GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO

FOURTH NATIONAL REPORT OF TRINIDAD AND TOBAGO TO THE CONVENTION ON BIOLOGICAL DIVERSITY

Male White-necked Jacobin (*Florisuga mellivora*)

EXECUTIVE SUMMARY

provides an update on the status of implementation of the Convention in Trinidad and Tobago, and assesses the progress of the country in meeting the 2010 Biodiversity Target. Preparation of the report was consistent with the guidelines provided by the CBD and was informed by perspectives and inputs of key stakeholders. The Report is presented in the following four (4) chapters:

- Chapter 1: An assessment of the status of, trends in and threats to biodiversity in Trinidad and Tobago
- Chapter 2: An update on the implementation of Trinidad and Tobago's National Biodiversity Strategy and Action Plan (NBSAP)
- Chapter 3: An overview of efforts to mainstream biodiversity into national policies, programmes and projects
- Chapter 4: Conclusions: Progress towards the 2010 Target and implementation of the Strategic Plan

Trinidad and Tobago is an archipelagic State, situated appropriately between 10^0 2' and 11º 12' north latitude, and 60^0 30' and 61º 56' west longitude. The country consists of the two (2) main islands, Trinidad and Tobago, and 21 smaller islands and islets. Trinidad is the larger of the two islands, with an area of approximately 4,827 km^2 while Tobago has an area of 303 km^2. The Exclusive Economic Zone (EEZ) of the country covers an area of seventy-five thousand square kilometres (75,000 km^2) – almost fifteen times as large as the land area of the islands combined.

Trinidad and Tobago boasts a rich biota relative to its size. The country's rich biodiversity is directly attributable (though not exclusively) to its geological history and location to the South American continent. The past and fairly recent "land bridge" to the South American continent, and proximity to the Orinoco River Delta and outflow, is attributed to the existence of relic continental species and relatively easy of colonization of mainland species into Trinidad and Tobago. Additionally, topographical features and associated microclimate variability (rainfall and temperature), as well as other factors such as varying soil types, and human activities all influence the country's biodiversity.

There are a number of natural ecosystems found in the country, including forest ecosystems ; inland freshwater systems (rivers and streams); coastal and marine ecosystems (coral reefs, mangrove swamps, seagrass beds and open ocean); savannas; karst landforms (including caves); and man-made/induced systems (secondary forests, agricultural lands and freshwater dams). For the purpose of this report, three (3) main biomes (Forested Ecosystems, Inland Freshwater Ecosystems and Marine and Coastal Ecosystems) are considered in the assessment of status, trends and threats.

The biodiversity of Trinidad and Tobago plays an important role in many of the ecosystem services that support human well-being – directly such as through the provision of freshwater, forest products and fisheries and indirectly , such as through a number of biophysical processes and amenities.

The Government of Trinidad and Tobago produced its National Biodiversity Strategy and Action Plan (NBSAP) in 2001. The NBSAP was developed through extensive stakeholder engagement and consultation and identified a number of strategies and actions for improved biodiversity conservation in the following broad categories:

- Education and Awareness
- Legislation and Enforcement

- Institution and Capacity
- Information and Research
- Policy and Commitment

The NBSAP remains the main document for guiding the implementation of the CBD in Trinidad and Tobago and significant progress has been made with respect to education and awareness and improvements to the legislative framework especially through the declaration of the environmental sensitive areas and species. Despite the progress made, the main challenges to NBSAP implementation have been lack of coordination of efforts, capacity and financing. It has been recognized that there is a need to revise and update the NBSAP. In this regard, discussions have been initiated between the Ministry responsible for the Environment and the Environmental Management Authority (EMA) regarding the revision of the NBSAP. Consideration is currently being given to the financial and capacity requirements for undertaking the work. It is anticipated that revision of the NBSAP will begin in 2011 and completed within 9 to 12 months of initiation. In the meantime, the Government of Trinidad and Tobago through the EMA will continue to implement the measures outlined in the current NBSAP to effectively manage biodiversity, and begin correcting some of the negative trends.

In Trinidad and Tobago, there are over 50 laws, polices, plans, strategies and programmes which seek to address biodiversity issues resulting in multiple government agencies having responsibility for management of biodiversity resources. There appears to be a growing understanding that the biodiversity of the country is declining, and that the economic (and other) costs of such a decline can no longer be overlooked. Worsening trends in biodiversity throughout the country indicate that efforts to date have not achieved a more sustainable approach to the management of biological resources. The question is why, and much of the answer lies in the limited extent to which biodiversity considerations have been mainstreamed in Trinidad and Tobago.

It is recognized that mainstreaming biodiversity in a manner that is meaningful and makes the best use of resources will not be an easy task. There are a few key steps which must be addressed urgently in order to make Trinidad and Tobago's efforts to manage biodiversity more effective. This can only be achieved through thinking strategically but acting specifically with the following considerations in mind:

Defining roles and responsibilities: There is a need for better coordination and collaboration amongst stakeholders involved in biodiversity management, including the definition of roles and responsibilities for achieving a joint work programme. What might be most useful to achieving better coordination is the development of a Programme of Work which is operationalized through the establishment of Working Groups based on stakeholder clusters e.g. Public Agencies; NGOs and CBOs; Research Institutions; Private Sector; and other interest groups. The mandate of Working Groups will be defined in specific Terms of Reference (TORs). Working Groups could meet occasionally and exchange views through electronic means (e.g. an intranet) which would improve logistics and minimise the occurrence of consultation fatigue since stakeholders could make inputs as their schedules allow. In addition to these Working Groups, there could also be the formation of specialist groups to address specific issues. This will ensure greater coherence in efforts. Such a mechanism, however, requires commitment, and Government will need to establish means (including incentives) to ensure ongoing participation. Within the public sector, such involvement should be institutionalized so that involvement is not seen as an 'add on'. For other stakeholders, incentives both financial (to cover time and support project activities) and otherwise could be offered.

Setting priorities: It will not be feasible to address all biodiversity-related problems at once. What is therefore required is the re-ordering of priorities identified in the NBSAP which address the current problems being faced by the country. The establishment of priorities would require:

- Identification of problems with a common cause and common solution to better facilitate a multiplier effect
- Assessment of the existing environmental legislation and policies (including drafts). In this regard, emphasis should be placed on ensuring that there is coherence and agreement among the various instruments, guided by a set of defined priorities for management
- Development of a national agenda for environmental research to promote a focus on critical data and information gaps.

Allocating resources: The allocation of resources (human and financial) should be guided by the process of priority setting. As a small island developing state, Trinidad and Tobago will continue to face problems of capacity. Emphasis should therefore be placed on the best orientation and use of existing entities and resources to achieve optimal output

Trinidad and Tobago has made some progress in achieving the 2010 Biodiversity Target. Some aspects of Trinidad and Tobago's biodiversity however have continued to show signs of decline, with some aspects suffering significant losses. Certain amenities of the environment, such as flood regulation are far more compromised and require urgent attention, and it is clear that the economic and social costs of inaction are beginning to take effect.

Data and information on the main direct driving forces in Trinidad and Tobago are in keeping with those outlined in the 3rd Global Biodiversity Outlook, with the following order of priority:

- Habitat loss
- Unsustainable use and overexploitation of resources
- Pollution
- Climate change
- Invasive alien species

It is now fully recognized that the following considerations are important in improving biodiversity management:

- Government involvement and leadership to serve as the backbone
- Improved collaboration and coordination
- Better integration of biodiversity considerations into all national plans, policies and programmes
- Research as a crucial step in biodiversity planning
- Funding and capacity development as key supporting mechanisms

The Government of Trinidad and Tobago has given its commitment to the protection of the country's biodiversity. Efforts are currently underway and plans are in place to revisit and update key pieces of legislation, policies, strategies, plans and actions, which will be crucial for improved management of the country's biological resources.

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LIST OF ACRONYMS

AMCHAM	American Chamber of Commerce
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CARSEA	Caribbean Sea Assessment
CBD	Convention on Biological Diversity
CBO	Community Based Organizations
CDA	Chaguaramas Development Authority
CEC	Certificate of Environment Clearance
CEPA	Communication, Education and Public Awareness
CITES	Convention on International Trade in Endangered Species
COP	Council of Presidents of the Environment
CRU	Cocoa Research Unit
CSO	Central Statistical Office
CXC	Caribbean Examinations Council
DNA	Deoxyribonucleic Acid
DNRE	Department of Natural Resources and the Environment
DSF	Deciduous Seasonal Forest
EE	Environmental Education
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMA	Environmental Management Authority
EMAct	Environmental Management Act Chapter 35:05
ESA	Environmentally Sensitive Areas
ESF	Evergreen Seasonal Forest

ESS	Environmentally Sensitive Species
EW	Elfin Woodland
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
GLOBE	Global Learning and Observation for the Benefit of the Environment
GoRTT	Government of the Republic of Trinidad and Tobago
HS	Herbaceous Swamp
HSE	Health, Safety and the Environment
ICG, T	International Cocoa Genebank, Trinidad
ICC	International Coastal Clean-up Exercise
ICS	Imperial College Selections
ICCAT	The International Commission for the Conservation of Atlantic Tunas
IE	Isozyme Electrophoresis
IITF	International Institute of Forestry
IMA	Institute of Marine Affairs
IRO	Inter-Religious Organization
IUCN	International Union for Conservation of Nature
LAC	Latin America and the Caribbean
LAD	Land Administration Division
LBS	Land-based Sources (of Pollution)
LMF	Lower Montane Rain Forest

LSA	Land Settlement Agency
LSD	Land and Surveys Division
MA	Millennium Ecosystem Assessment
MaF	Marsh Forest
MDG	Millennium Development Goals
MgW	Mangrove Woodland
MOA	Memorandum of Agreement
MODIS	Moderate Resolution Imaging Spectroradiometer
MOU	Memorandum of Understanding
MOWT	Ministry of Works and Transport
NBSAP	National Biodiversity and Strategy Action Plan
NEP	National Environment Policy
NGO	Non-Governmental Organization
NIHERST	National Institute of Higher Education, Research, Science and Technology
OECS	Organisation of Eastern Caribbean States
PAs	Protected Areas
PF	Palm Forest
POP	Persistent Organic Pollutant
RAPD	Random Amplified Polymorphic DNA
SAD	Stakeholders Against Destruction
Sav	Savanna
SEAs	Strategic Environmental Assessments
SESF	Semi-Evergreen Seasonal Forest
SMF	Seasonal Montane Forest
SPAW	Specially Protected Areas and Wildlife

SwF	Swamp Forest
T&T	Trinidad and Tobago
TCPD	Town and Country Planning Division
TDC	Tourism Development Company
THA	Tobago House of Assembly
TTMA	Trinidad and Tobago Manufactures Association
TORs	Terms of Reference
TSH	Trinidad Selected Hybrids
TTABA	Trinidad and Tobago Agri-Business Association
UN	United Nations
UNCLOS	The United Nations Convention on the Law of the Sea
UNDP	United National Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNCCD	United Nations Convention to Combat Desertification
US	United States
USDA	United States Department of Agriculture
UWI	The University of the West Indies
WASA	Water and Sewerage Authority of Trinidad and Tobago
WRI	World Resources Institute

CHAPTER 1

TRINIDAD AND TOBAGO'S BIODIVERSITY:

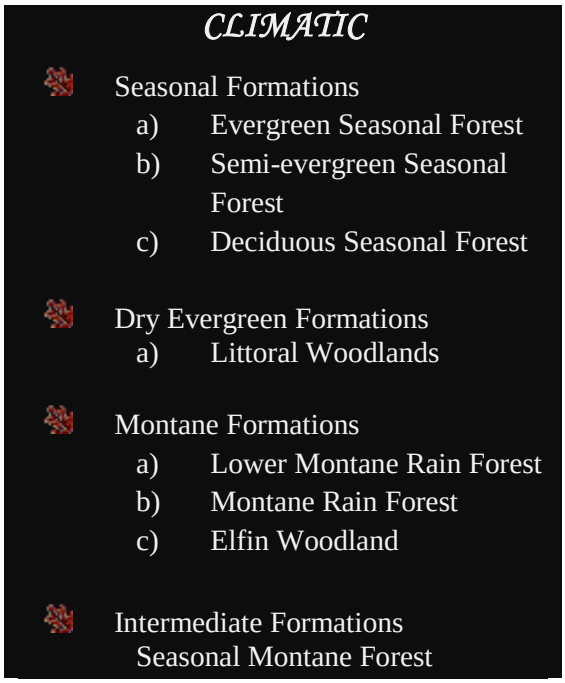
STATUS, TRENDS AND THREATS

Asa Wright Nature Reserve

Proposed Union Estate Industrial Estate

1.1 Main Ecosystem Types Found in Trinidad and Tobago

The Republic of Trinidad and Tobago exhibits many of the environmental characteristics which are common to small island states[1]. The country hosts a variety of ecosystems and based on a 1946 classification of the natural vegetation of Trinidad and Tobago compiled by Beard, the main (natural) terrestrial ecosystem types found on the islands are shaped by two main factors - climate and soils (edaphic). These formations are characterized as follows:



In addition to those outlined above, the following other ecosystem types are recognized:

- Inland freshwater systems – rivers and streams
- Coastal and marine ecosystems
  - Mud bottom
  - Coral reef and communities
  - Seagrass beds
  - Sandy bottoms
  - Beaches
  - Rocky shores and littoral
  - Mud flats
  - Freshwater and estuarine systems
  - Open Sea
- Man-made/man-induced systems
  - Secondary Forest
  - Agricultural lands
  - Freshwater dams/reservoirs
- Karst landforms (including karren, caves, springs, valley systems, and a range of doline or sinkholes, including any area of polygonal cockpit karst)

[1] As given by the Millennium Ecosystem Assessment 2005.

For the purpose of this report, an assessment of status, trends and threats on the forest, inland freshwater and marine and coastal ecosystems was conducted. The assessment is in keeping with the logic of the Millennium Ecosystem Assessment Conceptual Framework and information is presented on the following:

- Characterization of the main ecosystem types found on the islands
- Links between biodiversity and human well-being in Trinidad and Tobago
- Status of, and main trends in Trinidad and Tobago's biodiversity
- Driving forces affecting Trinidad and Tobago's biodiversity
- Consequences/implications for human well-being because of changes in biodiversity

The assessment does not adopt a strict biome-by-biome synthesis approach, given the significant overlap across biomes especially in the assessment of status and trends as well as for the driving forces of change and consequences/implications for human well-being.

1.2 Links between Biodiversity and Human Well-being in Trinidad and Tobago

The biodiversity of Trinidad and Tobago plays an important role in the ecosystem services that support human well-being. Directly some of these include the provision of freshwater, flood regulation/erosion control, tourism/ecotourism (beaches, forests, coral reefs, bird watching), recreation, shoreline protection (provided by coastal ecosystems such as mangroves, coral reefs and seagrasses) and the provision of food (fisheries, aquaculture, wild game meat/wildmeat, crops and livestock). Fisheries support many coastal communities on both islands; subsistence agriculture supplements the income of rural groups throughout the country; rural communities are also increasing reliant on the growing sector of ecotourism especially in the north-eastern regions of Trinidad where turtle watching has become very lucrative and guided forest tours in selected regions of the Northern Range; traditional tourism throughout Tobago is predicated on healthy biodiversity and functioning ecosystems; and non-timber forest products provide raw materials for cottage industries such as handicraft manufacturing and traditional medicines. Additionally, the country's biodiversity indirectly provide a number of regulating (carbon sequestration and nutrient cycling), supporting and cultural services.

There is a general paucity of quantitative data and information on the links between biodiversity and human well-being in the country, but based on available datasets, published reports, expert judgments and narratives, it is possible to characterize the main benefits derived from biodiversity-related services (Table 1.1).

TABLE 1.1: CHARACTERISATION OF THE MAIN ECOSYSTEM SERVICES PROVIDED BY BIODIVERSITY IN TRINIDAD AND TOBAGO[2]

Main Ecosystem Types/ Biomes	Provisioning Services	Regulating Services	Supporting Services	Cultural Services
Forests	• ***Timber*** • ***Non-timber forest products*** (including wildlife, handicraft and medicinal plants) • Tropical forest biota i.e. game species and species used in the pet trade	• ***Runoff regulation and retention*** • ***Biodiversity services*** (population regulation, habitat and species diversity) • ***Soil conservation;*** • ***Soil formation and fertility;*** • ***Climate and microclimate regulation;*** • ***Atmospheric composition regulation***	• ***Water cycling and replenishment*** of surface and ground water resources • ***Biodiversity support*** (pollination, germination, dispersal, food webs, productivity, terrestrial/aquatic ecosystem interface) • ***Nutrient cycling and transport***	• ***Amenity value*** (recreation; ecotourism; cultural heritage, diversity and values including spiritual and religious practices, inspiration and aesthetics, cuisine) • ***Education***: scientific research and teaching
Inland Freshwater systems: Rivers and Streams	• ***Freshwater sources*** • ***in land fisheries, species for the pet trade;*** • ***Aquaculture*** • ***Aquatic species used in the pet trade***	• ***Waste disposal, assimilation and treatment*** (for the provision of freshwater) • ***Flood regulation, water storage*** • ***Biodiversity services*** (population regulation, habitat and species diversity)	• ***Biodiversity support*** (food webs, productivity, terrestrial/aquatic ecosystem interface) • ***Nutrient cycling and transport***	• ***Amenity value*** (recreation, religious practices and values, aesthetics and inspiration) • ***Education***: scientific research and teaching
Coastal/ Marine systems	• ***Marine fisheries*** (including other coastal and marine products – e.g. oysters, shrimp, crabs) • ***Other food*** (wildlife, agricultural	• ***Waste disposal, assimilation and treatment*** (regulation of coastal water quality) • ***Flood regulation/ water storage***	• ***Biodiversity support*** (food webs, productivity, terrestrial/aquatic ecosystem interface) • ***Nutrient cycling and transport***	• ***Amenity value*** (tourism; recreation, turtle watching; spiritual and religious practices and values, aesthetics and inspiration) • ***Education***:

[2] In more recent thinking and studies on ecosystem services, regulating and supporting services are sometimes collapsed into a single group. This National Report recognises that there is overlap between the two groups but treats them separately.

Main Ecosystem Types/ Biomes	Provisioning Services	Regulating Services	Supporting Services	Cultural Services
	products) • ***Coastal and wetland resources*** (eg. from mangroves) • ***Ornamental marine, brackish water species***	• ***Shoreline protection (***provided by coastal ecosystems such as mangroves, coral reefs and seagrass beds) • ***Climate and microclimate regulation*** • ***Biodiversity services*** (population regulation, habitat and species diversity)		scientific research and teaching
Agricultural systems	• ***Agricultural products:*** *crops and livestock*	• ***Provide variations on natural habitats well as new niches*** • ***Soil conservation;*** • ***Soil formation and fertility;*** • ***Climate and microclimate regulation;*** • ***Atmospheric composition regulation***	• ***Biodiversity support*** (food webs, productivity, terrestrial/aquatic ecosystem interface) • ***Nutrient cycling and transport***	• ***Amenity value*** (agrotourism) • ***Education***: scientific research and teaching

Adapted from the Northern Range Assessment (2005)
Information sources: IMA (2010); Alburg (2007); CARSEA (2007); Kenny (2008)

One of the key services provided by forest systems is runoff regulation/erosion control/water provision. Forests play a significant role in the prevention of soil erosion especially on the steep slopes of the islands' mountain ranges thereby minimizing hazards such as landslides – principally the Northern Range, Trinidad and the Main Ridge, Tobago. Forests by reducing the rate of runoff also reduce flooding in the low-lying regions of the island. A study undertaken over a five-year period (1984 to 1989) in Trinidad provides quantifiable information on the importance of forest cover to protection from erosion, and indicates that soil loss could increase by a factor of two hundred and seventy-nine (279) when forests are converted to cultivated land (Table 1.2).

