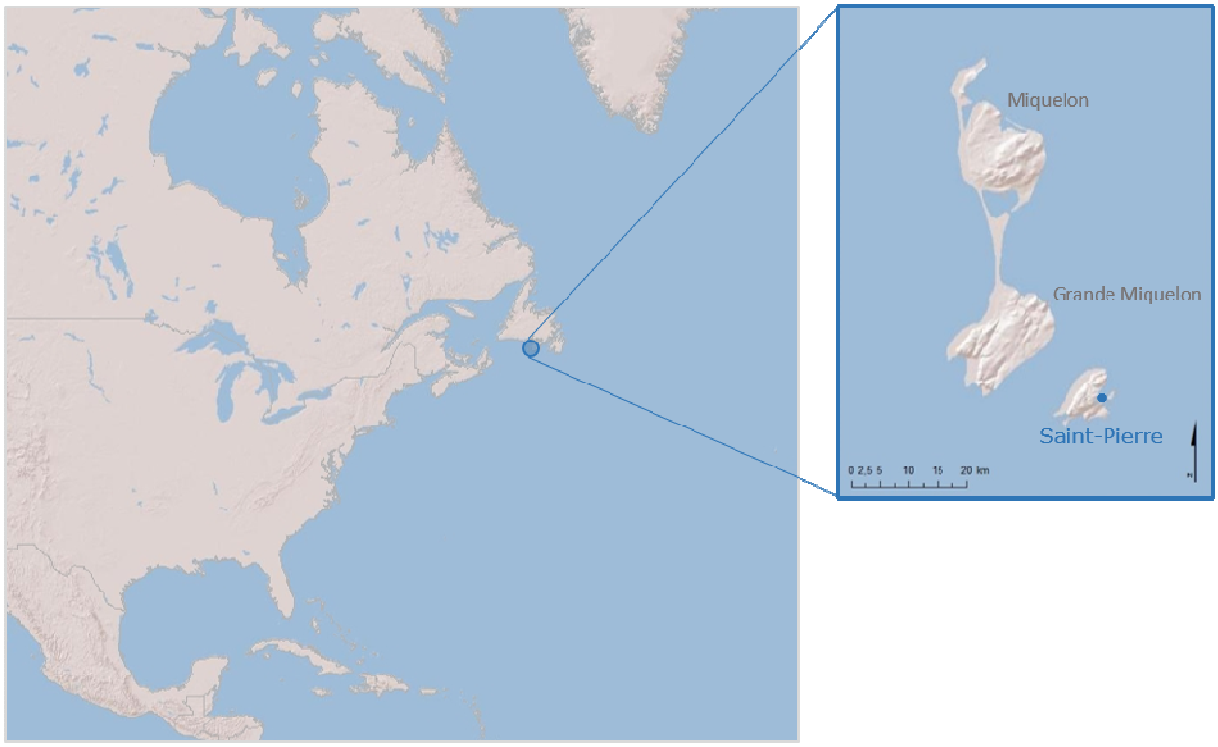
	fishermen. Encourage precautionary, science-based management of fisheries in areas within and beyond national jurisdiction. Support efforts to develop, improve and employ fishing technologies and practices that reduce by- catch of marine mammals, seabirds and non-target fish and avoid significant adverse impact to the seabed. *Safeguarding Tools* Promote sound short and long-term environmental risk assessment and management tools, using the best available scientific and traditional ecological knowledge, following the best environmental practices, considering cumulative effects and adhering to international standards Increase and focus inventory, long-term monitoring and research efforts to address key gaps in scientific knowledge. Continue playing a leading role in Arctic knowledge and monitoring development. Promote public training and education, where appropriate, as integral elements in conservation and management. Develop communication and outreach tools and methodologies to better convey the importance and value of Arctic biodiversity and ecosystems and the changes it is undergoing.

ANNEX C :

SAINT-PIERRE AND MIQUELON

ENVIRONMENTAL PROFILE

SAINT PIERRE AND MIQUELON



SUMMARY

Saint Pierre and Miquelon is a French territorial overseas collectivity, with a population of 6,300 inhabitants, located between the Canadian provinces of Nova Scotia and Newfoundland. Due to the depletion of fish stocks and various maritime claim disputes, this territory has a very limited fishing quota, which has seriously damaged its economy.

Important colonies of seals, dolphins and migratory birds enrich its natural wild environment, which without these animals would seem a desert: in fact, its flora is very diverse, but it is squat and typical of cold, subarctic environments. The main environmental challenges here are linked to solid waste, waste water and the management of fresh water supplies. Climate change is threatening to cause further erosion to the coasts and to submerge any low-lying land. Seawater temperature changes could affect nutrients and fish stocks.

In order to diversify their economy and gain access to offshore oil and gas deposits, SPM wishes to obtain an extension of the archipelago's continental shelf. This has led to a heated debate between France and Canada. France wishes to extend its exclusive economic zone around the archipelago through the EXTRAPLAC project[1]. It has until 2014 to formalise its requests to the UN.[2]

Since 2006 (the date of the previous environmental profile), progress has been made on environmental issues including, in particular, investments in the sector, adoption of strategic plans, development of the aquaculture sector, etc.

The collectivity has indicated its priorities for the coming years in its Strategic Development Plan 2010-2030[5]. In particular, it involves delivering balanced and sustainable management of the territory by:

- reducing energy dependency (in particular, by improving the energy efficiency of buildings and promoting renewable energies);
- preserving and enhancing the environment;
- managing water and waste sustainably.

1 BACKGROUND INFORMATION

Name of territory	Saint Pierre and Miquelon
Region	North Atlantic
Land area	242 km^2
Maritime claims	EEZ: 12,344 km^2 (200 nm)
Population	6,314 inhabitants (INSEE, official figures as of 27 December 2011). 5,716 (CIA estimates for 2014)[3] Density: 26 inhab/km^2
GDP/inhabitant	€28,327[4]
Literacy rate	99% (est. CIA)
Unemployment rate	About 0.04% (2012 IEDOM)

Saint Pierre and Miquelon is a territorial collectivity linked to France, located in the North Atlantic region, 25 km south of Newfoundland. The territory has changed status several times: it obtained its independence in 1976 and became a territorial collectivity of the French Republic with special status in

1 http://www.extraplac.fr/index.php
2 http://www.bfmtv.com/economie/france-canada-s-opposent-petrole-saint-pierre-et-miquelon-664206.html
3 https://www.cia.gov/library/publications/the-world-factbook/geos/sb.html
4 IEDOM Report 2012: http://www.iedom.fr/IMG/pdf/ra2012_st-pierre-et-miquelon.pdf
5 http://www.spmschemadeveloppement.fr/

1985.[5] Since 2003, Saint Pierre and Miquelon has had the status of an overseas collectivity.[6] The status change in 2003 provided a clearer definition of the responsibilities of the different parties (the French government, the territory and the municipalities of the two islands), in particular, regarding the fiscal sovereignty linked to new hydrocarbon resources.

1.1 PHYSICAL GEOGRAPHY AND CLIMATE

The archipelago of Saint Pierre and Miquelon is formed of several small islands and three main islands: Saint Pierre (26 km²), Miquelon (110 km²) and Langlade (91 km²). These last two islands are connected by an isthmus of sand that contains a saltwater lagoon in its northern part known as "Le Grand Barachois" (900 ha). To the north of Saint Pierre, the smallest island, we find Grand Colombier, a small rocky island inhabited by seabirds.

Geologically speaking, Saint Pierre and Miquelon is part of the Appalachian mountain range, just like the two Canadian provinces of Nova Scotia and Newfoundland in between which the territory is located. The poor, rocky and acidic soil has been eroded by the ice, the tough climate and deforestation. The climate is cold and damp, with temperatures ranging between -10°C and -5°C in winter and between 10 and 20°C in summer. The highest peak is the summit of Grande Montagne at an altitude of 240 m.

Saint Pierre and Miquelon is located along the Grand Banks, a group of continental plateaus where the cold Labrador Current meets the warm waters of the Gulf Stream. The mixture of these waters and the shape of the seabed at this location brings the nutrients up to the surface. These conditions have created one of the richest fishing banks in the world (it was so in the past).

1.2 DEMOGRAPHICS AND SOCIOECONOMICS

The inhabitants were originally Basque, Breton and Norman fishermen. The archipelago is faced with a major brain drain of young people leaving to pursue their higher education or to find their first jobs. The island of Saint Pierre is smaller than the island of Miquelon (where only 100 families live) but it is home to most of the population of the territory.

Agriculture, livestock farming and fishing account for a fifth of the working population. The public sector and the construction sector are the major employers. Public administration is a very important economic factor: workers' salaries represent almost half of the added value created on the archipelago and it accounts for 44% of all jobs.[7]

The resumption of cod fishing in 1997 helped to maintain a minimum amount of business for artisanal fishing and for the processing plants. For the 2011-2012 fishing year, the archipelago was allocated the same quotas as for the previous year, except for the TAC (total allowable catch) of squid, which moved from 442 tonnes to 510 tonnes.[8]

Aquaculture has been introduced to compensate the reduction in fishing. Two projects have been launched: cod aquaculture in Saint Pierre and scallop farming in Miquelon. They have run into several difficulties, mainly linked to the novelty of these practices and the validation of production protocols. Launched in 2002, the cod grow-out project required heavy investments that were subsidised by France and the collectivity.

As a possibility for economic diversification, tourism still remains a confined activity, although it directly

5 Law No 85-595 of 11 June 1985

6 Article 74 of the Constitution. The organic law of 21 February 2007 laying down the statutory and institutional provisions on overseas territories.

7 PASE Report - State Strategic Action Project: http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/le-pase-projet-d-action-a193.html

8 IEDOM report 2012 and also for the following paragraphs

or indirectly involves over 10% of the working population on the archipelago. In 2012, the number of visitors (non-residents) who came to the archipelago as tourists totalled 17,210, which represents an extraordinary increase of 50.3% compared with the previous year. This was essentially due to the boom in cruise tourism (the number of cruise passengers arriving here grew by a factor of 5.4), while business tourism fell by 6.1%. Most tourists come to the territory by boat (81%), except for business travellers, 96% of whom come by air.[9]

The archipelago's energy balance is a long way off European objectives; renewable energies only represent 2% of the archipelago's electricity production.

2 BIOGEOGRAPHY, ENDEMISM AND IMPORTANCE FOR GLOBAL BIODIVERSITY

The isolated yet intact ecosystem of the island to the north of St Pierre (Grand Colombier) is particularly rich in bird life, thanks to its morphology that is highly adapted to the habitats of this avifauna: rock faces and many crevices for nesting. This small island is home to 7 species of seabirds.[10]

A large number of birds use the Etang aux Alouettes as their habitat, located to the west of the Grand Barachois. About 325 species of birds have been counted and 85 of these species breed on these islands. Due to its latitudinal position and proximity to North America, the archipelago of Saint Pierre and Miquelon has no endemic species. One species: the piping plover[11] is globally threatened. The territory contains two Important Bird Areas[12] due to their seabird colonies. The presence of seal populations has also been recorded[13] in Grand Barachois, the saltwater lagoon.

The tables below summarise the species that have been recorded in Saint Pierre and Miquelon, according to a recent IUCN publication[14].