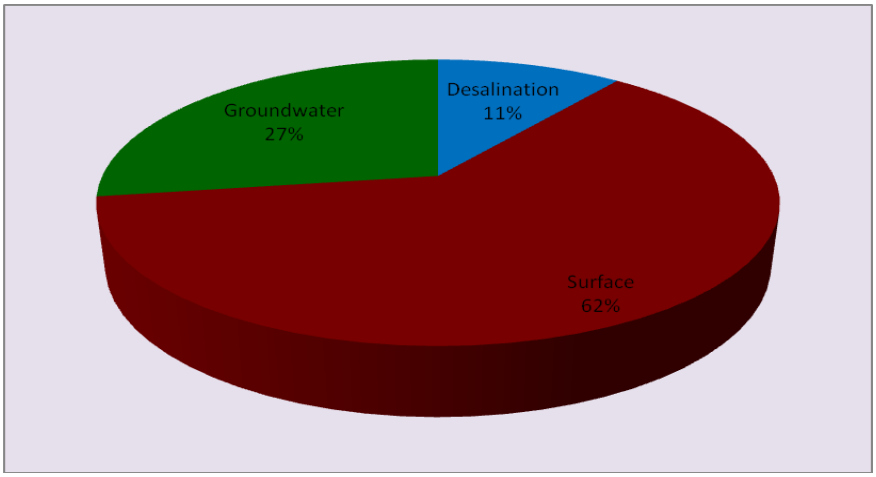
TABLE 1.2: SOIL LOSS FOR AN ANNUAL AVERAGE RAINFALL OF 161.7cm UNDER VARYING VEGETATIVE COVER BETWEEN 1984 AND 1989

Land use	Average annual ($t/ha^{-1}/year^{-1}$)	Loss factor
Natural forest	0.046	1
Degraded forest	0.516	12
Grassland	2.673	63
Cultivation	11.878	279

Source: Faizool 2002 (based on Forestry Division, Watershed Management Unit)

Freshwater in Trinidad and Tobago is largely derived from the natural watersheds (forested ecosystems) across the country, especially the Northern Range, Trinidad and the Main Ridge, Tobago, through either surface water sources or groundwater sources. A relatively smaller percentage of freshwater (11%) is also produced through desalination on Trinidad's west and south coasts. Figure 1.1 shows the percentage dependence on different sources for freshwater provision in 2009, and it is worth noting that this apportionment has generally remained unchanged over the last four years.

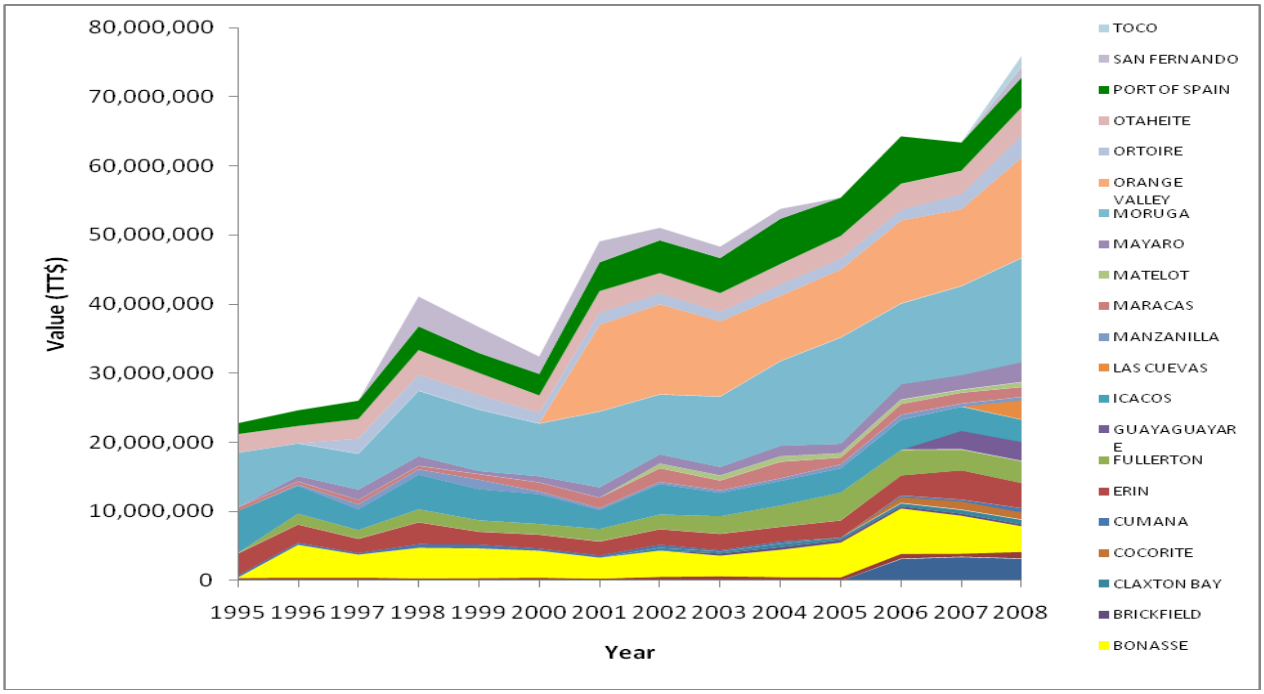
FIGURE 1.1: FRESHWATER ABSTRACTION FROM DIFFERENT SOURCES AS A PERCENTAGE OF TOTAL ABSTRACTION IN TRINIDAD AND TOBAGO (2006 - 2009)



Source: Water and Sewage Authority 2010 (unpublished)

Data indicate that the economic contribution of coastal and marine fisheries, especially to coastal communities throughout Trinidad and Tobago is increasing. Figure 1.2 shows the annual values of catch landed at a number of fishing sites around Trinidad from 1995 to 2008. As at 2008, the total value of catch stood at its highest recorded value to date - TT$75,860,118 (or US$12,355,068 equivalent). Some of the commercially important species include the Snappers (*Lutjanus* spp), Croaker (*Micropogonias furnieri*), Sharks, scombrid species (Tunas, mackerels – kingfish and Spanish mackerels), shrimp (*Litopenaeus* spp, and *Farfantepenaeus* spp), Billfish (*Xiphias gladius*), sciaenids, Herring (*Opisthonema oglinum*) and Cavalli (*Caranx* spp). In 2007, species like the Carite (*Scomberomorus brasiliensis)*, Croaker (*Micropogonias furnieri*), and a number of sharks constituted the greatest weight of estimated landings (Fisheries Division of the Ministry of Food Production, Land and Marine Resources, 2009).

FIGURE 1.2 ESTIMATED VALUE OF LANDINGS BY SITE IN TRINIDAD (1995 – 2008)



Source: Fisheries Division 2010
Analyzed data for 2009 not yet available.

Biodiversity is, in many ways, a key factor which supports activities related to recreation, tourism, scientific research and education. Every year, nature reserve sites such as the Caroni Swamp (Ramsar site), the Nariva Swamp (Ramsar site), the Matura Park (an internationally significant nesting grounds for the endangered leatherback turtle), the Quinam Bay Recreation Park, the Lopinot Historical Site, the River Estate Museum and Water Wheel, and a number of other recreational areas, attract thousands of visitors – mostly locals – because of their aesthetic value.

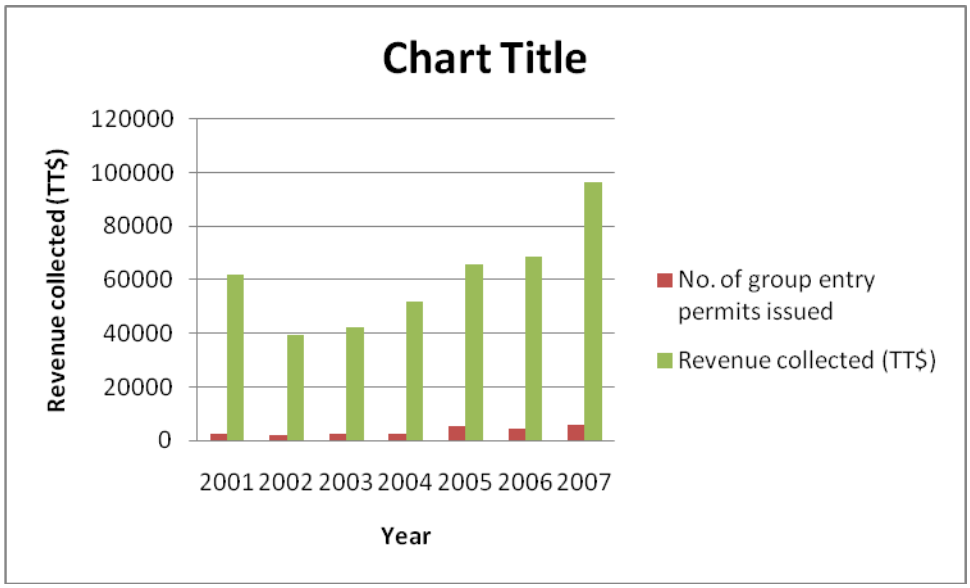
There are also facilities such as the Asa Wright Nature Centre (located in Trinidad's eastern Northern Range and is a world renowned destination amongst the ornithological community), and the Wildfowl Trust (located in an oil refinery in southern Trinidad) which have a well-established reputation for providing both local and international opportunities for biodiversity-related education, scientific research, recreation and ecotourism opportunities. These institutions also provide conservation services both *in-situ* and *ex-situ*, and they have been important in demonstrating that both development activities and conservation efforts can coexist if done within a proper planning framework[3].

One activity which has gained increasing popularity over the years is turtle viewing on Trinidad's north-eastern coast. As is shown in Figure 1.3, the number of permits and revenue collected from turtle viewing on an annual basis over the 2001/2007 period has generally increased. This income may not be significant in terms of national GDP, but it helps to support the livelihoods of a number of coastal communities in the areas that such activities take place, including Grande Riviere, Matura and Fishing Pond. In addition, and perhaps more importantly, the communities which depend relatively heavily on turtle viewing as a

[3] More information on how this has been achieved is available on the facilities' websites.

source of income have helped to enhance conservation efforts to protect species which are currently threatened such as the Leatherback turtle (*Dermochelys coriacea*).

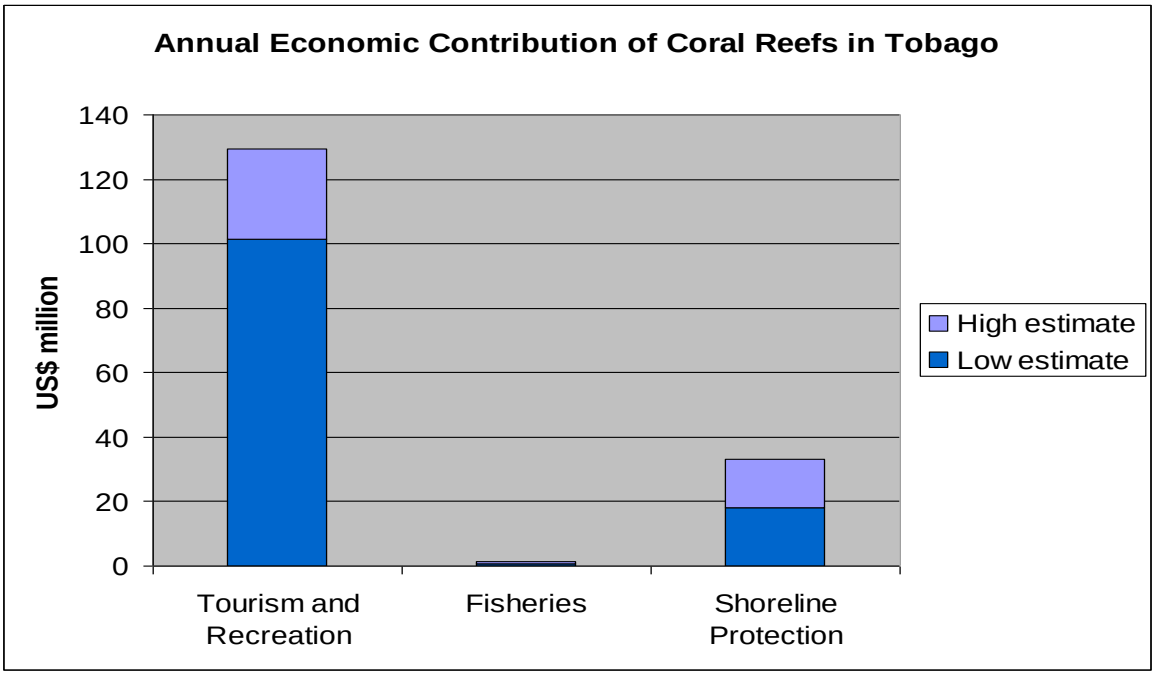
FIGURE 1.3: PERMITS ISSUED AND REVENUE COLLECTED FOR TURTLE VIEWING IN TRINIDAD (2001 – 2007)



Source: Forestry Division 2009
No data are available for 2008 and 2009

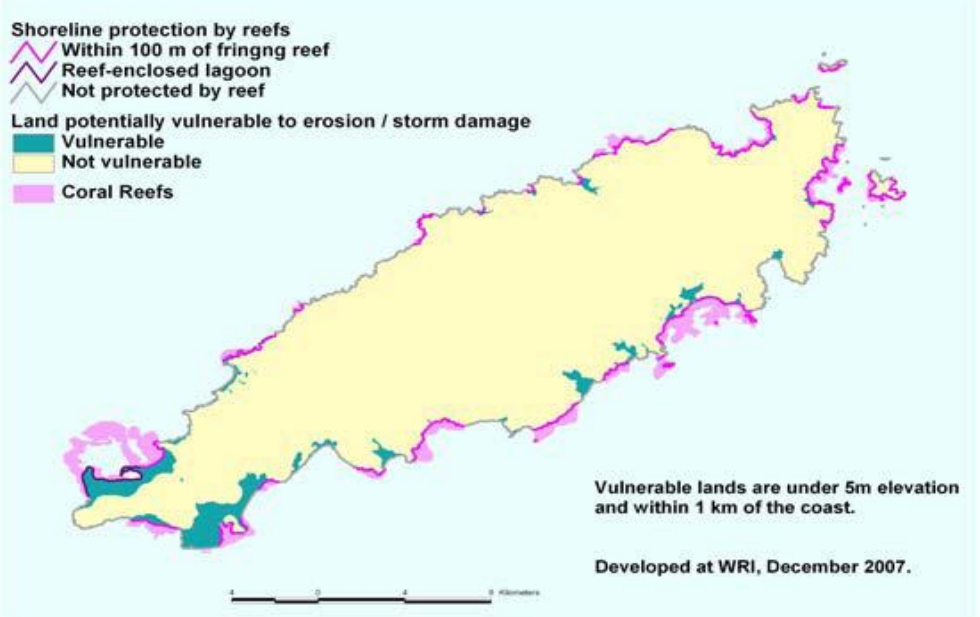
Coral Reef growth is more prominent around the island of Tobago and is important economically in providing opportunities for recreation and tourism (cultural services), with as many as 40% of Tobago's visitors being attracted to the island because of its reefs. This stands to reason asTobago has long been considered a world class tropical diving destination with highly diverse coral reef ecology and in one particular case the largest recorded brain coral specimen in the world. In 2006, the value of the reefs to recreation and tourism was estimated to be between US$100 and $130 million or approximately 45% of Tobago's GDP for that year (Figure 1.4). In addition, the coral reefs are critical in providing shoreline protection (an important regulating service) to a value of between US$18 and US$33 million in 2006. As is shown in Figure 1.5, these services are most important in the areas of the island which are most vulnerable to erosion and storm damage.

FIGURE 1.4: ECONOMIC CONTRIBUTION OF CORAL REEFS IN TOBAGO (2006)



Source: World Resources Institute 2008

FIGURE 1.5: VULNERABLE LAND AND SHORELINE PROTECTION BY CORAL REEFS IN TOBAGO



Source: World Resources Institute 2008

Coral-reef related fisheries (provisioning service) are also important economically. Fisheries linked to coral reefs were valued between US$0.8 and US$1.3 million per year in 2006. Additionally, coral reefs also provide a number of other services which have not been evaluated (for example beach nourishment) and the total value of coral reefs to Tobago can be higher than current estimates.

1.3 Status and Trends in Trinidad and Tobago's Biodiversity

1.3.1 Ecosystem Status and Trends

Rapid and sustained development in both Trinidad and Tobago has led to changes in the extent and integrity of natural ecosystems. These changes have been most apparent in forests and coastal systems (such as mangroves, coral reef and seagrasses), and have generally been more intensive in the western section of both islands.

Forest Cover:

A significant proportion of the country's forests are protected for different purposes as indicated in Table 1.3.

TABLE 1.3: PROTECTED FORESTS IN TRINIDAD AND TOBAGO

Category of Protected Area	Area(ha)	Purpose of Protected Area
Watersheds	8334	Protection of soil and water
Nature reserves	458	Conservation of biological diversity
Wildlife Sanctuaries	19004	Conservation of biological diversity
National Parks	5002	Social Services
Production forests	75,875	Production
Protective forests	42,986	Protection of soil and water
Total reserve and unproclaimed reserve	143,324.70	----

Source: Forestry Division 2009

Aerial photography taken in 1969 and then again in 1996 indicates a decrease in forest cover of about 2% (from 50% to 48%) over that period. Moderate Resolution Imaging Spectroradiometer (MODIS) satellite data from 2000 indicated a further decrease in forest cover to 44% by 2000. Data from the United Nations State of the World's Forests Assessment (2000) indicates an annual loss of forest cover of 0.8% between 1990 and 2000 with a total reported loss of 2% over the same period. Recently-published data (Opadeyi 2010) on forest cover in Trinidad (only) for three years over a 31-year period (1976, 1994, 2007) indicate an overall decrease of 1.8% in forest cover in Trinidad between 1976 and 2007 (although forest cover increased between 1976 and 1994). Table 1.4 shows estimates of forest cover provided by a number of sources. Because of the different methods of data collection and analysis applied in different studies, and the varying definitions of 'forests' used by different sources, estimates would vary. However, the general trend which emerges from the data is a decline in forest cover.

TABLE 1.4: FOREST COVER DATA FOR TRINIDAD AND TOBAGO

Forest Cover (Area and Forest Type)		Extent (ha)	Year	Source(s)
T&T	Total forest	172,140	1946	Beard (1946) (in Forestry Division (2003))
	Evergreen seasonal	*98,180*	*1946*	
	Deciduous seasonal	*3,620*	*1946*	
	Dry evergreen	*500*	*1946*	
	Seasonal montane	*930*	*1946*	
	Montane	*21,620*	*1946*	
	Secondary	*1,563*	*1946*	
	Swamp	*16,730*	*1946*	
T&T	Total forest	259,000	1969	1969 Arial photography
T&T	Total forest	246,240	1996	GIS map based on 1996 aerial photography with limited ground truthing (in Agard and Gowrie, 2003)
T&T	Total forest	159,000	1999	UN World Statistics Pocket Book, Dpt. For Economic and Social Information and Policy Analysis (UN) (in Agard and Gowrie, 2003)
T&T	Total forest[4]	229,000	2000	EarthTrends (2003) based on a study done by the University of Maryland Global Land Cover Facility using MODIS satellite coverage (in Agard and Gowrie, 2003)
T&T	Total forest	259,065	2003	FAO State of the World's Forests in Agard and Gowrie (2003)
Trinidad (only)	*Total forest*	*289,375*	*1976*	*Opadeyi, 2010*
		305,838	*1994*	
		280,956	*2007*	
T&T	*Secondary*	*16,630*	*1980*	*CIDA Forest Inventory (1980) in Kenny et al (1997)*

[4] Total forest area includes both natural forests and plantations and is defined as land with tree crown cover of more than 10% of the ground and area of more than 0.5 ha. Tree height at maturity should exceed 5 m (EarthTrends, 2003).

Forest Cover (Area and Forest Type)		Extent (ha)	Year	Source(s)
T&T	*State-owned commercial timber plantations*	*15,254* *14,608* *15,254* *15,496* *15,080* *15,005* *15,141*	*1992* *<1997* *1997* *1998* *1999/2000* *2001* *2002*	*Kenny et al (1997)* *Forestry Division (1998; 1999; 2002a; 2002b; 2002c; 2003)*

Source: Northern Range Assessment (2005)

Further to the data presented in Table 1.4, Ramlal (1994) has reported that as at 1994, 79% of the country's vegetation, including forests (based on Beard's 1946 classification) were considered to be intact. This would indicate that 21% were recorded as degraded. Highest percentages of degradation were reported for marsh forests, savannas, littoral woodlands, and combinations of these types of vegetation (Table 1.5).