Terrestrial biodiversity			
Flora			**Invertebrates**
Lichens	Mosses	Vascular plants	Insects
165 species	177 species	385 native angiosperms and pteridophytes (50% of the species are aquatic or semi-aquatic)	68 species of aquatic coleoptera and heteroptera
Vertebrates			
Fish	Birds		Mammals
A few species	Over 325 species surveyed, most of which are migratory; 87 nesting species (sea and land)		3 native species of bat; 3 species introduced for game

Marine and coastal biodiversity		
Vertebrates		
Reptiles	Birds	Mammals
3 species of turtles	87 nesting species (sea and land)	Species common to the Northwest Atlantic

The archipelago has the only boreal forest found on French territory. However, nearly 40% of the surface of this forest has been destroyed over the last fifty years. The deer introduced to the island of Miquelon-Langlade have slowly been preventing forest renewal.[15]

9 http://www.iedom.fr/IMG/pdf/ra2012_st-pierre-et-miquelon.pdf
10 including the leach's storm petrel, the Atlantic puffin and the razorbill.
11 Charadrius melodus
12 IBA, a classification based on the BirdLife international programme (http://www.birdlife.org/datazone/country/st-pierre-and-miquelon/ibas)
13 Phoca vitulina and Halichoerus grypus
14 Overseas Biodiversity, IUCN French Committee, Roger Le Guen Editions, 2013
15 http://www.senat.fr/rap/r10-308/r10-30826.html

3 STATE OF THE ENVIRONMENT

3.1 OVERVIEW

The government of Saint Pierre and Miquelon wishes to ensure that the population has a guaranteed supply of drinking water, a suitable service for the management of wastewater and a sound waste disposal sector.

3.2 MAJOR ENVIRONMENTAL CHALLENGES

Challenge 1 - Waste - Severe

According to the French National Centre for Independent Information on Waste (CNIID), waste management is very problematic in Saint Pierre and Miquelon, where existing French legislation is not enforced.[16]

The archipelago's old waste disposal plan dates back to 2004. Its waste incineration programme could not be implemented. This was caused by major climate constraints and a relatively modest volume of waste. Furthermore, Canadian legislation prohibits the importing of waste, so it was not possible to organise recycling operations to Canadian provinces.

A new plan (2009-2014) is looking to organise facilities in the next 5 years and to develop new sorting operations in the environmental interest of the archipelago and for the future of the population (see section 5.3).[17]

Non-governmental organisations, such as AIRPURSPM, are urging for quicker solutions to better waste management. [18]

Challenge 2 - Water pollution and water supply - Moderate

There are concerns about the pollution of waterways and about other surface waters affecting the population who live along the banks. Erosion has also increased due to deforestation. Furthermore, there are problems linked to water supply. A considerable amount of tap water is lost due to freezing, leakage and breaks in the dilapidated water pipes. Better quality materials and an improvement in cold weather adapted technology are required to allow the distribution network to function properly. The Goéland dam has been renovated. [19]

Challenge 3 - Nature conservation - Moderate

Despite its small size, the archipelago of Saint Pierre and Miquelon has some remarkable ecosystems that must be protected in the long term. It is essential to implement regulatory mechanisms for sustainable management measures of natural resources in order to halt the loss of biodiversity, in particular, the destruction of the boreal forest and the disappearance of species, such as the ptarmigan.

There are no protection mechanisms for the biodiversity in the archipelago in terms of protected areas. The exception being the land acquired by the Coastal Protection Agency (CELRL), which protects 993 hectares of the Grand Barachois lagoon and 295 hectares of land adjacent to the isthmus of Miquelon-Langlade; it also plans to take action in the Milieu valley and around Henry cove.

16 http://cniid.fr/St-Pierre-et-Miquelon-les-associations,693
17 http://www.servirlepublic.fr/actualites/636/saint-pierre-et-miquelon--nouveau-plan-delimination-des-dechets
18 http://cniid.fr/St-Pierre-et-Miquelon-les-associations,693 and http://airpurspm.wix.com/airpurspm#!documents/ch6q
19 http://www.servirlepublic.fr/actualites/450/saint-pierre-et-miquelon--le-barrage-du-goeland-rehabilite

The project to establish a national nature reserve of "Grand and Petit Colombier" in 2011[20] was not successful due to the reservations expressed by a part of the population of Saint Pierre. Langlade is primarily used as a leisure spot by the people of Saint Pierre, who are concerned that the measures taken to protect the environment may one day lead to restrictions on potential urban development or on hunting activities.[21]

The biodiversity issues primarily concern the management of natural resources: invasive alien species, game hunting and fishing.

The French National Hunting Organisation has conducted several studies in Saint Pierre and Miquelon. The IUCN has also studied the impact on vegetation of deer, rabbits and other game (which were introduced).[22]

Challenge 4 - Climate change - Severe

Due to its location, low-lying islands and fragile coastal belts, this archipelago is exposed to the effects of climate change, such as storms, rainfall, rising air and ocean temperatures and, in particular, rising sea levels.

Over the past few decades, the archipelago seems to have undergone more active phases of erosion. The sea is encroaching on the coast at increasing strength at each winter storm and the dune belts are diminishing. The general retreating of the coastline around these belts also means that storms are affecting infrastructure, in particular, the roads.

Located at the mouth of the Gulf of St Lawrence, the archipelago is impacted by the climate change affecting the region. Its small size and fragile coasts mean that require the capacity to forecast events to enlighten decisions on the future management of the territory.[23]

The DTAM (Directorate of Territories, Food and the Sea) is conducting studies and has set up measurement and management instruments (see section 4.3). The Territorial Collectivity and other financial backers have supported a geomorphological and sedimentary scientific study of the isthmus of Miquelon-Langlade, through a partnership with the University of Perpignan. The Territorial Collectivity hopes that this scientific knowledge will enable an Action Plan to elaborate a climate change adaptation policy.

4 ENVIRONMENTAL GOVERNANCE

4.1 STRUCTURE

Saint Pierre and Miquelon has a locally elected Territorial Council, which appoints a President to serve as head of government. This Council has powers over taxation and customs, as well as in the fields of construction, housing and urban planning. It has jurisdiction over its environment and its commitments are clearly laid down in various programming documents, such as the development contract and the Strategic Development Plan 2010-2030. The Assembly is advised by an Economic and Social Committee.

France appoints a Prefect. France is responsible for defence and foreign affairs. In cooperation with the devolved services from the French government, the Prefecture must deal with a certain number of tasks,

20 The State, the municipality of Miquelon-Langlade and certain organisations wish to take action to protect this environment.
21 http://www.senat.fr/rap/r10-308/r10-30826.html
22 http://www.saint-pierre-et-miquelon.pref.gouv.fr/Publications-annonces-avis/Etudes-et-rapports/Rapport-sur-l-impact-du-cerf-de-Virginie-et-du-lievre-d-Amerique-sur-les-boises-des-iles-de-Miquelon-et-Langlade and www.developpement-durable.gouv.fr/IMG/.../Ref_-_Prgm_Mer.pdf
23 http://www.saint-pierre-et-miquelon.pref.gouv.fr/content/download/1486/8053/file/PASE%20Saint-Pierre-et-Miquelon%202012.pdf

including defence, policing/civil protection, health, education, employment, the environment, agriculture and forestry. The municipalities of Saint Pierre and Miquelon-Langlade have the same powers as a Metropolitan France municipality, and they have their own mayors.

The protection of nature and the environment is the joint responsibility of the French government (which enforces its own environmental laws applicable to the territory through its devolved services over the two municipalities of Saint Pierre and Miquelon) and of the collectivity (the Territorial Council[24]) that deals with planning, investments and implementation.

Due to its status as an OCT, certain EU technical standards are not compulsory, which helps to facilitate trade, in particular, with the United States and Canada.[25]

4.2 INSTITUTIONS

The Directorate of Territories, Food and the Sea (DTAM) [26] of Saint Pierre and Miquelon, resulting from the merger in 2011 of the Directorate of Public Works, the Directorate of Agriculture and Forestry and the Maritime Affairs Service. This Directorate is responsible for environmental issues, with support from operational public institutions (ONCFS[27] and the CELRL[28]).

The DTAM is an interdepartmental directorate of the State, which has been placed under the Prefect's authority. The DTAM was made available to the Territorial Collectivity under the organic law of 2007. It manages the assets of the Territorial Collectivity, performs technical engineering tasks and provides support in the exercise of its powers. The DTAM covers eight services, including the Environment Protection and Risk Prevention Service, and the Service of Spatial Management, Urban Planning and Prospective Studies.[29] It also provides technical assistance to the municipality of Miquelon within the framework of an ATESAT agreement (Technical Assistance from the State for Solidarity and Spatial Management). Similarly to all the State's services in Saint Pierre and Miquelon, the DTAM's work helps to pursue the objectives of the State Strategic Action Plan 2012-2014 (PASE).[30]

A Territorial Natural Heritage Scientific Council (CSTPN) was created in 2007[31]. One of its first activities between 2008 and 2009 was to initiate and supervise an inventory of the archipelago's natural areas of particular interest in terms of ecology and wildlife (ZNIEFF).[32]

SODEPAR (the Development and Promotion Agency of the Archipelago) is the Economic Development Agency of Saint Pierre and Miquelon.[33] SODEPAR has several mandates:

1. To revitalise and develop economic activity in line with the priorities of the Collectivity's sustainable development policy;
2. To improve existing facilities and to work towards the creation of new infrastructures;
3. Representation: to serve as a permanent contact to the European Commission, the OCTA and other European and Metropolitan France authorities, in order to facilitate the mobilisation of aid and subsidies;
4. Promotion and communication.

24 http://www.cg975.fr/
25 PASE Report
26 http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/
27 The French National Hunting Organisation: 2012 Report - Action in the Gulf of Morbihan. http://www.oncfs.gouv.fr/IMG/pdf/rapport_activite_reserves_2012.pdf
28 http://www.dune-miquelon-langlade.net/fr/4-le-conservatoire-du-littoral-a-spm.html
29 http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/presentation-et-missions-r2.html
30 http://www.saint-pierre-et-miquelon.pref.gouv.fr/content/download/1908/10871/file/Projet%20d'action%20strat%C3%A9gique%20de%20l'Etat%202012-2014.pdf
31 By Prefectural Order No 398 of 2 July 2007
32 Overseas Biodiversity, IUCN French Committee, Roger Le Guen Editions, 2013
33 http://www.sodepar.com/

The Chamber of Agriculture, Commerce, Industry, Professions and Crafts [34] (CACIMA) is a public institution run by craftsmen, retailers, farmers and business leaders, who have been elected by their peers. The CACIMA performs an advisory role; the public authorities are required to ask its opinion on the following subjects: trade regulations, taxes (trade tax, the local tax code, the customs code, etc.), commercial urban planning, transport and the environment. The General Assembly of 18 elected members defines policies, determines the activities to carry out and votes on the budget. There are several internal commissions (infrastructure, construction, markets and finance) which conduct studies and issue proposals and recommendations.