TABLE 1.5: ASSESSMENT OF THE STATUS OF TRINIDAD AND TOBAGO'S VEGETATION (1994)

Vegetation Formation (Beard 1946)	Total Area in Crown Lands (Beard 1946) (ha)	Area in Protected Areas (ha)	% in Protected Areas (ha)	Area in Natural Ecosystem (Ramlal 1994) (ha)	% Intact
DSF: Deciduous Seasonal Forest	1804	1094	61	1508	84
ESF: Evergreen Seasonal Forest	120732	84602	70	96442	80
ESF & LMF	8716	3835	44	8492	97
ESF & MaF	317	271	86	137	43
ESF & SESF	18563	14908	80	14235	77
ESF & SGC	1770	1136	64	1170	66
EW: Elfin Woodland	48	0	0	48	100
HS: Herbaceous Swamp	7023	944	13	4310	61
LMF: Lower Montane Rain Forest	16451	8766	53	16101	98
LMF & MF	1421	825	58	1419	100
LMF & SMF	1290	3	0	1268	98
LW: Littoral Woodland	738	220	30	235	32
MaF: Marsh Forest	1526	973	64	452	30
MaF & Sav	13	0	0	0	0
MaF & TP	527	342	65	149	28
MF: Montane Rain Forest	277	0	0	278	100
MgW: Mangrove Woodland	5580	2467	44	4016	72

Vegetation Formation (Beard 1946)	Total Area in Crown Lands (Beard 1946) (ha)	Area in Protected Areas (ha)	% in Protected Areas (ha)	Area in Natural Ecosystem (Ramlal 1994) (ha)	% Intact
PF: Palm Forest	1312	0	0	1059	81
Sav: Savanna	455	63	14	50	11
SESF: Semi Evergreen Seasonal Forest	20521	15361	75	12787	62
SESF & LMF	278	254	91	278	100
SMF: Seasonal Montane Forest	1585	0	0	1585	100
SwF: Swamp Forest	529	131	25	446	84
TOTAL	211478	136197	64	166466	79

Source: Ramlal 1994 (unpublished)

It is to be noted that an updated inventory of Trinidad and Tobago's forests is currently underway and is expected to be completed in early 2011. This study will be crucial in providing up-to-date figures and analysis on the extent of the country's forests.

Wetlands:

Wetlands in both Trinidad and Tobago have undergone significant alterations especially on account of human activities. Significant losses have occurred along the west coast of Trinidad (including the Caroni Swamp), on the east coast of Trinidad (Nariva swamp), and in south-western Tobago (Institute of Marine Affairs, 2010). Opadeyi (2010) reports a general decrease in the extent of wetlands in Trinidad - from 16,836 ha in 1976 to 13,940 ha in 2007. The National Wetlands Policy estimated a loss of approximately 50% of wetlands in Trinidad and Tobago up to 2002.The IMA (2010) has reported loss of habitat in the largest mangrove wetland on the island of Trinidad, the Caroni Swamp, with 494 ha of its 5,263 ha being lost between 1922 and 1985 due to road construction, sewage treatment facilities, landfill and river widening. Assessments of Landsat imagery by the IMA in 2001 revealed that a further estimated 170 ha may have been lost between 1956 and 2003, it has been estimated that there has been overall reduction in the size of the Nariva Swamp from 15,703 hectares to 15,568 hectares as a result of rice farming activities, slash and burn agriculture and infrastructural development (Carbonell et al (2007)).

Savannas

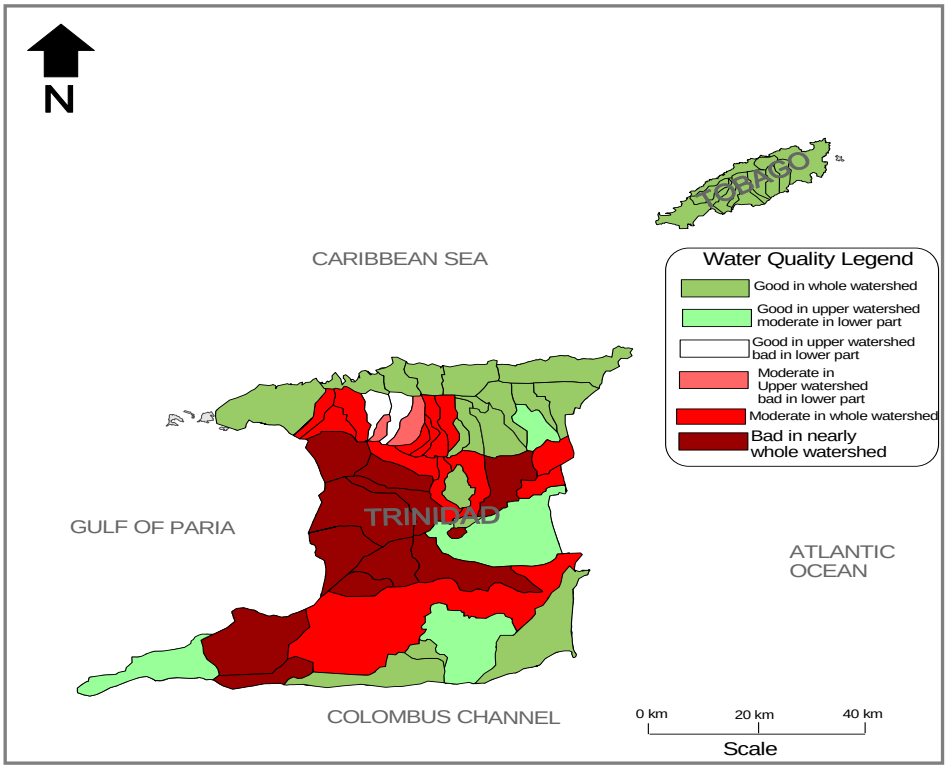
The Aripo Savannas - the only remaining natural savanna ecosystem in Trinidad and Tobago has been under threat from quarrying (which has been reported to have affected 2 – 5% of the savannas), as well as fires, illegal human settlements (and hunting). This has resulted in greater fragmentation of the savannas as well as degradation of both the savanna and marsh vegetation.

Inland Freshwater Systems

Inland freshwater systems are primarily exploited as supplies for potable water as well as water for commercial use (inclusive of agricultural irrigation). Additionally, inland water systems serve as drainage outfalls for domestic and commercial effluents. These two aspects of freshwater abstraction and the input of contaminants constitute significant pressures to biodiversity, particularly inland aquatic biota since abstraction reduces available habitat and water contamination leads to decrease in habitat quality for aquatic species. Similarly, habitat reduction and contamination would result in ancillary adverse effects for biota which may not be aquatic but depend on freshwater systems for completion of their life cycles.

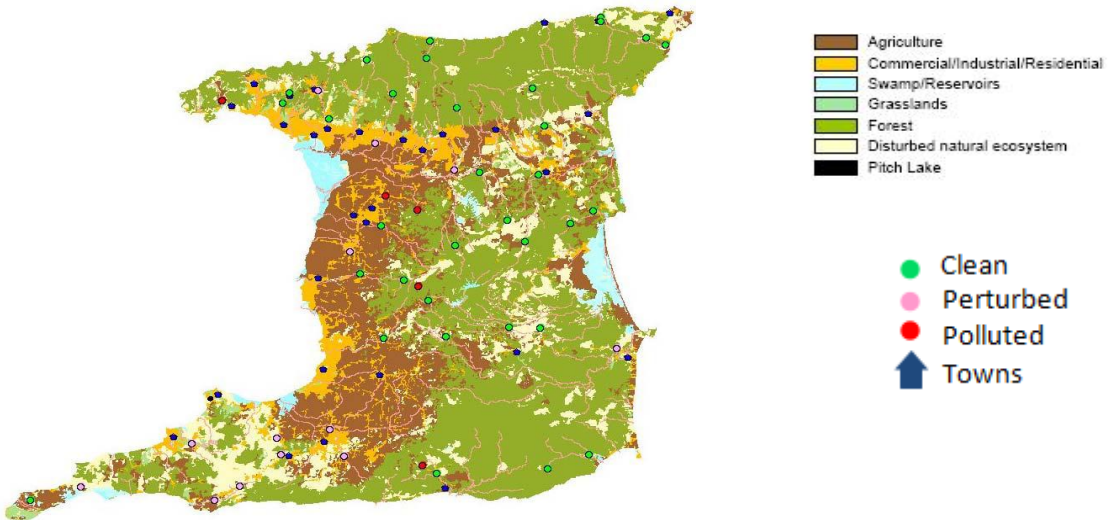
In 1998, an assessment of watershed quality throughout Trinidad and Tobago indicated that a number of watersheds especially in western Trinidad, showed signs of degraded surface water quality (Figure 1.6). Again, in 2001, data generated by the University of the West Indies showed the quality of rivers in Trinidad against a backdrop of land use types (Figures 1.7 and 1.8), indicated that water courses in areas under agricultural, commercial, industrial and residential development were the most heavily affected by heavy metals and deviations in physicochemical parameters (dissolved oxygen, pH, total phosphate, and biological oxygen demand) from the original baseline conditions. This demonstrates a direct link between the impacts of human activities on inland watercourse quality.

FIGURE 1.6: SURFACE WATER QUALITY IN TRINIDAD AND TOBAGO (1999)



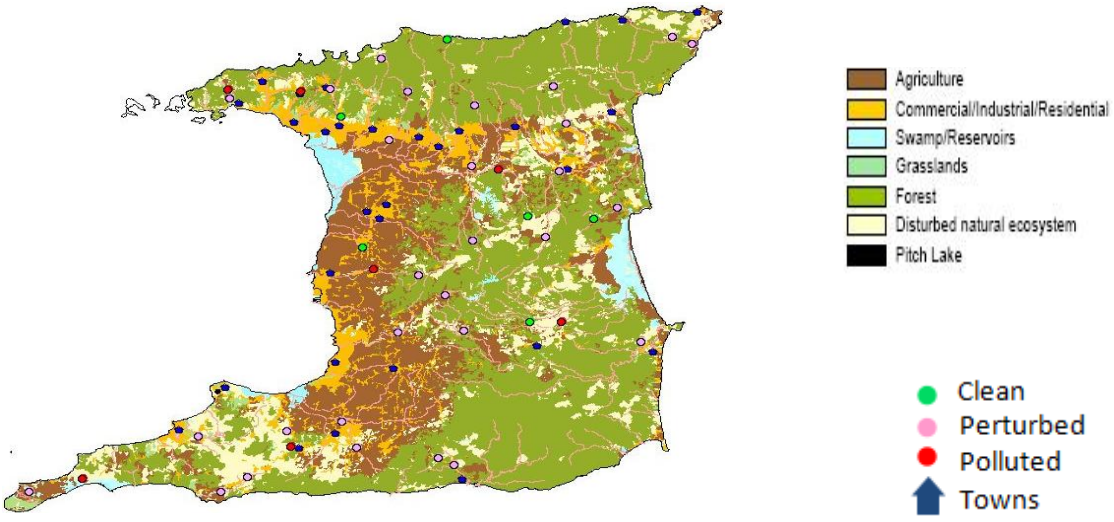
Source: Water Resources Management Strategy for Trinidad and Tobago, Final Report
DHV Consultants/Delft Hydraulics/Lee Young and Partners, Government of Trinidad and Tobago. June 1999

FIGURE 1.7: MAP OF TRINIDAD SHOWING LAND USE TYPES AND PHYSICOCHEMICAL SURFACE WATER QUALITY



Source: The University of the West Indies 2001

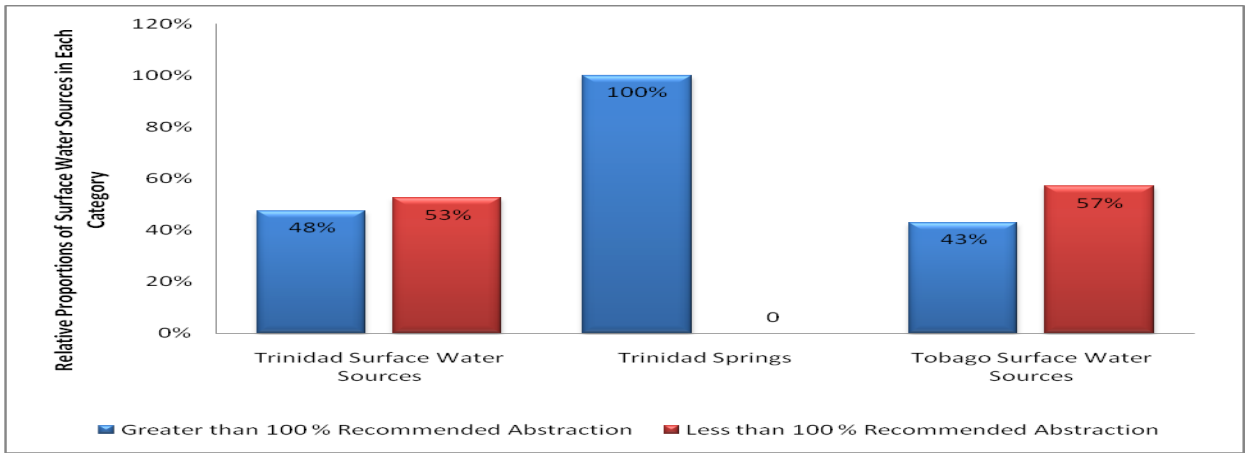
FIGURE 1.8: MAP OF TRINIDAD SHOWING LAND USE TYPES AND HEAVY METALS IN SURFACE WATER SOURCES



Source: The University of the West Indies 2001

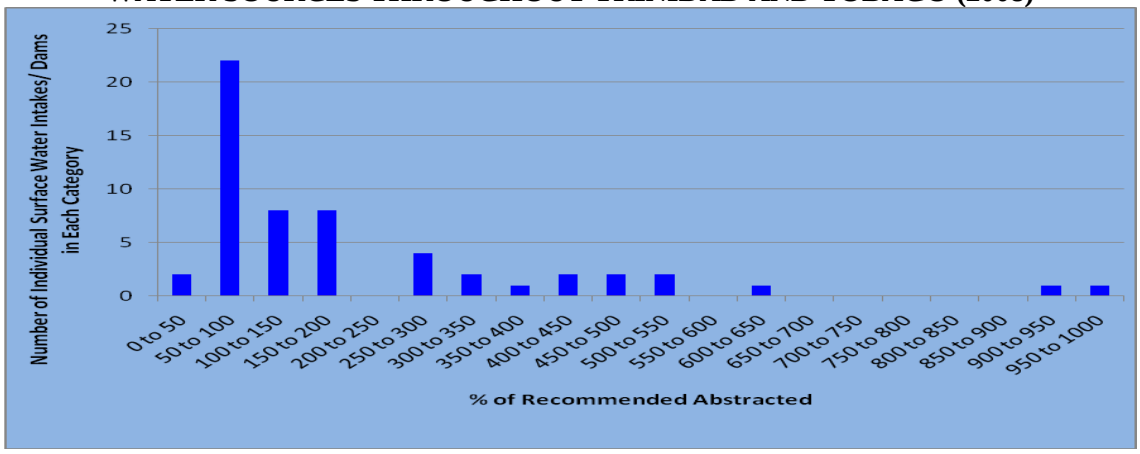
There are some proxy data that serve to indicate the status of water quantity in the inland surface water sources in Trinidad and Tobago. Recommended abstraction levels for surface water sources throughout Trinidad and Tobago (rivers, streams, and dams) are based mainly on a percentage of recharge rates. These levels attempt to protect and sustain ecological function in the water body by preserving twenty-five percent (25%) for ecological purposes. This is a policy-based rule of thumb indiscriminately applied to all water sources throughout the country and therefore may not necessarily be truly protective of ecological function (Sankar pers comm., 2010). Assuming however that the assigned 25% abstraction is a threshold which would help to afford inland surface water sources protection from over-abstraction, what data for 2008 clearly point to is higher than recommended levels of abstraction from many of the country's surface waters (Figure 1.9). What is perhaps even more worrying is that drawdown in some cases is as high as 500%, even reaching almost 1000% (Figure 1.10). These data potentially point to unsustainable use which might be having an impact on the biodiversity associated with these ecosystems.

FIGURE 1.9: SUMMARY OF ABSTRACTION LEVELS FROM SURFACE WATER SOURCES THROUGHOUT TRINIDAD AND TOBAGO (2008)



Source: Water Resources Agency (2010)

FIGURE 1.10: FREQUENCY DISTRIBUTION OF ABSTRACTION LEVELS FROM SURFACE WATER SOURCES THROUGHOUT TRINIDAD AND TOBAGO (2008)



Source: Water Resources Agency (2010)

Coral Reefs:

It is now well established that coral reefs in the Caribbean have been severely degraded on account of a number of driving forces – a decline of over 80% since the 1970s (CARSEA 2007; Ali, 2009). In Tobago, where coral reef formations occupy about 70% of coastal waters (IMA, 2010), there has been significant loss of coral due to bleaching, pollution and sedimentation, human damage and storm/wave activity (IMA, 2010; Ali, 2009); . The following general/noteworthy trends have been observed in Tobago's coral reefs:

- In 2005, the reefs were affected by the region-wide bleaching that occurred due to elevated sea surface temperatures (Table 1.6).
- Mean coral cover in reefs in the northwestern region of the island at depths of seven (7) and twelve (12) metres was found to have decreased from twenty-one percent (21%) in 2005 to fifteen (15%) in 2008 – most likely attributable to a number of diseases which began to spread in the wake of the 2005 Caribbean bleaching event (Bouchon et al, 2008)
- In 2008, large swells caused further damage to shallow reefs on the Caribbean Sea coastline Bouchon et al, 2008)
- In Culloden, there has been an 85% reduction at the reef crest - from 29.1% in 1985 to 4.5% in 2009 (Ali, 2009)

TABLE 1.6: CORAL ABUNDANCE BY SPECIES AS A PERCENTAGE OF TOTAL CORAL COVER IN TOBAGO IN 2005

Taxonomic name	Common name	% bleached	% of total corals observed
Acropora palmate	Elkhorn	0	0.5
Agaricia agaricites	Leaf	93	3
Colpophyllia natans	Giant Brain	80	9
Diploria labyrinthiformis	Grooved Brain	84	1
Diploria strigosa	Smooth Brain	50	11
Madracis mirabilis	Yellow Pencil	3	4
Meandrina meandrites	Butterprint Brain	67	2
Millepora spp.	Fire Coral	53	12
Montastrea annularis	Boulder Star	73	37
Montastrea cavernosa	Cavernous Star	47	4
Porites astreoides	Mustard Hill	34	3
Porites divaricata	Thin Finger	60	1
Porites furcata	Finger	50	1
Siderastrea radians	Rough Starlet	93	1
Siderastrea sidereal	Smooth Starlet	68	6
Other	Various	5	5

Source: Buccoo Reef Trust 2008

1.3.2 Species Diversity and Vulnerability

There are a number of different sources of data and information on species diversity in Trinidad and Tobago. An updated inventory of the flora of Trinidad and Tobago (unpublished) undertaken as part of a project known as the Darwin Initiative indicates a total of 3,337 plant species in Trinidad (including species, subspecies and variations of indigenous and introduced species (Baksh-Comeau 2010). A 2007 study of bird abundance (White *et al*, 2007) indicates a total of 467 species of birds on both islands. A study on coral diversity (Miloslavich *et al*, 2010) indicates 42 species as compared with previous accounts of 36. For most species, there is a good understanding of numbers (in some cases even their distribution and abundance). These include plants, mammals, reptiles, amphibians, freshwater fishes, birds, and coastal species such as corals, seagrasses and mangroves. There are however some groups for which, according to the literature, there is no consensus on total numbers of species found locally – for example, marine fishes including reef-associated fishes and insects except for butterflies and termites. Based on the most up-to-date available information therefore, the numbers of species of plants and animals in Trinidad and Tobago (based on major categories of groupings) are shown in Table 1.7.