The House of Nature and the Environment (MNE) is a territorial service created in 2012/13[35], which existed since 2008 as an association. [36] The MNE has several mandates covering, in particular, education/awareness on the environment and its preservation, as well as interpretation and valorisation of biodiversity. It has also set itself the objective of developing eco-tourism activities on the archipelago. The MNE organises information days and eco-tours, and publishes information documents on nature and the environment. A public interpretative centre on the archipelago's nature will be built in the centre of Miquelon. This territorial facility will increase awareness on the local biodiversity, help people to learn about it and enlarge the tourism season by creating an "all-weather" tourism attraction. To meet these objectives, the project has been included in the State-Territorial Collectivity Development Contract 2007-2013, as well as in the SDS 2010-2030.

The Coastal and Lake Shore Protection Agency (CELRL) purchased its first land on the isthmus of Miquelon-Langlade in 2005. Since 2006, the Agency has had a permanent local office based in Saint Pierre, as part of an agreement signed with the Directorate of Agriculture.

Overview of institutions and powers:

Issue	**Policy decisions**	**Law enforcement**
Environment and biodiversity	TC (Territorial Council)[37] /State	State
Water	Town Council/State	State
Waste	Territorial Council	
Territory management	Territorial Council	
Civil protection [38]	State	State
Integrated coastal zone management	TC/State	State
Fishing and the private sector	TC/State/CACIMA	
Forests, agriculture, livestock farming, renewable energy and energy efficiency	TC/State	
Mining sector and tourism	TC/State	

4.3 POLICIES, STRATEGIES, PLANS AND PROGRAMMES

PASE

A State Strategic Action Plan (PASE) was adopted in June 2012 for 2012-2014. [39] The 5 guidelines of this document are:

1. To encourage sustainable development;
2. To address economic change;

34 http://www.cacimaspm.fr/ Chamber of Agriculture, Commerce, Industry, Professions and Crafts
35 It was officially created on 28 May 2013 (Deliberation No 142/2013)
36 http://www.cg975.fr: see the Environment page and at the bottom of the page there is a link to the MNE.
37 http://www.cg975.fr/
38 Response to natural disasters and emergency situations, coordination of emergency planning measures, responsibility for early warning systems
39 http://www.saint-pierre-et-miquelon.pref.gouv.fr/content/download/1908/10871/file/Projet%20d'action%20strat%C3%A9gique%20de%20l'Etat%202012-2014.pdf

3. To contribute to social cohesion;
4. To promote the archipelago's integration into its regional environment; and
5. To make the State more effective.

For the first guideline "To encourage sustainable development", the State will set up a marine and coastal database for Saint Pierre and Miquelon and will develop scientific partnerships with Metropolitan France and Canada. Its unique biodiversity (petrel colonies, the boreal forest, etc.) will be protected and enhanced. The implementation of the French National Sustainable Development Strategy will primarily rely on the experimental application of an IFREBIOM [40] . The search for endogenous economic development to succeed the sole activity of deep-sea fishing will mobilise the State into action to reform various sectors, whether they involve fishing, aquaculture or agriculture. The development of regional cooperation with its Canadian neighbours will help to find new economic opportunities. The State will actively participate in the exploration of new development "niches" by working complementarily in its areas of expertise. The infrastructures, in particular the port, should help to grasp economic opportunities, such as local development of large cruises market.

SDS

The Strategic Development Plan of Saint Pierre and Miquelon 2010–2030 (SDS) of November 2009 preceded the PASE.[41] The strategic priorities, agreed upon by the socio-economic actors of the territory, are:

- To emphasise and accelerate the archipelago's integration into the regional and international economic environment;
- To consolidate, modernise and diversify the archipelago's business economy;
- To promote and make full use of human resources and to strengthen social cohesion;
- To lead balanced and sustainable management of the territory;
- To implement effective management of the Development Plan.

Furthermore, the following policies and actions are underway:

Management and protection of natural environments/climate change

To improve management of the impacts of climate change, the DTAM has set up in 2009 a comprehensive mechanism to measure and monitor different natural phenomena (erosion, wave height, sea level rising, etc.) within the framework of scientific partnerships with France and Canada.[42] In 2012, a tide gauge was added to the wave-recorder.[43] The data on tides and wave heights is available in real time on the Internet. Further specific actions took place in 2012: the clean-up of ammonia from the SPM Seafood factory and the set-up of a geographical information system (GIS).[44]

Waste

The Territorial Council has developed a new waste disposal plan (PED)[45] adopted in 2011. In 2009, SODEPAR was commissioned to update the 2004 PED and to set up a comprehensive waste disposal sector. Aiming at gathering all the relevant actors in the area of waste management, the Territorial Council is a founding member of the SyGeD[46]: the Joint Association for Waste Management, which includes the Territorial Council, the Municipalities of Saint Pierre and Miquelon and the CACIMA, chaired

40 French Initiative for the Conservation and Management of Overseas Biodiversity
41 http://www.spmschemadeveloppement.fr/documents/SPM_Schema_de_Developpement_Strategique_2010-2030.pdf
42 http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/IMG/pdf/synthese_RA_DTAM_2012_cle6fbc39.pdf
43 PASE Report.
44 DTAM Report 2012: http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/IMG/pdf/synthese_RA_DTAM_2012_cle6fbc39.pdf
45 Text received on the services: Deliberation No 250/2011 approved on 9 November 2011: http://www.cg975.fr/cg975_web/PDF/Publi/JO-Conseil%20Territorial-Novembre2011.pdf
46http://www.sodepar.com/files/file/ENVIRONNEMENT%20le%20syndicat%20mixte%20de%20gestion%20des%20dechets%20cr%C3%A9%C3%A9.pdf

by the President of the Territorial Council.

The new plan intends to gradually refurbish the facilities and to develop new waste sorting operations. In fact, current operations must be modified so they comply with existing regulations. The timetable spans 5 years with two priorities: 1) A reduction in the amount of hazardous waste disposed of in landfills - this waste should be stockpiled before shipment and valorisation; 2) The development of valorisation operations for "ordinary industrial waste" with Canada. In the long term (10 years), the goal is to increase the percentage of valorised waste.