TABLE 1.7: NUMBERS OF SPECIES IN TRINIDAD AND TOBAGO

Major Categories of Plant and Animal Species	Number of Species recorded in Trinidad and Tobago	Additional Notes	Data source	Number of recorded endemics	Source
Plants	3,337	includes sp. subsp. and variations of indigenous and introduced records	Baksh-Comeau et al 2010 (unpublished checklist)	59	Eynden *et al* 2008
Birds	467	of which 400 in Trinidad and 170 in Tobago	White 2007 Kenny 2008	1 Pawi/ Piping guan (*Piplie pipile*)	Kenny 2008 Starr 2001
Mammals	>100	in 22 families. Bats (60 spp) and Rodents (17 spp) are largest groups	Kenny 2008	0	Kenny 2008
Reptiles	Ranges between 85 and 90	of which there are 40 to 55 species of snakes; about 30 species of lizards, and 5	Murphy 1997; Kenny, 2008	1 Luminous lizard (*Proctoporus shrevei*)	Kenny 2008

Major Categories of Plant and Animal Species	Number of Species recorded in Trinidad and Tobago	Additional Notes	Data source	Number of recorded endemics	Source
		turtle species			
Amphibians	between 30 and 32	there are no newts or salamanders in T&T	Murphy 1997; Kenny 2008; Starr 2001	1 Golden Tree Frog (*Phyllodytes auratus*)	Kenny 2008
Freshwater Fishes	50	in 21 families	Kenny 2008	0	Can find no evidence of endemics in the records
Marine Fishes	Recorded as being at least 950	Fishbase (2008) reports a figure of 956; Ramjohn (1999) reports 1013 spp[5]	Kenny 2008; Fishbase 2008; Ramjohn (1999)	Unknown	Can find no evidence of endemics in the records
Butterflies	659		Starr 2007	5	Starr 2007
Corals	41	approximately 40 found in Buccoo Reef	Miloslavich *et al* 2010; IMA 2010	0	IMA 2010
Mangroves	7	Of which 7 in Trinidad and 4 in Tobago	IMA 2010	0	IMA 2010
Seagrasses	4	Of which 3 in Trinidad and 4 in Tobago	IMA 2010	0	IMA 2010
Marine Algae	198	-	Duncan and Lee Lum (2004)	0	Can find no evidence of endemics in the records

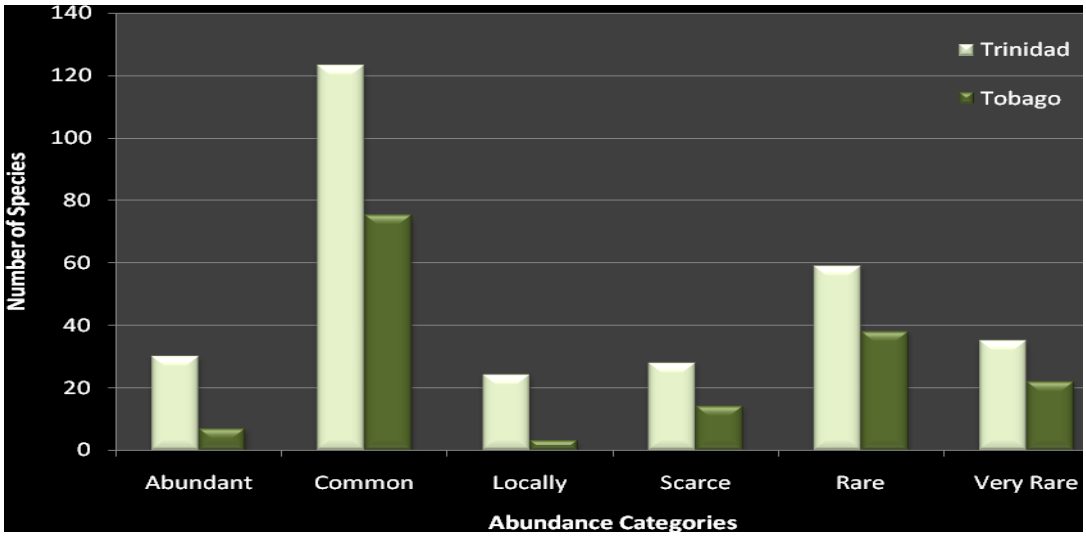
[5] As reported by Ramjohn (1999), there are a total of 1013 species of fish - Teleost fishes are represented by 942 species in 437 genera in 148 families in 28 orders; Elasmobranchs are represented by 71 species in 37 genera in 22 families in 9 orders. This does not include crustaceans.

It addition to the data presented above, records show that there are 56 molluscs species, 85 crustaceans and 56 sponges (IMA 1999); 55 species of echinoderms (Miloslavich *et al* 2010); 201 species of polychaetes (Gobin 2009); 70 species of marine hard bottom nematodes (Gobin 2007); 276 species of spiders (Sewlal pers comm. 2010) and 10 species of scorpions (Starr 2007).

There have been observed (and in some cases well studied and documented) changes in the abundance and distribution of species on the islands directly attributable to habitat degradation, and to a lesser extent overharvesting and pollution. As a result of this, a number of both plants and animals are now vulnerable, are threatened by extinction or have become critically endangered. Red Howler Monkey (*Alouatta seniculus insularis*), Ocelot (*Leopardus pardalis*), Wild hog or quenk (*Tayassu tajacu*), the Pawi or Trinidad Piping Guan (*Pipile pipile*), and certain orchid species have been known to be affected in both their distribution and abundance because of increasing human pressures.

A recent study on the abundance of birds in Trinidad and Tobago (White et al, 2007) reveals that while most birds have been assessed to be 'common', a large percentage are described as either 'rare' or 'very rare' (Figure 1.11). The bird species locally known as the Pawi or Trinidad Piping Guan (*Pipile pipile*), which has been tested and found to be the only locally endemic bird species in Trinidad and Tobago, continues to be of special interest (Box 1.1). It has been categorized as critically endangered by the International Union for the Conservation of Nature (IUCN) as its numbers in the wild continue to decline because of habitat destruction and overhunting (Hayes et al, 2009).

FIGURE 1.11: ASSESSMENT OF THE ABUNDANCE OF BIRDS IN TRINIDAD AND TOBAGO (2007)



Source: White et al 2007

A - Abundant; widespread and usually in some numbers in suitable habitat
C - Common; usually found in suitable habitat
U - Uncommon; occasionally seen in suitable habitat singly or in small numbers
Sc - Scarce; Very few (less than 5) records per year
R - Rare; not recorded annually
VR - Very rare; less than 1 record per decade
L - Locally distributed in restricted habitat, where it may be not uncommon.

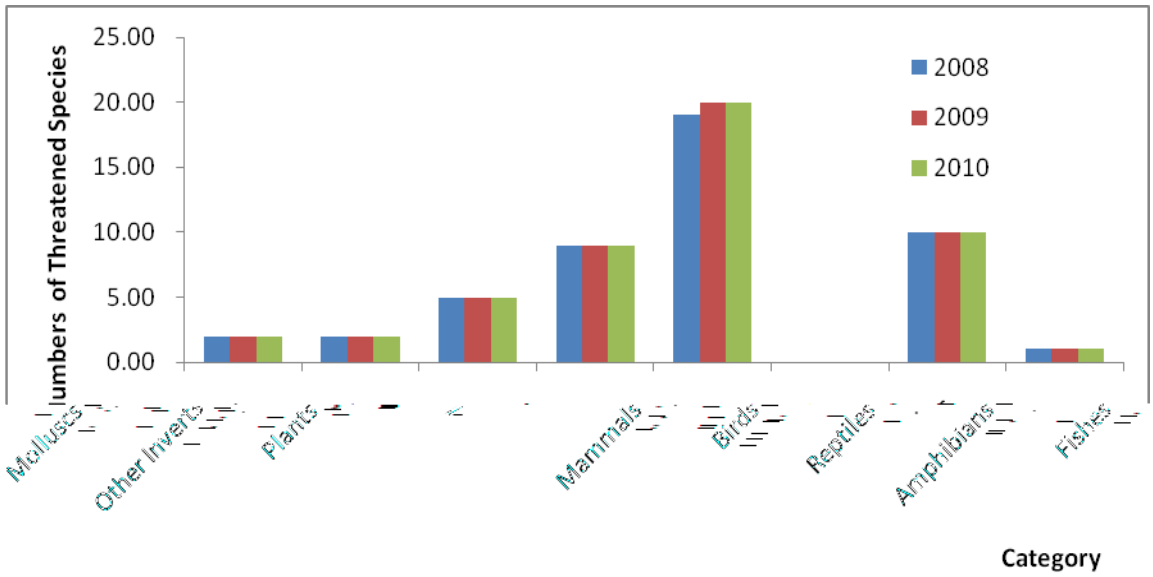
BOX 1.1: THE TRINIDAD PIPING GUAN – A CRITICALLY ENDANGERED BIRD

The Trinidad piping-guan *Pipile pipile* is endemic to the island of Trinidad, where it is critically endangered. The piping-guan formerly occurred throughout much of Trinidad at all elevations, except perhaps along the west coast. Currently it is most abundant in the eastern half of the Northern Range, where considerable forest habitat remains, yet it remains rare and local. A few piping-guans may persist in forested areas of southern Trinidad, where the species was last reported in 2000. It may be extirpated in central Trinidad, where it was last reported in 1983. Hunting is clearly the major threat but appears to have declined in the past decade, at least in the Northern Range, due to recent public education campaigns. Recent sightings in areas where the piping-guan had previously not been reported for a century suggest a growing population in the Northern Range. Although deforestation has also contributed to its decline, the piping-guan tolerates limited human disturbances in small-scale agricultural plantations of rural communities as long as canopy trees are left intact in nearby forest and it is not hunted. From 1999 to 2001, we conducted variable-radius point counts in suitable habitat at or near selected localities in the Northern Range where the piping-guan had been reported within the past 2 decades. We detected piping guans in only 3 of 284 (1.6%) point counts, resulting in an estimated density of 0.22 birds km^{-2}.

Source: Extracted from Abstract of Hayes et al, 2009.

Data from the IUCN through its Red List (2008, 2008 and 2010 version 1), indicate that in Trinidad and Tobago, there are threatened species in all major IUCN groups, except molluscs (Figure 1.12). In 2009, a new fish species was added to the list bringing the total number of threatened species in Trinidad and Tobago to 49.

FIGURE 1.12: NUMBERS OF THREATENED SPECIES IN TRINIDAD AND TOBAGO IN CATEGORIES (2008, 2009 and 2010 version 1)



Source: IUCN 2010

Further data from the IUCN Red List (2010 version 1) points to 10 species being critically endangered, 10 endangered, 28 considered vulnerable and 1 in the category of lower risk or conservation dependent (based on the IUCN Red List categories).

In Trinidad and Tobago, special attention has been given to the protection of three species under law - the Environmentally Sensitive Species Rules 2001. They are the Trinidad Piping Guan or Pawi (*Pipile pipile*), the West Indian Manatee (*Trichechus manatus*), and the White-tailed Sabrewing Hummingbird (*Campylopterus ensipennis*). Since their designation as environmentally sensitive species in 2007 the level of awareness and protection (especially by involvement of local communities) is preventing further devastating declines.

1.3.3 Status and Trends in Key Ecosystem Services

An overall assessment of the status and trends in key biodiversity-related ecosystem services in Trinidad and Tobago (based on ecosystem and species data and information) is provided in Table 1.8.

TABLE 1.8: SUMMARY ASSESSMENT OF THE STATUS AND TRENDS IN KEY BIODIVERSITY-RELATED ECOSYSTEM SERVICES IN TRINIDAD AND TOBAGO

Northern Range ecosystem service	Service type - Provisioning/ Regulating/ Supporting	Condition	Trend	Certainty/ Confidence level
Forested ecosystems				
Timber	Provisioning	Fair	Decreasing	High
Non-timber forest products (including wildlife hunting)	Provisioning	Fair	Decreasing	Medium
Runoff regulation and retention (flooding and landslides)	Regulating	Fair	Decreasing (rapidly)	Medium to High
Climate and microclimate regulation	Regulation	Fair	Decreasing	Medium
Soil conservation	Regulating	Fair	Decreasing	Medium
Biodiversity services – wildlife habitat	Regulating and supporting	Fair	Decreasing	Medium
Water cycling and replenishment (for the provision of freshwater)	Supporting	Fair	Decreasing	Medium
Amenity value (recreation and ecotourism)	Cultural	Good	Decreasing	Medium
Inland Freshwater ecosystems				
Freshwater provision	Provisioning	Fair	Decreasing	High
Fisheries, aquaculture	Provisioning	Fair	Decreasing	Medium
Waste disposal, assimilation, and treatment	Regulating	Fair	Decreasing	Medium
Flood regulation, water	Regulating	Fair	Decreasing (rapid)	Medium to High

Northern Range ecosystem service	Service type - Provisioning/ Regulating/ Supporting	Condition	Trend	Certainty/ Confidence level
storage				
Biodiversity support	Regulating and Supporting	Fair	Decreasing	Medium
Amenity value	Cultural	Fair	Decreasing	Medium
Coastal and Marine ecosystems				
Fisheries (both marine and coastal)	Provisioning	Fair	Decreasing (rapidly)	Low to Medium
Flood regulation/ water storage	Regulating	Fair	Decreasing (rapidly)	Medium to High
Shoreline protection (from erosion and storms)	Regulating	Fair	Decreasing	High
Waste disposal, assimilation and treatment	Regulating	Fair	Decreasing	Medium
Climate and microclimate regulation	Regulating	Fair	Decreasing	Medium
Biodiversity services – coral reef diversity, mangrove and seagrass fish nurseries etc.	Regulating and supporting	Fair	Decreasing	Medium
Amenity value	Cultural	Good	Decreasing	Medium

Table adapted from the Northern Range Assessment (2005)

This assessment, which is based on an analysis of available, empirical data, as well as expert judgments, indicates that most services are in fair condition but are in decline. The decline is especially evident in the flooding which is growing in frequency and intensity throughout the country. The ability of forests and coastal systems to help regulate surface runoff and soil erosion, and thereby assist in minimizing the effects of flooding in low-lying areas around the country has been significantly impaired by reductions in the extent and integrity of vegetation cover. Flooding effects are coupled with reductions in infiltration surfaces because of increasing infrastructural development (as well as improper/inadequate drainage systems). The result has been greater occurrence and severity of flooding throughout the country in areas that coincide with greatest degradation – such as in western Trinidad

1.3.4 Agricultural Diversity

Table 1.9 shows the status of the diversity of major crops in Trinidad and Tobago as at 2007, and indicates that most are considered stable. Such was also found to be the case for minor crops and forages (Ministry of Food Production, Land and Marine Resources Central Experiment Station 2007).

TABLE 1.9: STATUS OF THE DIVERSITY OF MAJOR CROPS IN TRINIDAD AND TOBAGO

Major Crops	Genus	No. of Accession	Relative Importance		State of Diversity			
			Food Security	Economic	I	D	RS	UN
Pigeon Peas	*Cajanus*	3	H	H			*	
Citrus	*Citrus*	156	H	H	*			
Major Aroids	*Colocasia, Xanthosoma*	4	H	H			*	
Sweet Potato	*Ipomoea*	85	H	H			*	
Cassava	*Manihot*	66	H	H			*	
Rice	*Oryza*	5	H	L		*		
Eggplant	*Solanum*	1	H	L	*			
Cowpea	*Vigna*	5	L	L			*	
Maize	*Zea*	3	M	L			*	
Breadfruit	*Artocarpus*	2	H	L			*	
Yams	*Dioscorea*	41	M	L			*	

H – High , I – Increasing , D-Decreasing , RS – Remaining the same , UN – Unknown, M – Medium, L- Low
Source: Ministry of Agriculture, Land and Marine Resources Central Experiment Station.2007.

Trinidad and Tobago is also recognised as the centre of origin for *Trinitario* germplasm which originated from natural hybridization between remnants of *Criollo* germplasm introduced into Trinidad in the 16th Century by the Spanish and the Forastero varieties from South America, introduced in the 18th Century (Box 1.2).

BOX 1.2: GENETIC DIVERSITY OF COCOA AND ITS ECONOMIC IMPORTANCE TO TRINIDAD AND TOBAGO

Trinidad and Tobago is an exclusive producer of fine or flavour cocoa and is regarded as the centre of origin for *Trinitario* germplasm. The *Trinitario* germplasm, which literally means 'native of Trinidad', originated from natural hybridization between remnants of *Criollo* germplasm introduced into Trinidad in the 16th Century by the Spanish and the Forastero varieties from South America, introduced in the 18th Century. This occurred after the original material was destroyed by a mysterious 'blast' in 1727(CABI Commodities.2004). Selection and breeding programmes have spanned over 60 years. In the 1930s F.J. Pound carried out an extensive survey of cocoa in Trinidad & Tobago from which he selected the best 100 clones, the well-known Imperial College Selections (ICS). Subsequently, W.E. Freeman at the Ministry of Agriculture (now Ministry of Food Production, Land and Marine Resources[6]) spent over 30 years developing the Trinidad Selected Hybrids (TSH) in an ambitious recurrent selection breeding programme. The TSH cultivars are renowned for fine or flavour attributes, and TSH 919 in particular has been described to have an 'aristocratic' flavour. With appropriate agronomic inputs, the TSH cultivars are noted for their high yield (>2,000 kg/ha), large bean size and low pod index. The breeding programme in Ministry of Food Production, Land and Marine Resources is on-going, with further selections being made for superior yield, disease resistance, environmental adaptability and to maintain fine flavour potential for the export market (CABI Commodities.2004).

Research efforts at The Cocoa Research Unit (CRU) over the last 10 years have been directed towards the task of characterization and evaluation of all the accessions in the International Cocoa Genebank, Trinidad (ICG,T), selecting those with desirable traits and undertaking pre-breeding to produce genetically diverse populations with

[6] Since the time of publication of the report from which this case study is drawn, the Ministry has changed its name and is now known as the Ministry of Food Production, Land and Marine Resources.

enhanced characters (such as disease resistance) (CRU.2009). One thousand four hundred and sixty-four accessions have now been characterised with morphological descriptors according to the standard protocol. Random amplified polymorphic DNA (RAPD) and isozyme electrophoresis (IE) techniques were used to estimate the level of genetic diversity in a sample of cacao germplasm existing at the International Cocoa Genebank, Trinidad. Twenty-six cocoa populations represented by 459 cocoa genotypes were analysed using IE and 22 populations represented by 353 cocoa genotypes were analysed using RAPD. Despite few differences in the classification of the populations, both techniques revealed three major groups: the indigenous trees, the cultivated Trinitario and the cultivated trees from Ecuador. Two-thirds of the partitioned diversity were found within populations and one-third between the populations, with both techniques (Sounigo,Umaharan,Christopher,Sankar & Ramdahin 2005).

When optimally processed, cocoa from Trinidad & Tobago possesses interesting fruity, mildly floral, winey, even raisiny overtones that are quite distinct from those found in bulk cocoas. These flavour attributes are sought after by certain manufacturers of premium chocolates. This demand provides a market environment in which the price for cocoa from Trinidad & Tobago is well above the international market price for bulk cocoa (CABI Commodities.2004) - Grade I cocoa beans exported from Trinidad and Tobago currently command US$ 4,500 to $ 5,300 per tonne compared to US $ 2,300 per tonne paid for bulk cocoa

Source: CRU 2009

Another agriculture species which is well known and relatively well documented is the Buffalypso – a locally derived breed of the Water Buffalo which derives its name from a popular form of music in Trinidad and Tobago known as calypso. The abundance of this species is currently on the decline and it is noted that the country stands to lose germplasm if conservation efforts are not increased (Box 1.3).