In January 2014, with the State's approval, the town council of Saint Pierre and a private company, Eco-Emballages, launched separate collection of household packaging waste to be recycled. The project will evolve in 3 phases throughout 2014: 1st glass, 2nd plastics and metals and 3rd cardboard. This project is part of a comprehensive, multi-sector approach in waste management, as the town council is also leading initiatives in other waste streams (salvaging scrap iron, batteries and tyres, collecting electrical and electronic waste, composting organic waste, etc.).[47]

Biodiversity

In 2006, an ambitious action plan for the biodiversity of Saint Pierre and Miquelon was launched in the archipelago and approved by the Territorial Council in its Deliberation of 14 May 2008.[48] Five lines of action have been defined:

1. Understanding the biodiversity;
2. Protecting and managing natural areas;
3. Monitoring and policing natural areas;
4. Educating and spreading awareness about the environment and sustainable development;
5. Integrating biodiversity into public policies.

Exchanges and relationships with the Canadian Wildlife Services (Newfoundland) create a dialogue for monitoring common migratory species.

Several projects to establish protected areas have been launched since 2006[49]. Four scientific missions (between 2006 and 2009) have led to:

- the creation of an inventory of the ZNIEFF (natural areas of particular interest in terms of ecology and wildlife) over the entire territory of the archipelago;
- the establishment of a natural reserve project on the island of Grand Colombier located off Saint Pierre, which is home to extraordinary colonies of seabirds (in particular, 10,000 pairs of Atlantic puffins and 180,000 pairs of Leach's storm petrels). A public opinion poll was held for this project but it was rejected;
- the classification of the Grand Barachois lagoon as a wetland, under the Ramsar Convention on wetlands;
- decrees for the protection of biotopes at breeding grounds of piping plovers and tern colonies, or at peat marshes and reforestation sites in the Milieu valley in Saint Pierre.

Energy

A partnership between the Territorial Collectivity and EDF (Electricity of France), for the period 2009-2012, was renewed in December 2012 for electricity demand management.[50] Residents can now receive support to purchase more efficient boilers and to insulate their homes (only for the private residential sector). An "écoprise" operation[51] was put in place with the aim of distributing 1,200 écoprise sockets in 2013 around schools in order to raise awareness among students on energy saving (with the participation

47 http://www.mairie-stpierre.fr/fr/news/284-p-margin-bottom-0-08in-la-mairie-de-saint-pierre-lance-la-collecte-selective-avec-eco-emballages-p-margin-bottom-0-08in.html

48 Overseas Biodiversity, IUCN French Committee, Roger Le Guen Editions, 2013, page 167.

49 http://www.uicn.fr/IMG/pdf/Espaces_proteges-Partie-6.pdf

50 http://saint-pierre-et-miquelon.edf.com/edf-a-saint-pierre-et-miquelon/nos-engagements/les-priorites-d-edf-a-saint-pierre-et-miquelon-50010.html

51 http://www.ecoprise.fr/

of the MNE: the House of Nature and Environment), as well as two promotion campaigns for the use of energy saving light bulbs. [52]

Blue economy - fish products:

In February 2012, a mission of international experts produced an assessment of the amount of fish products available around the two islands. It also proposed a processing operation, which would be included as part of a "bi-localised" PTU project (Single Processing Centre).

By visiting different industrial sites, they could determine an infrastructure "overhaul" project, taking into account their size, age and the existing facilities. The mission identified several emergencies as part of its priority measures, both in terms of "priority investments" to allow the sector to work for the current year and a series of "precautionary measures".

To carry out its work, the mission relied on the local IFREMER office[53] and the State's services, as well as by listening to all the actors in the sector, from fishermen to processors. The synthesis of this study mentions the presence of many premium species in the waters around Saint Pierre and Miquelon, but it also notes the difficulty of accessing these resources due to the following reasons:

- remoteness;
- catch quota restrictions;
- rough seas for much of the year;
- inadequate fishing fleet.

Tourism

To develop tourism, a Regional Tourism Committee (CRT) was established, aiming at defining a promotion strategy for the existing range of tourism services and to position it within the regional tourism offer. This Committee created a "territorial plan for tourism, culture and recreation" in order to develop the sector over the period 2012-2015.

4.4 LEGAL FRAMEWORK AND LAW ENFORCEMENT

Saint Pierre and Miquelon has extended all the multilateral environmental agreements (MEA) signed by France, except for the Kyoto Protocol on Climate Change and the Aarhus Convention.