BOX 1.3: THE STORY OF THE BUFFALYPSO

E.E. Mac Lachlan, M.R.C.V.S. in 1952 brought to the attention of the Trinidad Veterinarians that the Water Buffalo was an important animal for the Caribbean and the hot humid Tropics. In 1949 Dr Steve Bennett, DVM, Colorado, began with Mr. T. Hume Porteous the development of the Buffalypso breed for beef production in Trinidad at the Caroni Limited Sugar Company. "The adaptability of these animals to tropical conditions would indicate that, with selective breeding and improved environmental conditions, these animals may easily find their way in the tropics in the field of beef production and, to a lesser degree, as an auxillary to the diary industry". This was the foundation of the philosophy behind the breeding of the Buffalypso by Steve Bennett. He and Mr. T. Hume Porteous [the manager of the buffaloes at Caroni Limited] developed the selection process of the buffaloes that were imported into Trinidad between 1905 and 1908 and then later in 1923 and 1949. Dr L Shannon had earlier introduced the water buffalo onto the sugar plantations of Trinidad replacing the Zebu and the Brahaman [Nellhore type] cattle as work animals. The water buffaloes imported into Trinidad were the Murrah, Surti, Jaffarbadi, Nelli and Bhadawari, the last being six Murrah bulls in 1948. Caroni Limited the sugar company that pioneered the development of the Buffalypso as a beef type animal saw this initiative as one of their efforts at diversifying out of sugar. Today in Trinidad there are less than 5000 buffaloes of which less than half would be of the Buffalypso type. In addition there is no present effort at ensuring the survival of this germplasm in Trinidad. But the Buffalypso has been exported to many countries (19 in all), including USA, Colombia, Cuba, Costa Rica, Guatemala, Hondorous, Mexico (via Hondorous),Nicaragua, Panama, Venezuela. Steinfeld, Gerber, Wassenaar, Castel Rosales and de Hann (2006) have indicated that there is erosion of the Livestock biodiversity. It has been argued that the management of livestock genetic resources is the same as for other types of biodiversity: to maintain use and non-use values to humans, to preserve important components of cultural heritage or typical landscapes, or to preserve traits that may be of value in the future. In this regard it will be important for the Buffalypso of Trinidad be preserved for this and future generations.
Extracted from: Bennett.S.P, Garcia.G.W and Lampkin.P.2007.The buffalypso: the water buffalo of Trinidad and Tobago.

There are also several other species which have been bred to increase agricultural production locally. These include (but are not limited to) commodity items such as sheep, goats and rabbits. The Ministry of Food Production, Land and Marine Resources has reported one case where the importation of different breeds to enhance local production is actually leading to extirpation of the local variety of the Barbados Blackbelly Sheep *Ovis aries*. The Ministry has indicated that special emphasis will need to be given to ensure that this strain is not lost from the local gene pool.

1.4 Drivers of Change

1.4.1 Direct Drivers of Change

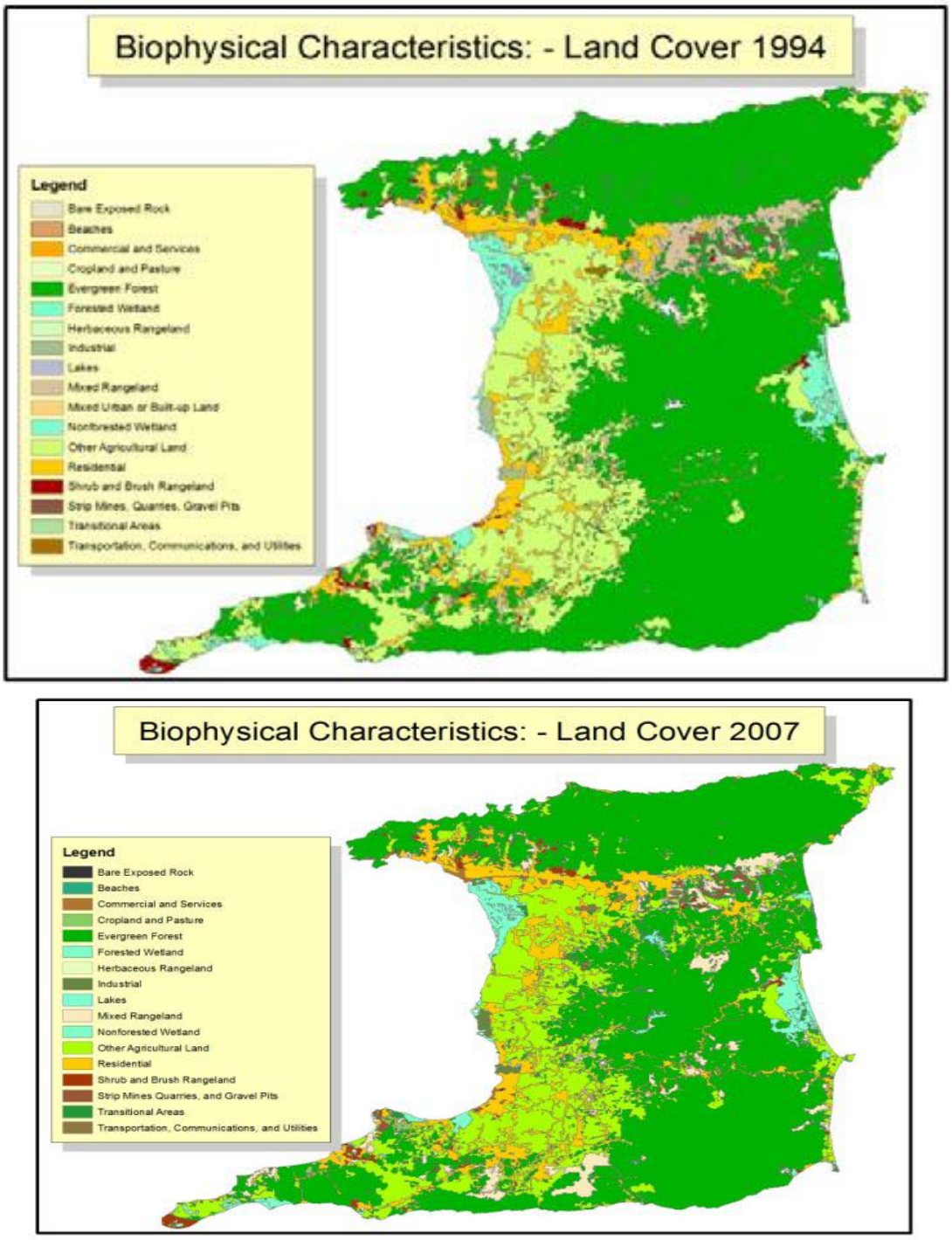
1.4.1.1 Land Use and Land Cover Change

Land use and land cover changes are the main driving forces contributing to biodiversity loss in all biomes in Trinidad and Tobago. Deforestation and conversion of land principally for agriculture and housing have been the main drivers, and these have resulted in the reduction in forest cover and coastal ecosystems, as well as greater fragmentation of remaining natural systems.

Figures 1.13 shows comparative land use/ land cover maps for Trinidad for two years - 1994 and 2007. These maps indicate that the most extensive conversion has occurred in the western parts of the island and along a belt on southern foothills of the Northern Range (known locally as the East-West Corridor). Between 1994 and 2007, the most significant change was the increase in the extent of urban/residential development on the island. Urban/residential development has been spreading both eastward across the island, and further up into the valleys (or watersheds) of the Northern Range. In recent years, the rate of housing development has increased significantly because of programmes, especially those which were Government-led, to increase the number of houses for low-income families.

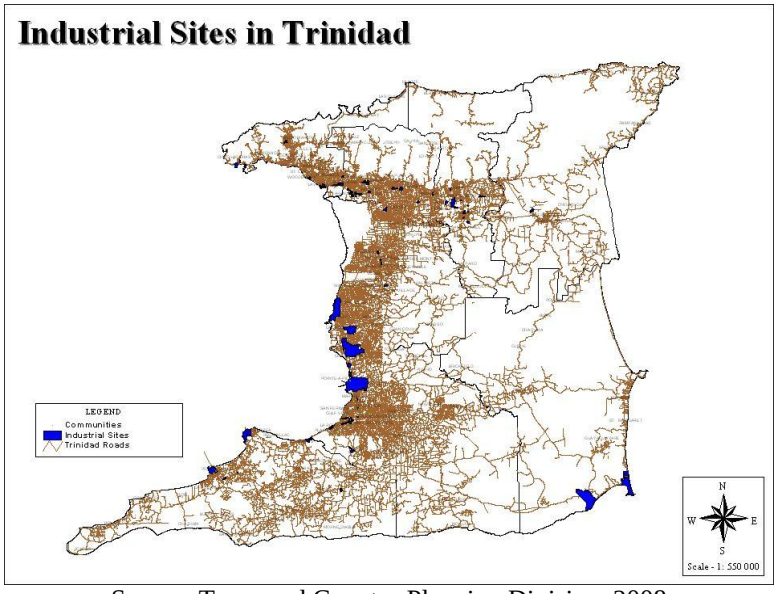
Industrial development in Trinidad, largely driven by the growing petrochemical sector over the last several years, has resulted in the conversion of significant tracts of coastal ecosystems, principally mangroves along the western coast of Trinidad, to industrial estates (Figure 1.14). Some coastal conversion is also occurring in the south-western region of the island. Figure 1.14 illustrates the road network which is earmarked for country wide expansion which would pose a risk of increased fragmentation of ecosystems.

FIGURE 1.13: LAND USE/LAND COVER MAP OF TRINIDAD (1994)



Source: Opadeyi 2010

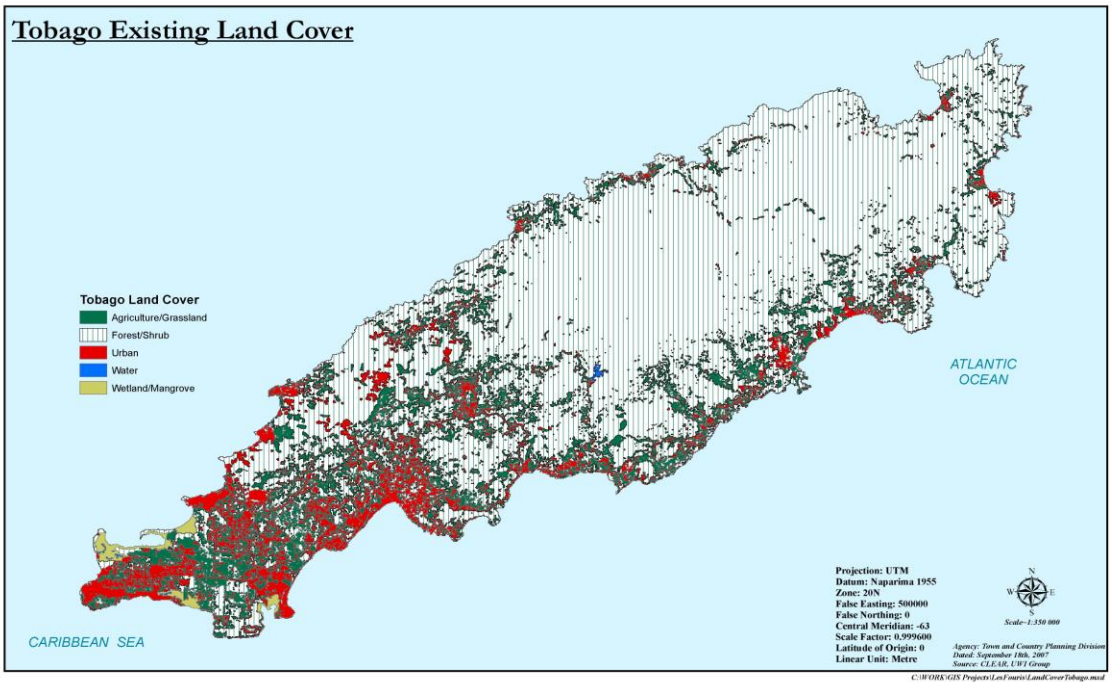
FIGURE 1.14: MAP SHOWING INDUSTRIAL SITES AND ROAD NETWORKS IN TRINIDAD



Source: Town and Country Planning Division, 2008

In Tobago, significant alterations of the landscape have occurred especially in the south-western part of the island, and along the south coast, mainly for urban development (including hotel construction associated with the growing tourism industry) and agriculture (Figure 1.15). As is evident from the map, this development has been intensive.

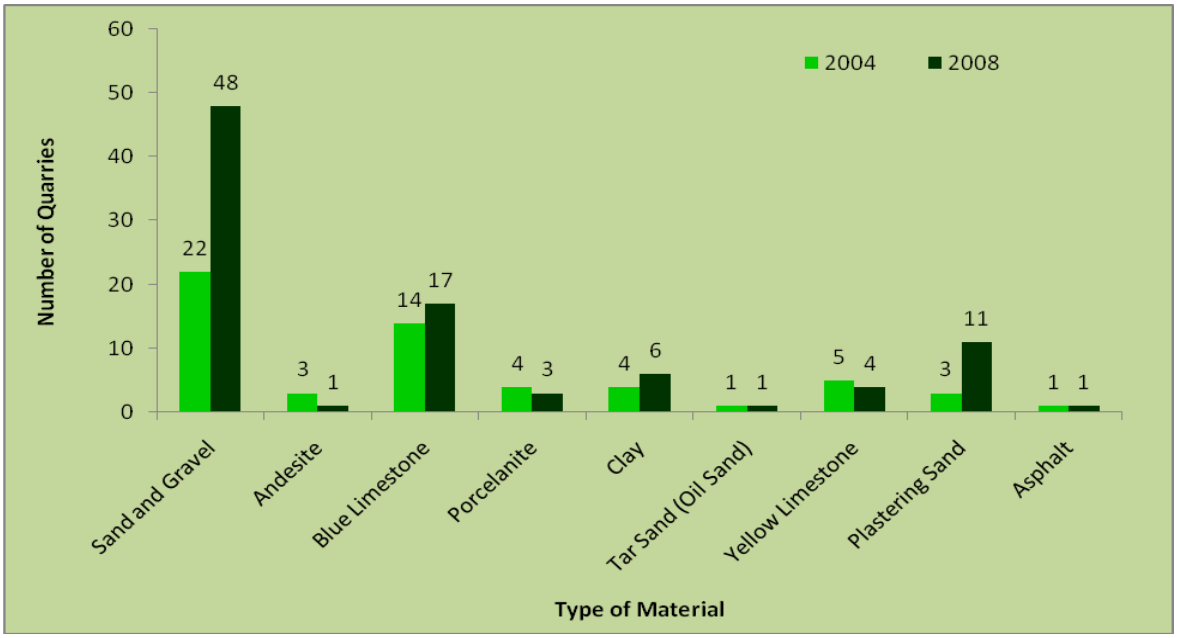
FIGURE 1.15: LAND USE/LAND COVER MAP OF TOBAGO



Source: Town and Country Planning Division, 2006

Among the other land use issues contributing to changes in land cover are quarrying, logging and fires. Quarrying has been receiving increasing attention in Trinidad and Tobago as an activity which adversely affects biodiversity principally through the removal of large tracts of forest, pollution of waterways and noise pollution. Figure 1.16 shows a significant increase in the number of quarries throughout the country over the four-year period 2004 to 2008.

FIGURE 1.16: NUMBERS OF QUARRIES THROUGHOUT TRINIDAD AND TOBAGO

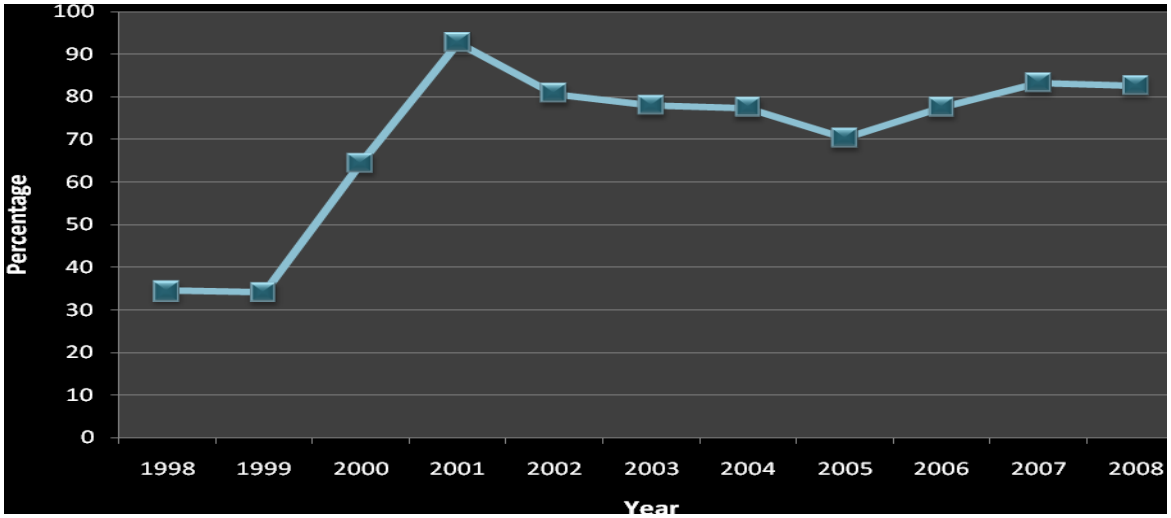


Source: Oliver 2010

The increase in certain types of quarries, such as sand and gravel, blue limestone and plastering sand has occurred to meet the local 'boom' in the construction industry, and it was driven mainly by government-led infrastructural development. Rapid development was made possible by the country's buoyant economy at that time. Though the regulation of quarry development is governed under law [the Minerals Act and the Water Pollution (Amendment) Rules 2006], the approach to the establishment, operation and rehabilitation of quarries is still regarded as unsustainable. As such, quarrying continues to have significant, deleterious effects in such areas as the Northern Range (e.g. the Arima Valley and in the Valencia area).

Logging, especially illegal logging, is a contributing factor to decreasing forest cover in Trinidad and Tobago. In 1998 and 1999, only a small percentage of logs were removed from natural forests on state lands - most were derived from plantations (such as teak – *Tectona grandis* - and pine – *Pinus caribaea*). However, from 2000, the proportion of sawnlogs originating from natural forests began to increase. The average removal from natural forests has been approximately 80% (of total logs harvested) for the last several years (Figure 1.17).

FIGURE 1.17: REMOVAL OF SAWNLOG FROM NATURAL FORESTS IN TRINIDAD AND TOBAGO AS A PERCENTAGE OF TIMBER REMOVAL FROM ALL (1998 – 2008)



Source: Forestry Division 2009

Every year, fires destroy significant tracts of vegetation throughout Trinidad and Tobago. None of the fires are thought to be started by natural factors (such as lightning). Rather, fires are most often initiated through malicious acts, slash and burn agriculture, hunting, smoking and other acts of negligence (Singh 2003 in Northern Range Assessment 2005). Table 1.10 outlines the number of fires and acreage of land burnt on an annual basis between 1998 and 2008 (most current available data).

TABLE 1.10: FOREST FIRE DATA FOR TRINIDAD AND TOBAGO (1998 - 2008)

AREA BURNT BY LAND USE IN TRINIDAD 1998 – 2008																
Year	**Natural Forest**		**Shrub/Sec. Forest**		**Teak Plantation**		**Pine Plantation**		**Savannah / Grasses**		**Other**		**Agricultural Lands**		**Grand Total**	
	No. of Fires	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**	**No. of Fires**	**Area burnt (ha)**
1998	21	248	96	845	100	5,467	51	584	327	1,732	49	182	118	1,225	**762**	**10,283.0**
1999	6	9	16	28	22	562	12	79	96	280	6	20	14	15	**172**	**993.0**
2000	-	-	8	18	19	717	8	23	39	136	3	9	15	24	**92**	**927.0**
2001	18	126	82	453	74	2,246	34	223	177	850	14	121	64	238	**463**	**4,257.0**
2002	-	-	7	15	4	9	2	10	41	85	4	10	4	5	**62**	**134.0**
2003	16	1,267	45	452	45	1,192	45	760	144	750	27	165	25	137	**347**	**4,723.0**
2004	-	-	13	175	19	968	3	18	76	276	17	32	8	16	**136**	**1,485.0**
2005	3	11	26	55	35	936	13	22	149	410	15	177	29	86	**270**	**1,696.0**
2006	1	15	21	55	16	606	13	153	106	338	53	79	0	0	**210**	**1,245.8**
2007	12	147	53	229	57	1,338	18	219	227	1,316	24	115	61	203	**452**	**3,567.0**
2008	2	8	23	43	18	402	16	135	83	704	10	28	74	216	**226**	**1,536.0**

Source: Forestry Division 2009

1.4.1.2 External Inputs – Chemical and Solid Waste Pollution

There are a number of sources of pollution which are affecting biodiversity in Trinidad and Tobago – both aquatic (freshwater and coastal/marine) and terrestrial. An in-depth assessment of the causes and effects of land-based sources of pollution in Trinidad and Tobago (published by the Institute of Marine Affairs, the United Nations Environment Programme and several other partners in 2008 as part of the development of a National Programme of Action for the Protection of the Coastal and Marine Environment from Land-based Sources and Activities) has identified several sources of pollution of concern (Table 1.11).