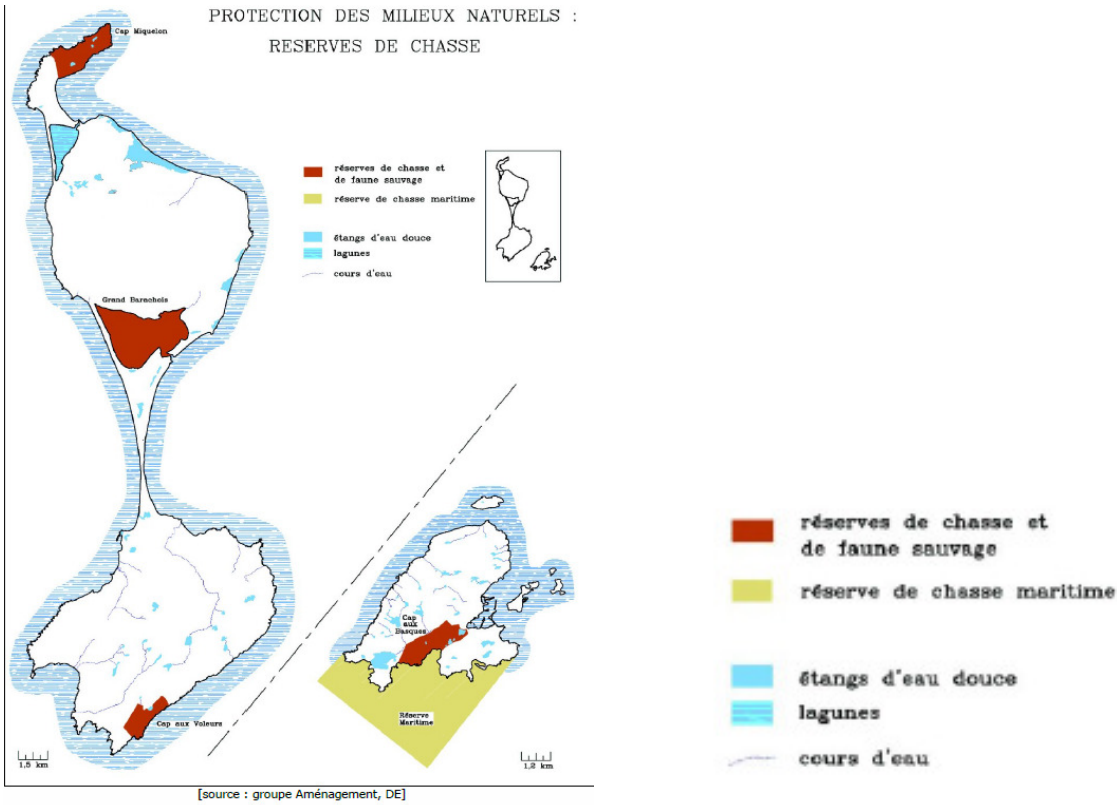
The French Environmental Code applies to the archipelago, although Saint Pierre and Miquelon is the only overseas collectivity that does not benefit from any protected areas regulations, except for its game and wildlife reserves.

The game and wildlife reserves were established by the Prefect following a request by hunting permit holders. There are 4 terrestrial reserves and 1 marine reserve (as by the Prefectural Orders of 29 April 1992 and 23 July 1993). They extend over public and private properties. The Ministerial Order of 27 June 1985 specifies the list of game species, which can be hunted on the archipelago: in total, it contains 4 species of mammals and 44 species of birds.[54]

52 http://sei.edf.com/actualites/toutes-les-actualites/1200-ecoprises-distribuees-a-saint-pierre-et-miquelon-en-2013-283888.html&return=48174%2526page%253D6 and http://sei.edf.com/fichiers/fckeditor/Commun/SEI/Saint-Pierre_et_Miquelon_/Collectivite-Territoriale-SPM-Bilan-operation-Ecoprises-juin-2013.pdf

53 IFREMER Report 2012: http://www.saint-pierre-et-miquelon.pref.gouv.fr/content/download/1555/8556/file/Rapport%20Final%20IFREMER-%20Restructuration%20fili%C3%A8re%20peche%20SPM.pdf

54 Saint Pierre & Miquelon: Diagnosis of the Territory, Directorate of Public Works of the archipelago, Sep 2007. http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/IMG/pdf/DT_2007_web_cle677f76.pdf



[source : groupe Aménagement, DE]

4.5 Environmental awareness

The House of Nature and the Environment (MNE) is particularly active on the archipelago. It is notably behind several environmental education and awareness tools, for example:

- a walking trail guide (Nature Guide) (in French in 2012 and in English in 2013);
- the organisation of a series of pedagogical tools comprising educational exhibitions and events on local biodiversity (from 2009 to 2013);
- the creation of a local network of people connected to education and the environment (environmental education and training in SPM with the school and nature network in 2013, and understanding the territories in 2010);
- the organisation in 2011 of a seminar on enhancing biodiversity and developing ecotourism with other ecotourism actors from France, Canada and Overseas territories.

Several French and international NGOs are working in the territory.

The AIRPURSPM organisation advises and acts against air, water and soil pollution.[55]

4.6 Environmental funding

The Territorial Council decides on the budget allocated to the environment. The Strategic Development Plan (2010)[56] helps us to understand the major development issues for the next 20 years. It involves 5 lines of action: one of which is "To lead balanced and sustainable management of the territory".[57]

There are levies for the use of water and for the collection of household waste. In 2010, the amount collected with those levies was approximately €50,000 in the town of Saint Pierre.[58] This amount does not

55 http://airpurspm.wix.com/airpurspm
56 http://www.spmschemadeveloppement.fr/
57 No data on the breakdown of the budget.
58 http://www.mairie-stpierre.fr/files/file/CPTERENDUCONSEIL/PV%20du%20CM%20du%202-06-2010.pdf

cover the sums invested in the sanitation work or for the collection of household waste.[59]

The Territorial Council, making use of its jurisdiction over customs has been able to lower customs duties on imported firewood and rechargeable batteries.

5 COOPERATION

5.1 COOPERATION WITH FRANCE

On 8 June 2007, the Prefect and the President of the Territorial Council signed a State-Territorial Collectivity development contract for 2007-2013, for a total of €43 million (€19 million for the State and €24 million for the Collectivities).[60]

The objectives of the development contract are divided into four sections:

- Improvement of facilities thanks to the repair of port infrastructures, coastal protection and sustainable waste management (receiving 41% of the funding);
- Economic diversification through the support of aquaculture, the modernisation of the inshore fishing fleet, the development of agricultural production and the support of tourist activities (27%);
- Support for the archipelago's development by focusing on professional training and regional cooperation (19%);
- Improvement of living standards through the financing of cultural and recreational facilities, the repair of the road network in Saint Pierre and an energy efficiency policy (13%).

A new development contract is currently being drafted.