TABLE 1.11: LAND-BASED SOURCES OF POLLUTION AND ACTIVITIES IN TRINIDAD AND TOBAGO

Contaminant or Alteration	Major Sources/ Causes	Affected Land Use Activities
Sewage	Inadequately treated STP effluent	Residential, Industrial, Tourism
	Septic tanks	Residential, Industrial, Tourism
	Pit latrines	Residential
	Animal waste	Intensive animal husbandry
	Industrial effluent	Industrial
POPs	Runoff containing excessive pesticides	Agricultural
	Animal waste	Intensive animal husbandry
	Improperly disposed insecticides, rodenticides	Residential, Commercial, Industrial,
	Chemicals contained in termite treatment	Residential, Commercial
	PCBs in industrial use	Industrial
Heavy metals	Petroleum mining and refining	Industrial (Petrochemical, Extractive)
	Petrochemical plants	Industrial (Petrochemical)
	Boatyards and marinas	Industrial, Tourism (Yachting)
	Leaking underground gasoline storage tanks	Commercial
Oils (Hydrocarbons)	Petroleum production and refining	Industrial (Petrochemical, Extractive)
	Spent lubricating oils	Commercial, Industrial
	Leaking underground gasoline storage tanks	Commercial
	Boatyards and marinas	Industrial, Tourism (Yachting)
Nutrients	Sewage	Residential, Commercial, Industrial
	Grey water (from showers, laundries, etc.)	Residential, Tourism
	Animal waste	Intensive animal husbandry
	Runoff containing excess fertilizers, crop residues	Agriculture
	Abattoirs	
	Effluents from ammonia production, food processing plants, beverage manufacturers, sugar refineries, rum distilleries, breweries	Industrial
Sediments	Deforestation of hillsides for development purposes	Residential, Infrastructural, Agricultural
	Slash and burn agriculture	Industrial (Extractive/ Mining)
	Forest fires and timber harvesting	All development/ land use activities
	Discharges from gravel quarry wash plants	All development/ land use activities
	Careless construction stage practices	All development/ land use activities
	Reclamation of land	All development/ land use activities
	Beach sand mining	Residential, Tourism
	Installation of coastal protection structures	
Litter/ solid waste	Improper disposal of consumer goods	Residential, Commercial, Industrial
	Inadequate waste collection, disposal infrastructure	Residential, Commercial, Industrial
Toxic and other wastes	Solid and liquid waste from industrial operations	Industrial
	Landfills and dumps that leak toxic substances	Land-filling/ waste disposal
Physical	Reclamation of wetlands	All land use activities

Contaminant or Alteration	Major Sources/ Causes	Affected Land Use Activities
Alterations and Destruction of Habitat (PADH)	Installation of coastal protection structures Dredging to develop and maintain harbours Beach sand mining	All land use activities Ports and harbours/ Infrastructure All land use activities

Source: TT NPA for the Protection of the Coastal and Marine Environment from Land-based Sources and Activities, 2008-2013 – IMA and UNEP, February 2008

The same study also conducted an assessment of the severity of impacts of the various sources of pollution on various aspects related to human well-being – one of them being ecosystem health. As is evident from Table 1.12, the assessment concluded that with the exception of heavy metals and toxic waste, all other pollutants have a high level of impact on ecosystem health. Heavy metals and toxic waste were found to have an effect in the medium-high range. This very comprehensive assessment would be key to identifying the priorities and actions needed to better manage the effects of pollution locally.

TABLE 1.12: SEVERITY OF IMPACTS OF LAND-BASED SOURCES OF POLLUTION ON VARIOUS ASPECTS OF HUMAN WELL-BEING

Contaminant or Alteration	Food Security and Poverty Alleviation	Public Health and Safety	Ecosystem Health	Economic and Social Benefits. Uses	Total
Sewage	3.00	3.00	3.00	3.00	12.00
POPs	3.00	3.00	3.00	3.00	12.00
Heavy Metals	2.00	2.17	2.17	2.00	8.34
Oils (Hydrocarbons)	2.17	2.17	3.00	2.17	9.51
Nutrients	3.00	2.00	3.00	2.17	10.17
Sediments	2.17	1.75	3.00	2.80	9.72
Litter/Solid Waste	2.17	2.30	3.00	3.00	10.47
Toxic, other Wastes	2.30	2.50	2.30	2.30	9.40
PADH	3.00	2.00	3.00	2.00	10.00

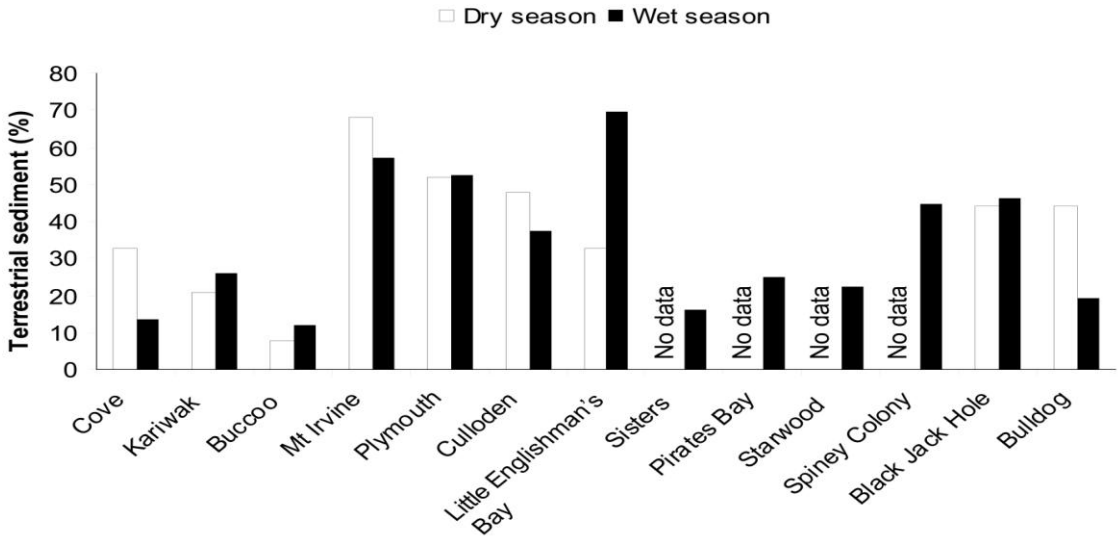
1 – Low Impact 2 – Medium Impact 3 – High Impact

For each pollutant, the severity of each impact was given a weighted score out of 3. The total severity for each pollutant was then calculated by finding the sum of the scores awarded to the four individual impacts.

Source: IMA and UNEP 2008

Specifically related to the coastal/marine environment, there are some available datasets which allow for a closer examination of the impacts of pollution on ecosystem health and services. A study undertaken in Tobago in 2007 to determine the percentage of terrestrial sediment settling onto Tobago's coral reefs, estimated that on average, 30% of the sediment on Tobago's reefs is derived from inland sources. The results of this study are shown in Figure 1.18.

FIGURE 1.18: PROPORTION OF TERRESTRIAL SEDIMENTS IN COASTAL SEDIMENT TRAPS FROM SELECTED SITES AROUND TOBAGO (2007)



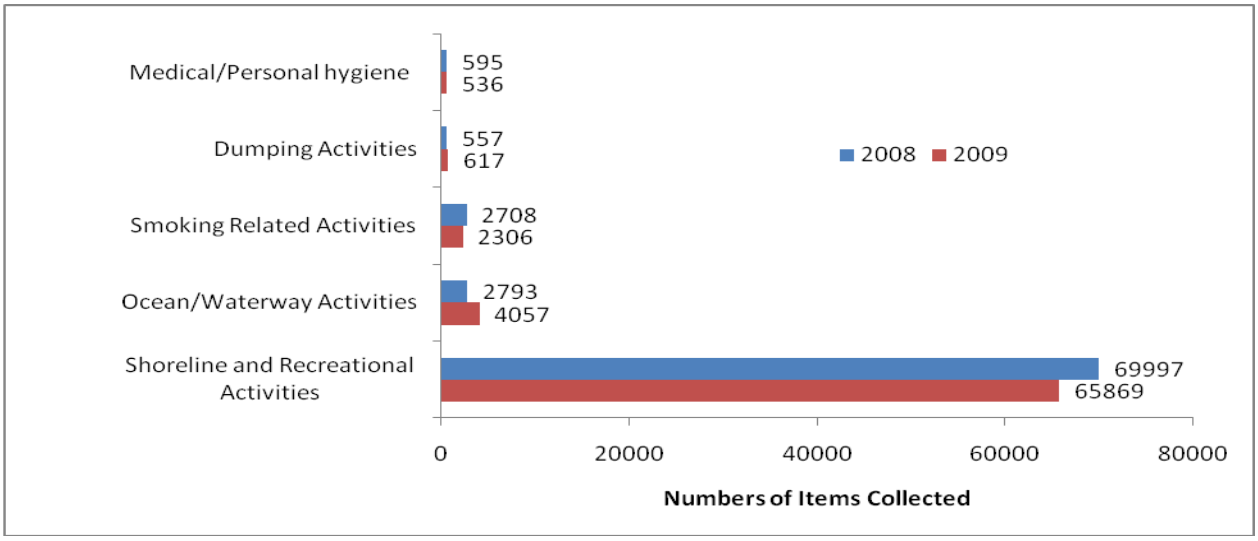
Source: Buccoo Reef Trust 2008

Given the rapid development of the oil and gas industry in Trinidad and Tobago, there have been concerns about the pollution impact of these activities on aquatic systems. There is no conclusive evidence however, that spills which occurred in the offshore environment in Trinidad and Tobago have had major impacts on marine and coastal environments.

Solid waste is another form of pollution that affects both terrestrial and aquatic life. Perhaps the most comprehensive, complete and compelling dataset on the sources and extent of coastal pollution in Trinidad and Tobago is derived from the annual International Coastal Clean-up (ICC) Exercise. Figure 1.19 shows the most up-to-date information from the 2008 ad 2009 ICC exercises. What is clear from these data is that shoreline and recreational activities are the major contributor to coastal pollution, and the types of materials that are most abundant in this category are plastic bottles, bags, plates, and plastic utensils. These are the very types of materials that are known to suffocate marine species such as turtles. In addition, and as a result of ocean and waterway activities, items such as lost fishing nets, which are also a hazard to marine life - have been collected during the ICC exercise. Solid waste is indiscriminately disposed of in rivers, canals and other waterways which invariably deposit this waste at their outfall points at the coastline.

Quantitative data on the impacts of solid waste on inland freshwater systems are not available, but observations of most of the waterways on the islands would indicate that plastic bottles and styrofoam containers comprise the majority of the waste – which more than likely plays a very significant role in the increasing incidence of flooding in Trinidad and Tobago. Other types of items which are dumped into waterways include other types of plastic items, food boxes, appliances, tires/vehicle parts and even pieces of furniture.

FIGURE 1.19: SUMMARY OF THE SOURCES OF DEBRIS COLLECTED DURING THE 2008 AND 2009 INTERNATIONAL COASTAL CLEAN-UP EXERCISES IN TRINIDAD AND TOBAGO



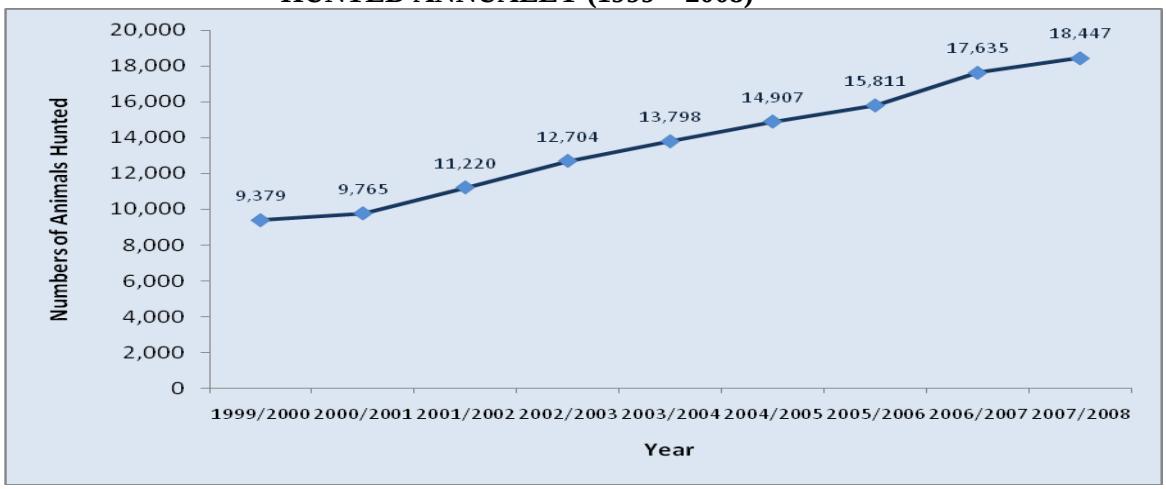
Source: ICC 2010

1.4.1.3 Harvest and Resource Consumption

Activities such as timber extraction, wildlife hunting, and fishing are all potential threats to species abundance, distribution and diversity. As previously described, there has been, for several years, a high dependency on natural forests for the provision of timber (Figure 1.17, page 48). Though the removal of timber is not contributing to deforestation to the extent of other activities (housing, agriculture and even quarrying), more research is required to determine the effects of this activity on forests.

Wildlife hunting – an activity which is regulated by law - is becoming increasingly popular in Trinidad and Tobago. Figure 1.20 shows that there was a steady increase in the numbers of wildlife animals hunted annually between 1999 and 2008, with an almost 100% increase in numbers over the period.

FIGURE 1.20: TOTAL NUMBERS OF WILDLIFE ANIMALS HUNTED ANNUALLY (1999 – 2008)



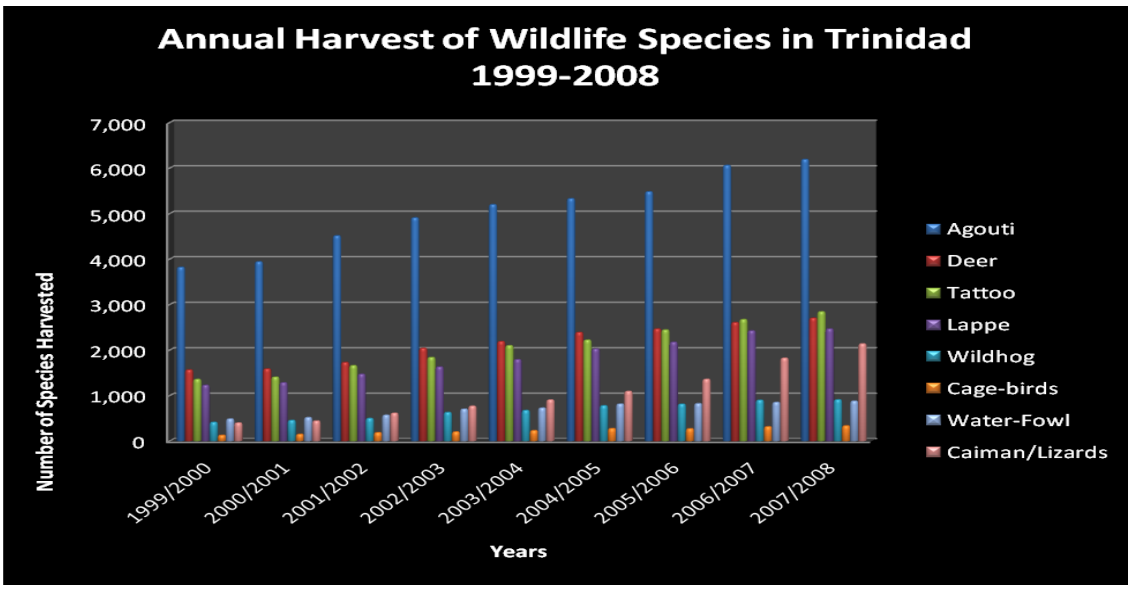
Source: Forestry Division 2009

The most popular as game species include the agouti (*Dasyprocta leporine*) which accounts of one third of all animals hunted, deer (*Mazama americana trinitatis*), armadillo (*Dasypus novemcintus*), spotted paca or lappe (C*uniculus paca*), the collared peccary or quenk (*Tayassu tajacu*), and lizards (including the Caiman – *Caiman crocodilus*) – see Figure 1.21. It is unlikely that the increasing harvest numbers reported by the Forestry Division are an indication of an increasing resource base (i.e. that the numbers of animals in the wild are increasing) – rather it would more likely indicate that the hunting effort is becoming more efficient/successful. What is yet to be understood are the critical thresholds in wildlife populations to help guide decision-making about regulating the hunting effort.

However there are troubling signs indicating unsustainable levels of harvesting. The Northern Range Assessment (2005) reported declines in populations such as the peccaries (*Tayassu tajacu*) and the spotted paca or lappe (C*uniculus paca*), and noted that the deer (*Mazama americana trinitatis*) was vulnerable. In addition to these Kenny (2008) reported on the vulnerability of other species that are illegally hunted - monkeys (the Red Howler Money - *Alouatta seniculus insularis* - and the White-fronted Capuchin - *Cebus albifrons trinitatis*). The Capuchin is described as uncommon in Trinidad, and the Northern Range Assessment (2005) reported significant decreases in the Howler Monkey populations. The Ocelot (*Leopardus pardalis*) which is the least common of the land dwelling mammals in the country is also sometimes illegally killed by hunters. The Pawi (*Pipile pipile*) – categorized by the IUCN Red List as critically endangered, is also sometimes illegally hunted. It should be noted that while there is a prescribed hunting season and a system for the issuance of hunting permits by species, there has been and continues to be year-long illegal hunting, as this activity is widely recognised as a reliable method of supplementing income amongst rural demographic groups. Meat from game species fetches premium prices during the hunting season and prices increase during the off-season when meat is sold in black-market trade. The Christmas period is traditionally the high season for the harvesting and consumption of game species.

Forest biodiversity also face threats from the illegal pet trade. Whilst data on seizures of illegally captured species are inconsistent, this is known to be a perennial problem, with avian, fish, reptile and even some arachnid species being prime targets for both local and foreign markets (the latter being mainly the US).

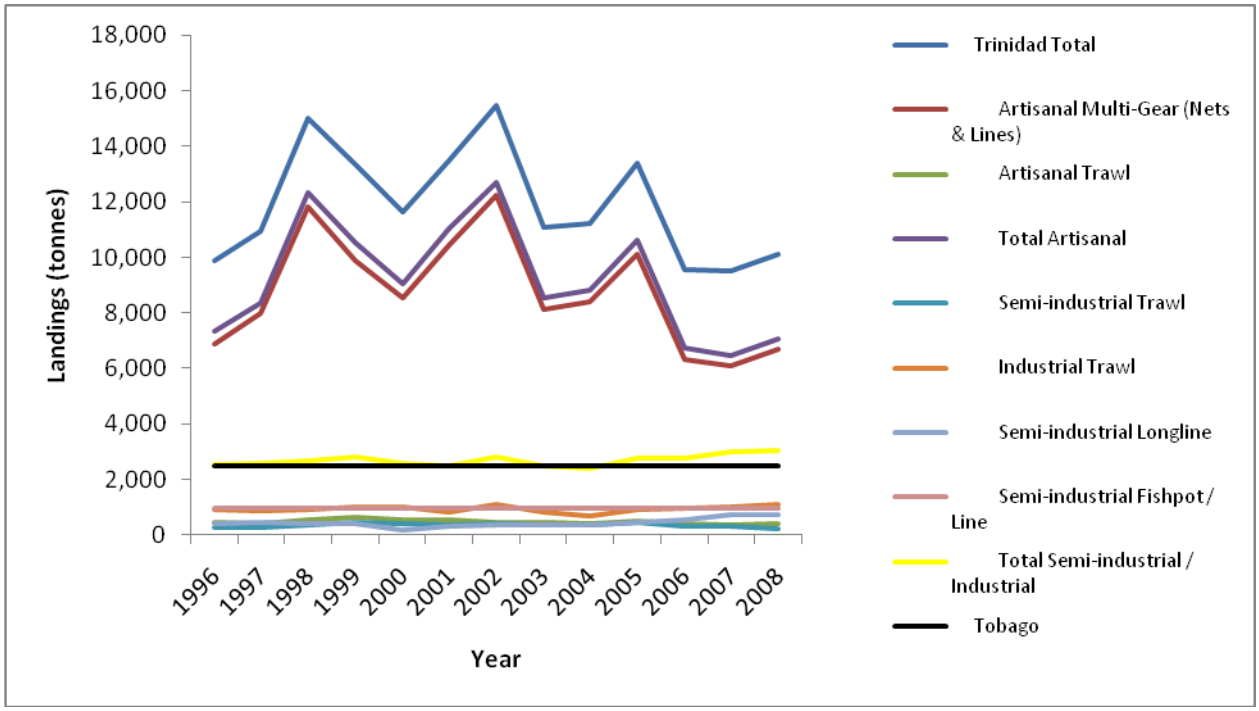
FIGURE 1.21: INDIVIDUAL NUMBERS OF WILDLIFE SPECIES HARVESTED ANNUALLY (1999 - 2008)



Source: Forestry Division 2009

Trinidad and Tobago's marine fisheries are under serious threat similar to most other fisheries in the world. Figure 1.22 indicates an overall decline in fish landings after 2002, and as at 2008, recovery was still not evident. Current per unit effort data for Trinidad and Tobago are not available, although statistics for the Caribbean show that catch per unit effort at a regional level has been decreasing (CARSEA, 2007). Moreover certain deductions could be made from available data for Trinidad and Tobago. By taking the information in Figure 1.2, page 25 (which shows an overall increase in the value of fish landings) and matching it against the data in Figure 1.22, what might be deduced is that the disjuncture in the pattern between landings (overall decline) and value (overall increase) would suggest a disproportionate increase in price – indicating greater resource scarcity. Offshore fisheries in Trinidad and Tobago's territorial waters face major threats from commercial vessels that target high value species such as tuna and crustaceans. Often fishing gear from long liners and trawlers become damaged and remain in fishing grounds where they continue to "ghost fish" (i.e. trap marine species), in addition to which the commercial fishing effort usually results in a high degree of by-catch which is disposed of at sea. Marine turtles en route to nesting sites are an outstanding example of by-catch caught by trawlers.

FIGURE 1.22: ESTIMATED LANDINGS BY FLEET FROM THE MARINE CAPTURE FISHERIES IN TRINIDAD AND TOBAGO (1996 – 2008)



Source: Fisheries Division 2010

Note: The landings by fleet for Trinidad and broken down into individual fleets. Tobago is given as an amalgamated figure for all fleets.

1.4.1.4 Climate Variability, Change and Associated Effects

The question is no longer whether climate change is having and will continue to have an impact locally, but rather the extent to which this is happening/ expected to continue. The datasets are by no means complete in terms of being able to establish conclusive cause-effect relationships, but there is information

which can be used to start developing an understanding of the effects of climate change and variability on local biodiversity.

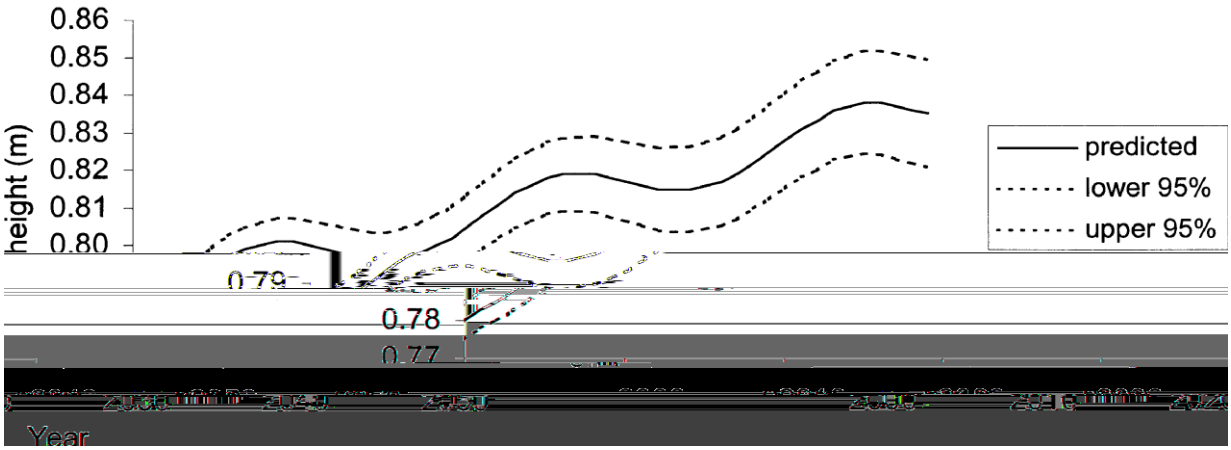
The average temperature of the country is 26°C with a mean temperature range of about 2°C. Highest temperatures are generally recorded during the dry season (Jan-May) and dry season temperatures may have an average of 35°C. At higher elevations, such as in Trinidad's Northern Range and in Tobago's Main Ridge, temperatures tend to be lower than at sea level. There is an average rainfall of 1750 mm per year with much of the rain being concentrated in the wet season (June-December). Rainfall is also unevenly distributed with the heaviest being recorded along the eastern Northern Range and the eastern side of Trinidad, while heaviest rainfall in Tobago is experienced along the Main Ridge.

It is still to be determined whether the local rainfall data point to any conclusive trends about the impact of climate change on rainfall patterns. There are no long-term statistically significant trends which establish either an increase or decrease in total rainfall. Additionally, seasonal and geographic data which exist do not allow for drawing sound conclusions about changes. Many locals believe that rainfall patterns are changing – there is less predictability in wet and dry season patterns; rainfall is now occurring in short, but very intensive bursts rather than being spread out more evenly; and rainfall distribution is changing – there is now more rain in western Trinidad and less rain in eastern Trinidad when compared with historical patterns. Scientists however agree that further monitoring is required to be able to say anything with certainty. The Intergovernmental Panel on Climate Change's (2007) models predict less rainfall for the southern Caribbean (including Trinidad and Tobago) because of climate change. This would no doubt have consequences for biodiversity.

Recent reports also indicate a total increase in temperature of 1.7^0C over the period (1961 – 2008 (Draft Climate Change Policy for Trinidad and Tobago 2010). This is compared with an increase of 0.6^0C over the period 1961 – 1990. What these data indicate is an increase in the warming rate since 1990. It can therefore be concluded from the long-term data that air temperatures in Trinidad (and Tobago) are increasing, and that the rate of increase is also increasing.

As a small island developing state (SIDS), Trinidad and Tobago is at risk of losing significant portions of its low-lying coastal lands to sea level rise (driven by climate change). In a recently published paper (Sutherland, et al. 2008), it was reported that over the period 1984 to 1992, sea level around Trinidad and Tobago rose by 1.6mm to 3.0mm. Projections to 2050 (Miller 2005) indicate a rise of approximately 0.05m above recorded sea level height in 2001– a change of approximately 1mm per year (Figure 1.23). These data, along with data provided by the Intergovernmental Panel on Climate Change (2007) point to an increase in the rate of sea level rise. These changes would have serious impacts on local coastal ecosystems, the livelihoods of coastal communities, coastal development and human well-being in general.

FIGURE 1.23: PREDICTED ANNUAL MEAN SEA LEVEL IN PORT OF SPAIN TRINIDAD FOR THE FIRST HALF OF THE 21ST CENTURY

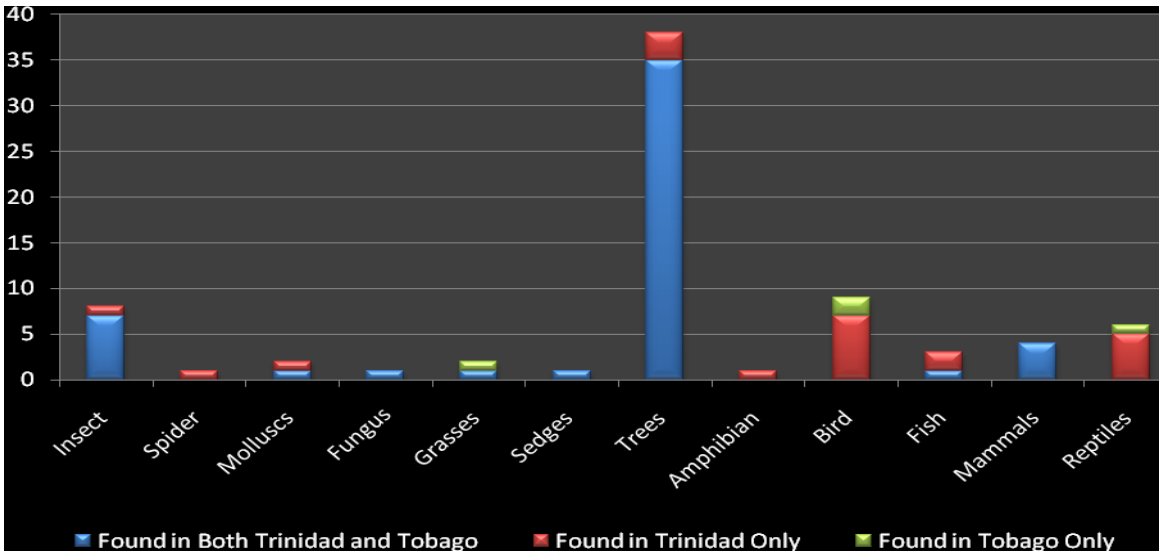


Source: Miller, 2005

1.4.1.5 Alien Invasive Species

The introduction of alien species into Trinidad and Tobago's environment – whether accidentally or on purpose – has had an effect on local biodiversity. Alien invasive species have been known to increase competition within ecological niches, reduce local biodiversity and have devastating impacts on commercially important crops. It is reported that there are 76 exotic species recorded in Trinidad and Tobago – of which 21 are found in Trinidad only and 4 in Tobago only. There have been more invasive trees than any other group (introduced mainly for agricultural and other commercial purposes). Birds, reptiles and insects also show large number of invasive species (Figure 1.24).

FIGURE 1.24: INVASIVE SPECIES IN TRINIDAD AND TOBAGO



Source: Kairo and Ali (2003) and the Global Invasive Species Database (accessed 2010)

There is a classification system which is used to describe the status of alien invasive species (Kairo and Ali, 2003) and this is given in three categories: Exotic = known to be present in the Caribbean in cultivation, captivity or in the wild; Naturalised = known to be established in the wild in at least one Caribbean country; Invasive = established in the wild and reported to be spreading, and/or regarded as a threat to a native species, ecosystem or causing a socio-economic impact. Of the 76 exotic species, 36 species are considered invasive.

1.4.2 Indirect Drivers of Change

1.4.2.1 Economic Forces

Many of the changes which have been experienced over the last decade affecting Trinidad and Tobago's biodiversity have been almost directly on account of rapid economic growth in Trinidad and Tobago. In fact, it is probably fair to say that economic growth has been the single most important indirect driving force for biodiversity loss in Trinidad and Tobago. Most of the industrial growth has occurred on the island of Trinidad. Tobago's local economy depends heavily on tourism (World Resources Institute 2006), and to a lesser extent agriculture. Tobago's local GDP is thus lower than Trinidad's.

Owing to a very prosperous energy sector, Trinidad and Tobago managed to sustain a very high rate of development for several years – one of the fastest rates of development in Latin America and the Caribbean (LAC). In the Caribbean, Trinidad and Tobago is the leading producer of crude oil, and internationally, it ranks as the fifth largest exporter of Liquefied Natural Gas (U.S. State Department, 2010). The local availability of oil and gas has led to the development of a number of downstream petrochemical industries such as ammonia and methanol production, and it has also spawned significant growth in other sectors such as construction. In turn, this led to increasing demand for land to accommodate housing and industry as well as non-petroleum mineral resources.

In the last three years, growth in the economy (including in the petroleum sector) has slowed and there has been increasing emphasis placed on the need to diversify the economy into such areas as agriculture, tourism, food processing and entertainment. Should such divestment take place it is anticipated that biodiversity would benefit as there should be significantly less industrial pressures and impacts placed on ecosystems.

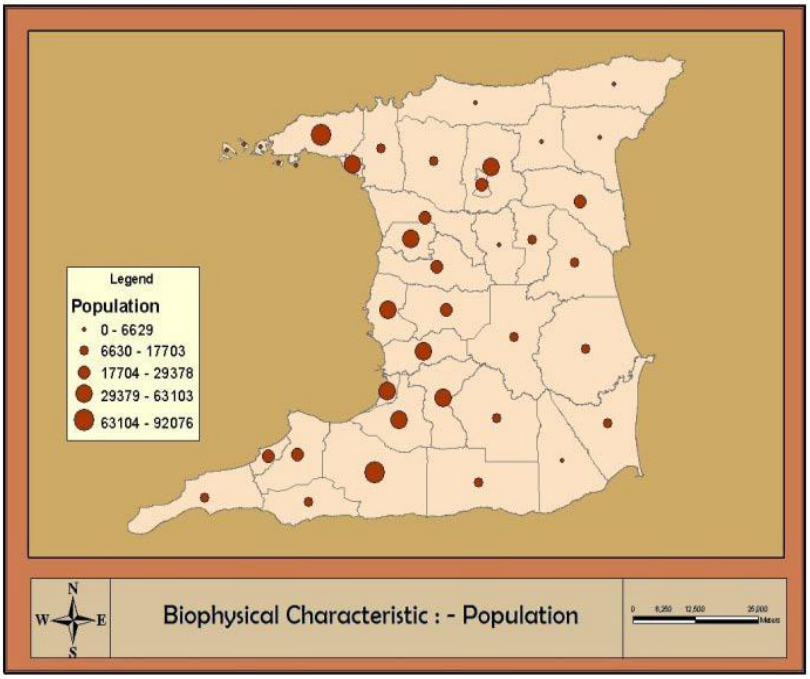
1.4.2.2 Demographic Changes

Based on the most recent estimates, Trinidad and Tobago's resident population stands at 1.3 million. The majority of people live on the island of Trinidad (approximately 1,248,000) with the remainder (approximately 52,000) in Tobago. Population density in certain areas is increasing (246 persons per square kilometer in 2000 compared with 237 persons per square kilometer in 1990) with most of the growth occurring in and around the major urban areas on both islands. The most densely populated areas are generally found in the following regions:

- Trinidad - along the west coast and the southern foothills of the Northern Range (a stretch of ribbon development known as the East-West Corridor), in cities and towns such as Port of Spain (capital city), San Fernando, Arima, Chaguanas, Diego Martin and St. Augustine (Figure 1.25).
- Tobago – the southwestern section of the island including the capital city Scarborough.

Because of the population distribution, certain ecosystems – such as coastal ecosystems and certain sections of the mountain ranges have been affected in those regions proximal to the densely populated areas.

FIGURE 1.25: POPULATION DISTRIBUTION IN TRINIDAD



Source: Opadeyi 2010

1.4.2.3 Tourism

The tourism industry has played a significant role in driving changes in land use/land cover especially in Tobago. Between 1991 and 2005, there was an increase in tourist arrivals of over 200% in Trinidad and Tobago, with approximately 50 tourist arrivals per square kilometre in 2005. This led to the need for expansion of the hotel industry, and also led to greater pressure on coastal ecosystems to carry the recreational load.

1.4.3 Summary of the Main Driving Forces Affecting Biodiversity, and Main Implications for Human Well-being

Table 1.13 provides a summary of the status of, trends in and main threats to biodiversity in Trinidad and Tobago, based on a biome-by-biome analysis. In summary, rapid economic growth on account of the oil and gas industry in Trinidad and Tobago has driven changes in demographics and land use/land cover especially (though not exclusively) in western Trinidad and in south-western Tobago. Additionally, pollution of inland freshwater systems and coastal regions on account of land use activities (principally housing/urbanisation, agriculture, industrialization and quarrying) has negatively impacted freshwater aquatic biota and coastal ecosystems. These impacts have been exacerbated by lack of effective governance and implementation of laws/policies, as well as by other stressors such as overharvesting, climate change and alien invasive species. On account of these changes, there have been significant modifications especially in the country's forests and coastal systems. Loss of ecosystem integrity has had some very direct and severe consequences, the most pressing include:

- Greater severity of flooding in recent years in areas most modified by human activities. These also coincide with areas of highest urban and residential development
- Lower quantities and quality of water from inland water sources for human consumption

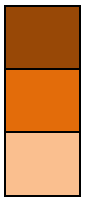
- Loss of suitable habitats for wildlife, resulting in reductions in the abundance and distribution of species on both islands, as well as a higher vulnerability of certain species to endangerment and extirpation
- Economic losses in tourism and fisheries in Tobago associated with coral reef degradation
- Higher fish prices due to depleted marine stocks

TABLE 1.13: SUMMARY OF STATUS OF, TRENDS IN AND THREATS TO MAJOR BIOMES/ECOSYSTEMS IN TRINIDAD AND TOBAGO

Main biomes	Status			Trends			Driving Forces								
							Land Use/Land Cover Change				Pollution				
	Extent of biome	Integrity of Ecosystem Services	Associated Species abundance	Extent of biome	Integrity of Ecosystem Services	Associated Species abundance	Urban including Housing	Agriculture	Industrial	Quarrying	Chemical	Solid Waste	Alien Invasive species	Overharvesting	Climate Change & variability
Forests	Fair	Fair	Fair	Declining	Rapidly Declining	Declining	High	High	Med	High	Low	Low	Med	High	Med
Inland Freshwater Systems	Stable	Fair	Fair	Stable	Declining	Declining	Med	High	High	High	High	High	Med	High	Med
Coastal Systems-Wetlands	Fair	Fair	Fair	Declining	Declining	Declining	High	High	High	Med	High	Med	Med	High	High
Coastal Systems-Coral Reefs	Poor	Poor	Fair	Declining	Declining	Declining	High	High	Low	Low	High	High	Med	Med	High
Marine	N/A	Good	Fair	N/A	Declining slowly	Declining	N/A	N/A	N/A	N/A	Med	?	?	High	?

Notes to table:

- For driving forces, three categories of the extent of impact are used – High, Medium and Low.
- N/A – Not applicable; ? – Data not sufficient to make an assessment
- The color of the boxes indicates the degree of certainty/confidence assigned to each factor - given as follows:



High

Medium

Low

CHAPTER 2

TRINIDAD AND TOBAGO'S NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (NBSAP)

Aripo Savannas Environmentally Sensitive Area

2.1 Background to Trinidad and Tobago's NBSAP

The Government of Trinidad and Tobago produced its National Biodiversity Strategy and Action Plan (NBSAP) in 2001. The NBSAP was developed through extensive stakeholder engagement and consultations and identified a number of strategies and actions for improved biodiversity conservation in the following broad categories:

- Education and Awareness
- Legislation and Enforcement
- Institution and Capacity
- Information and Research
- Policy and Commitment

Under each category, several very specific activities and actions were identified – all of which were to be completed/ addressed to some extent within a three-year of the adoption of the NBSAP.

2.2 Status of Implementation

The NBSAP remains the main document for guiding the implementation of the CBD in Trinidad and Tobago. Significant progress has been made in the implementation of the NBSAP with respect to education and awareness and improvements to the legislative framework especially through the declaration of the environmental sensitive areas and species. Since the NBSAP was completed in 2001 and until 2010, progress has been made in regulating development which may have potential negative impacts on biodiversity through the Environmental Management Act (Chapter 35:05) and its Certificate of Environmental Clearance Rules. The protection of certain areas and species has been enhanced through their declaration as environmentally sensitive through the Environmentally Sensitive Areas and Environmentally Sensitive Species Rules. Additionally many organizations and entities such as research institutions, NGOs/CBOs, certain communities, and some private sector entities have been taking responsibility for the development/advancement of biodiversity related programmes.