5.2 COOPERATION WITH THE EU

In March 2011, the European Commission approved the Single Programming Document (SPD) presented by the Territorial Council. This document provides for European funding of €20.7 million for 2010-2013. In accordance with the guidelines of the SDS (the Strategic Development Plan of SPM), the 10th EDF focuses on the modernisation of existing businesses and on general support for economic development. About 40% of these funds should be allocated to the activities set out in the State-Territorial Collectivity development contract. In December 2012, the European Commission approved the first payment instalment of €7 million to the budget of the Territorial Council as part of the 10th EDF.

Furthermore, the European Commission has accepted the requests for derogation from the rules of origin, which allows the archipelago to process products from Canada and then export them to the European Union. The first derogation was signed in March 2007 for a duration of six years and accounted for 1,290 tonnes a year of fish products processed in Saint Pierre and Miquelon (fillets of hake, haddock, pollock, plaice, sole, cod, filets of salt cod, whole salt cod and frozen haddock, pollock and cod). A second derogation was agreed in March 2011 for a period of eight years, accounting for 1,075 tonnes of produce (lobster, mussels, mackerel and herring).[61]

59 Saint Pierre & Miquelon: Diagnosis of the Territory, Directorate of Public Works of the archipelago, Sep 2007 http://www.saint-pierre-et-miquelon.developpement-durable.gouv.fr/IMG/pdf/DT_2007_web_cle677f76.pdf
60 Document received on the services and: http://www.iedom.fr/IMG/pdf/ra2012_st-pierre-et-miquelon.pdf
61 IEDOM Report 2012:

5.3 Other international cooperation on the environment (or on environmentally sensitive sectors)

The cooperation between Saint Pierre and Miquelon and the Atlantic Canadian Provinces (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador) is based on the agreement signed on 2 December 1994 between the government of the French Republic and the federal government of Canada. There is an administrative committee and working sub-committees for: economic and commercial relations; aquaculture, agriculture and the environment; tourism; security; health; as well as society, culture and education.

One of the priority objectives of the State Strategic Action Plan (PASE) for SPM is to collaborate on agriculture, aquaculture and the environment (as part of guideline No 4 "To promote the archipelago's integration into its regional environment").[62]

6 Conclusions and recommendations

The main environmental concerns in the territory are linked to waste management, waterway pollution, water supply issues and the lack of statutory protected areas. A reduction in energy dependency has also been included in the Strategic Development Plan.

Another concern is the potential effect of climate change on fishing, given the location of Saint Pierre and Miquelon on the shelf of the Grand Banks.

The priority issues for the Territorial Collectivity of Saint Pierre and Miquelon are:[63]

- Climate modelling for the OCTs (regional affiliation for modelling);
- To assess and map the vulnerability of OCTs to climate change;
- To develop risk management mechanisms;
- The implementation of territorial planning.

62 PASE Report: http://www.saint-pierre-et-miquelon.pref.gouv.fr/content/download/1908/10871/file/Projet%20d'action%20strat%C3%A9gique%20de%20l'Etat%202012-2014.pdf

63 Submitted by the SPM authorities in November 2013

Goal	Action	Current situation	Priority and time frame	Responsible entities	€ and HR needs	Risks and assumptions	Possible sources of funding
Conservation of natural heritage	Create new protected areas Protect the boreal forests	A nature reserve on the island of Grand Colombier (uninhabited). 4 game and wildlife reserves and one marine reserve. The CELRL's land on the isthmus of Miquelon-Langlade is now managed by the municipality. The deer introduced to the island prevent forest renewal. 2 IBAs (BirdLife)		DTAM		More participatory consultation with the population	
	Activities						
	--Study and show the economic and social consequences of creating new reserves/protected areas. --Establish and protect more habitats thanks to the ZNIEFF inventory (natural areas of particular interest in terms of ecology and wildlife) --Implement an IFREBIOM (French Initiative for the Conservation and Management of Overseas Biodiversity) by the State to mobilise all the actors for the preservation of the archipelago's biodiversity and, in particular, the boreal forest. --Establish an environmental observatory --Develop a plan to improve the management of invasive alien species. --The implementation of territorial planning						

Goal	Action	Current situation	Priority and time frame	Responsible entities	€ and HR needs	Risks and assumptions	Possible sources of funding
Waste management	Modernisation of waste management	A joint association has been created (SyGeD) A new plan is currently being drafted		DTAM, SyGeD and SODEPAR Territorial Council Municipalities CACIMA Eco-Emballages ADEME			
	Activities						
	--Support the drafting of the new plan (for the collection, sorting, processing and recovery of waste) --To support and assess the initiative by the town council of Saint Pierre and Eco-Emballages for the separate collection of household packaging waste to develop this area of recycling. --To detail and implement the agreement with Canada for the exportation/recovery of waste. --To organise soil decontamination following the dismantling of the power plant built in 1984. --To help the collectivities to implement a compliant waste collection and processing system that ensures the health of inhabitants and the protection of the environment.						

Goal	Action	Current situation	Priority and time frame	Responsible entities	€ and HR needs	Risks and assumptions	Possible sources of funding
Climate change and energy	Improve energy efficiency. Promotion of renewable energies.	Fuel oil is the main source of energy on SPM. Saint Pierre accounts for 86% of the archipelago's total electricity consumption.		DTAM Territorial Council EDF			
	Activities						
	--Continue to support the purchase of more efficient boilers; --Information campaigns to reduce electricity demand; --Improvement of the energy efficiency of buildings; --Study/support the project to install a heating network that supplies public buildings in Saint Pierre; --Continue to measure, assess and model the impact of climate change and the frequency of extreme weather events (on the coastline and on fish resources). --Collaboration between researchers from Quebec and local actors to exchange scientific data, which will help to simulate climate change in the region.						