Table 2.1 provides a summary assessment of the main challenges as well as overall progress in implementation of the measures outlined within the NBSAP as at 2010. This summary is based on an analysis of progress in individual activities (or blocks of similar activities) identified in the 2001 NBSAP document.

2.2.1 Challenges to Implementation of the NBSAP

The main challenges to NBSAP implementation have been financing, political priority, capacity and lack of an effective coordinating mechanism. The need for an effective coordinating entity to implement the NBSAP is the greatest challenge. The Environmental Management Authority (EMA) which spearheaded the development of the NBSAP is responsible for coordinating its implementation. The (human) capacity of the EMA to perform coordinating functions is limited. The result is that many of the activities which require coordination and collaboration amongst key stakeholders have not advanced significantly.

The budget proposed in the NBSAP (based on best estimates at 2001), is by no means inadequate but much has changed since 2001, and it is likely that budgetary requirements to support many of the activities identified may have to increase. In advancing biodiversity management initiatives, special attention must be paid to the identification of priorities for the efficient and effective allocation of funding. Government will also need to assume a greater role in the financing of such initiatives which will require the careful appropriation of funding in annual national budgets.

Another challenge to NBSAP implementation, is that Trinidad and Tobago has not fully capitalized on opportunities to collaborate with other countries/ international organizations/ institutions in order to draw

on best practices and lessons learned, and in some cases, recruit the appropriate expertise . At a CBD-led regional workshop entitled 'Capacity-Development Workshop for the Caribbean region on National Biodiversity Strategies and Action Plans (NBSAPs), Mainstreaming of Biodiversity and the Integration of Climate Change' hosted by the Government of Trinidad and Tobago in November 2008 it was recognised that the scope for collaboration is expansive but largely underutilized. In addition, it was also highlighted that there has been limited mainstreaming and integration of the CBD Strategic Plan, Thematic Programmes and Cross-cutting Issues in implementing the NBSAP (Chapters 3 and 4 provides more in-depth analysis).

2.2.2 Revision and Future Plans for the NBSAP

Discussions have already been initiated between the Ministry responsible for the Environment and the EMA regarding the revision of the NBSAP. Consideration is currently being given to the financial and capacity requirements for undertaking the work. The proposed steps in the process are as follows:

- finalize budgeting arrangements for the project and enlist the services of a consultant to lead the project
- establish a project Steering Committee of key stakeholders to oversee the work and provide technical guidance and support.
- undertake an in-depth assessment of the progress made in implementation of activities in the first NBSAP, clearly outlining reasons for success/ failure. This should also include a feasibility study of the activities outlined in the first NBSAP – their financial and time requirements, and the capacity required for implementation
- undertake an in-depth assessment of the state of Trinidad and Tobago's biodiversity (which builds on the work undertaken in the Fourth National Report to the CBD) so as to be able to identify priority issues and actions
- organise stakeholder consultations to gather inputs and feedback
- compile the reports on stakeholder consultations, finalise and submit the revised NBSAP

It is anticipated that revision of the NBSAP will begin in 2011 and be completed within 9 to 12 months of initiation. In the meantime, the Government of Trinidad and Tobago through the EMA will continue to implement measures outlined in the NBSAP to effectively manage biodiversity, and begin correcting some of the negative trends.

TABLE 2.1: TABLE SUMMARISING THE MAIN PROGRESS AND CHALLENGES IN IMPLEMENTING TRINIDAD AND TOBAGO'S NBSAP

The first four columns of the following Table are extracted from the NBSAP (2001). It outlines the actions and activities that were identified to be undertaken in the three-year period following the implementation of the NBSAP (to be completed in 2004). A description of major actions/activities completed to date (2010) is given in the last column titled 'Status of Implementation'.

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
Education and Awareness				
Build Education and Awareness Programmes in biodiversity conservation on existing initiatives and fill gaps in formal approaches. • Commission an interdisciplinary working group which will develop a policy and action plan for Environmental Education that will have biodiversity conservation and sustainable development as its basis. The Working Group will be coordinated by the EMA and should include participating agencies, NGO's, CBO's and other interested partners. It will find methodologies to allow integration of appropriate existing conservation education programmes and be expected to take a holistic approach to the development of informal awareness programmes. • Develop an Awareness campaign based on the Environmental Education Action Plan and Policy, which will emphasize the importance of the links between biodiversity and all sectors of development in the country. The policy will identify the content of the campaign, with the media being utilized. • Strengthen existing MOU's between the	EMA THA Ministries of Planning and Development, Agriculture, Land and Marine Resources, Education, Information NGOs CBOs	GoRTT National Lotteries Control Board	90,000.00	There has been limited implementation of Biodiversity Education and Awareness Programmes in Trinidad and Tobago in the ways articulated in the NBSAP. The following are noted: • An interpretive Environmental Education (EE) working group was established by the EMA in April 2008 to seek to improve coordination and collaboration amongst EE stakeholders. A few meetings were held, but significant difficulties were encountered in securing participation for meetings. The group is currently dormant but there are plans by the EMA to re-initiate these efforts • An EE Action Plan and Policy has not been developed • MOUs with a few key stakeholders were developed but never operationlized. In 2009, attempts were made to revisit these MOUs, and discussions are still ongoing

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
EMA and its participating agencies (through supplemental agreements) to enable the strategies and actions recommended by the NBSAP and those coming out of the Working group on Environmental Education. These supplemental agreements should detail the responsibilities of these entities. (2) Foster greater collaboration between conservation and education agencies and other stakeholders.				• Through the Interpretive EE working group and other activities, the EMA has been trying to promote greater dialogue between and amongst key stakeholders involved in conservation. But these efforts are still largely ad hoc, and not undertaken within a comprehensive framework
(3) Promote infusion of EE into the Primary and Secondary educational systems • Conduct an assessment of pre-school, primary and secondary programmes to determine the appropriate mechanisms for EE infusion into the curricula • Based on the assessment, develop local and regional education materials in support of EE and develop additional materials, as required to facilitate EE and awareness throughout the educational system. • Building agency partnerships to allow development of these materials(perhaps through a Standing Committee for development of these materials) • Use existing educational materials as the basis for EE infusion into the curricula • Advocate further infusion of EE into the CXC curricular, at a regional level, through CARICOM as well as promote practical "hands on" approaches to learner for schools and youth. • Develop a training programme for teachers, principals and supervisors in the delivery of EE ideas concepts and materials (at one of the tertiary Institutions).	Ministry of Education THA MALMR UNESCO IMA NGO's NIHERST	GoRTT	800,000.00	There have been attempts by the Caribbean Examinations Council, the Ministry of Education in T&T, the EMA and certain NGOs (such as the Wildfowl Trust, the Asa Wright Nature Centre, NIHERST, the Buccoo Reef Trust and The Cropper Foundation) to promote better infusion of EE into existing primary, secondary and even early childhood education. • In 1998, the Caribbean Examinations Council began introducing a revised curriculum for its secondary examination schemes – the Caribbean Advanced Proficiency Examinations (6^{th} form) and the Caribbean Secondary Education certificate (5^{th} form. Included in these revisions was the better integration of environmental issues into all subject areas – not just biology. At the Caribbean Advanced Proficiency Examinations level, Environmental Sciences was introduced as a new subject with a full syllabus. These were introduced to T & T in 2005 and are a major advancement in the

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
• Reinstate subjects for common-entrance which incorporate environmental education. • Provide opportunities for accessing information located in international bodies and on the internet. • Promote the Global Learning and Observation for the Benefit of the Environment (GLOBE) project of the Ministry of Education and other UNESCO associated schools projects				formal school system, although problems of resource material and insufficient teacher training have emerged • Although a Standing Committee for learning resource material production was never established, the EMA and several NGOs are involved in the production of learning materials for primary and secondary schools. But it appreciated that much more is needed in this respect • A formal system to qualify teachers to deliver EE has not yet been developed in T&T. The Ministry of Education runs routine training programmes for its teachers, but the scope for inclusion of EE issues is limited. The Cropper Foundation in collaboration with the Ministry of Education has therefore sought to develop a formal programme to provide capacity development opportunities for teachers • The Government of Trinidad and Tobago as well as some private/corporate entities have been supporting initiatives to ensure that school students have access to internet resources so that they are able to source information (including those from international sources) more easily. The Cropper Foundation has also been playing a role in assessing and packaging information from international sources for use by teachers and students

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				• The EMA has taken responsibility for a number of initiatives geared at the primary and secondary school levels - For 12 years, the EMA has been hosting an annual primary school hands-on competition - An annual residential youth environmental education workshop, undertaken during the July/August school break, targets the upper level of the secondary school system (6th form). This has been in pace for 3 years - An Ecosong competition was started in 2008 for the lower levels of the secondary schools system, and because of its success, in 2010, the competition was also extended to the upper levels of the secondary school system - Every year there is a Dramatic Envirologue competition for the upper levels of the secondary school system • The Forestry Division conducts specialized school lectures on forest and wildlife issues; convenes essays poster competitions and other educational activities associate with World Wetlands Day, World Forestry Day, and World Environment Day • Several schools throughout T&T signed onto the GLOBE programme and training was provided in the use of equipment and data collection.

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				However, the rigour required for data collection, as well as a lack of proper institutionalization of GLOBE into the formal schools system have resulted in limited success of this initiative locally. Only one school has been reported to have been consistent in its inclusion of GLOBE • The National Commission for UNESCO has been involved in supporting EE initiatives in T&T.
(4) Promote the sensitization of communities to biodiversity concerns through shared planning and management of these resources. • Identify and implement meaningful demonstration projects and opportunities for co-management that involve communities in their planning and execution (e.g. hillsides replanting and quarry restorations) • Make biodiversity a part of holistic community programmes, which emphasize linkages between community activities and the Environment.	MALMR THA Ministry of Community Development IMA, NGOs, CBOs Women's Federation Village Council Federation Youth Council	GoRTT UNDP Private Sector Ministries of Heath, Information, Planning.	250,000.00	The Government has initiated a number of co-management activities to enhance the involvement of and empower communities to manage biological resources. The Government is currently in the process of strengthen the policy framework for enhancing participatory management through the revision of the Forest Policy and the development of a Protected Areas Policy. Some of the important co-management programmes and initiatives include: • Through the EMA's efforts to designate Environmentally Sensitive Areas (ESAs) under the ESA Rules 2001, there has been the enhancement of local capacity to understand and become involved in projects aimed at conservation. This has been especially so in the ESAs - Nariva Swamp, Aripo Savannas and the Matura Park – but it has also been occurring in other areas across the country • Community co-management of marine turtle nesting sites on the East

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				Coast of Trinidad. Community groups neighbouring turtle nesting beaches are assisting the Forestry Division in assessing the status of the turtle population through a tagging programme; managing eco-tourist by providing guided tours; and conducting wildlife patrols. • Establishment of a National Reforestation and Watershed Rehabilitation Programme werein NGOs and CBOs are engaged in reforestation of degraded forested areas in critical watersheds and the maintenance of replanted areas including the suppression of forest fires. • Implementation of the Honourary Game Warden Programme where interested individuals volunteer to assist the Forestry Divsion in enforcement of the Conservation of Wildlife Act. • Establishment of the Green Fund, which provides grants to NGOs and CBOs to undertake reforestation and conservation activities. • The Institute of Marine Affairs in collaboration with UNEP and the Government of Trinidad and Tobago, has been developing a National Programme of Action for the protection of the coastal and marine environments from land-based sources of pollution. A pilot exercise is currently underway in the Northern Range, and involves communities

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				• The Cropper Foundation, as a follow-up to its Northern Range Assessment, has been heavily involved in community-based initiatives to promote more sustainable hillside farming and community-based tourism activities
(5) Utilize Organization and Agencies involved in informal environmental education as foci for development of informal education programme.	EMA, THA Environment Tobago/ Chamber of Commerce TTMA, AMCHAM IRO, Division of Culture	Private Sector Environment Fund	200,000.00	There has been limited progress in this respect.
(6) Collaborate with corporate business, (e.g. the industrial sector) as they can contribute financing, expertise on advertising, public relations and communications.	IMA, CBOs, NGOs, Tobago Heritage Committee TDC Pointe a Pierre Wildfowl Trust	-	-	There has been limited success in building collaboration between the corporate sector and partners involved in biodiversity conservation. But the EMA has been engaging corporate entities mainly for the purpose of improving information sharing
(7) Use cultural and artistic traditions, including drama, as vehicles for environmental education and awareness programmes	-	-	500,000.00	The EMA has been heavily involved in this aspect of education. Through its primary and secondary school competitions (previously described).
(8) Involve religious organizations to promote biodiversity conservation and stewardship, through emphasis of relevant religious teachings and cultural values. • Develop demonstration projects at relevant locations, as opportunities for practical outdoor experiences an sensitization on biodiversity issues and encourage	-	-	150,000.00	There has been limited progress in this respect. But the Inter-religious Organization (IRO) has been involved or expressed an interest in environmental initiatives.

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
sustainability (e.g. rehabilitation of quarried sites and hillsides • Institute special days and quizzes etc., as environmental promotions.				
(9) Promote biodiversity and environmental education at the Tertiary (University and Technical) levels especially in disciplines projected to be major economic growth areas. (e.g. tourism an industry) • Introduce a mandatory basic environmental education course at the year 1 level, which exposes all students to issues in biodiversity conservation at a national and regional level. • Introduce degree programmes in Environmental Management, Engineering, Forestry, Conservation biology and geography at the UWI, St. Augustine and other tertiary institutions, and make these courses as electives to other degree programmes. • Provision of scholarships, overseas attachments, student exchanges, career guidance and other incentives to encourage a wide exposure to environmental education.	NIHERST THA UWI, TTHTI Ministry of Planning and Development	Ministry of Planning and Development	-	There has been a fair amount of progress at the tertiary level. The University of the West Indies (UWI), the University of Trinidad and Tobago (UTT) and other institutions offering tertiary level studies all have undergraduate and postgraduate courses in environmental sciences. These are most extensively offered at UWI. UWI and UTT have also taken steps to ensure that environmental considerations are incorporated into subject areas other than sciences. For example, the Land Surveying, Economics and Agriculture departments at UWI all have fairly robust environmental components. The Government has provided a number of scholarships to forestry officers to undertake degree in forest management at the undergraduate and postgraduate level.
Legislation and Enforcement				
(10) Make legislation and regulations more effective management tools, through harmonization, and by incorporating the use of new technologies and stakeholder involvement. • Develop and update legislation for conservation of protected areas ecosystems and species, consistent with international standards.	EMA, THA, MALMR Tobago House of Assembly Stakeholders, IMA	GoRTT FO UNDP International Donors	200,000.00	• Environmentally Sensitive Areas (ESA) and Environmentally Sensitive Species (ESS) Rules have been enacted and the areas and species are being declared. • In late 2009/early 2010 the GoRTT initiated a process to develop/revise

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				national policies for Forests, Protected Areas and Climate Change. This process involved extensive stakeholder consultations and adopted an integrated ecosystem-based approach • There are also plans in place to revise a Fisheries policy (2007) and policies for agriculture. In 2008, consultations were held to begin revision of the Fisheries Act (1916).
(11) Improve law enforcement success rate and utilize it as an important tool for management and sensitization on biodiversity conservation. • Build on existing law enforcement initiatives for protection of species and ecosystems (e.g. the Honorary Game Warden System and Environment Police) • Conduct regular programmes to sensitize the magistracy, police and coast guard, to the long term effects of detrimental activities on biodiversity. • Expedite establishment of the proposed environmental Court or Commission to address biodiversity and environmental crime.	MALMR, THA, EMA/ NGOs, CBOs Ministries of Agriculture, Land and Marine Resources, National Security, Attorney general and Legal Affairs Judicial and Legal Service Commission.	GoRTT, Corporate Sponsors, National Lotteries Board UNDP-GEF, Regional Authorities, Environmental Fund.	270,000.00	. • Veichle fleet and equipment of the Forestry Division has been upgraded to enhance their law enforcement capability • Coast Guard vessels and equipment has also been upgraded which has enhanced their capability to protected offshore wildlife sanctuaries and interdict illegal importation of wildlife. • A programme for systemic and systematic training and sensitization of public officers has not been implemented. However, there are training opportunities which are offered by the EMA specifically for the Environmental Police Unit. • The Environmental Commission was established 2001 with the following core duties: • hearings and decision-making • alternative dispute resolution

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
				• staff processing of hearings • public relations • public access The Commission, through stakeholder workshops and various planning exercises has continually been trying to improve its delivery of services to T&T.
Capacity				
(12) Establish an adequate means of sharing information, training and experience amongst agencies and their stakeholders • Conduct a programme to identify stakeholders, relevant government agencies, relevant NGO' other key players in biodiversity conservation. • Develop a series of interactive workshops to foster mutual understanding among these parties • Define at these workshops, the roles and function of each key player. • Establish means to ensure communication and collaboration between key players.	EMA, THA NBSAP Task Force NGOs, CBOs Private Sector	GoRTT EMA Non-governmental sources	50,000.00	There has been limited progress in this respect. Much more is required in the way of developing capacity. One of the main problems has been lack of an effective coordinating mechanism to implement this strategy.
(13) Develop advocacy tools for building consensus on biodiversity issues at the highest political levels. • Develop a program to identify leaders of opinion in communities by NGO' and CBOs. These persons could be promoted as focal points for biodiversity issues in local communities. • Develop a series of seminars designed to develop the capacity with CBO' to organize and lobby government entities on conservation issues, and in the generation of	NBSAP-Task Force COPE/ Relevant Government agencies NBOs, CBOs International NGOs	-	120,000.00	There has been limited progress in this respect. Efforts related to biodiversity conservation are still being conducted in an ad hoc manner.

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
public support for biodiversity. • Build strategic alliances between NGOs, CBOs, and governmental agencies to allow them to lobby political entities on conservation issues.				
(14)Strengthen NGOs and CBOs to play a greater role in the conservation and management of biodiversity towards sustainable livelihoods. • Encourage and assist their NGO's and CBO's to properly constitute their organizations and formalize organization networks • Conduct capacity building, seminary for NGOs and CBOs to enable their participation in project planning and implementation. • Promote joint training programmes for resource managers and stakeholders	Ministries of Legal Affairs, Community Development, MALMR THA Forestry Division, EMA, International Agencies, Regional Agencies, NGOs, International NGOs UWI	GoRTT International Donors	55,000.00	There has been limited progress in this respect. But it is worth noting that there are a number of NGOs and CBOs in T&T which have, through their own initiative, been building capacity to become involved in biodiversity management initiatives.
Information and Research				
(15) Prioritize research needs in collaboration with research institutions and private sector. • Conduct a detailed inventory of the resource, including the status and distribution of species important for agro-diversity conservation as well as the economic value of ecosystem services. Identify sources of additional data to fill these information needs (e.g. the private sector) • Establish a clearinghouse for bibliographic data, identification services , and database management for biodiversity in the country	MALMR THA EMA UWI CARINET Other national Research Institutions IMA and Other research Institutions	International funding sources	2,500,000.00	Not being addressed sufficiently: • Research and data gathering still being undertaken in a fairly ad-hoc manner because a national research agenda for biodiversity has not yet been developed. There is urgent need to expedite this activity • In 2007, the EMA initiated plans to commission the preparation of a national biodiversity assessment, but these plans never came to fruition • A biodiversity clearing-house has been established by the Ministry for

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
• Government entities and other research bodies responsible for biodiversity management should identify priority areas for applied research • Research the ecological relationships, ecosystems and the threats to biodiversity, as well as develop indicators for monitoring environmental changes affecting biodiversity.				the Environment, and is currently being updated • There has been no meaningful progress in the development of a national set of indicators for tracking biodiversity in Trinidad and Tobago.
(16) Identify support for research activities • Government to support relevant applied research programmes through annual appropriations and incentives such as scholarships. • Management agencies to develop a system of incentives for research institutions/students to conduct research projects. • Identify creative mechanisms for funding and other support for applied research. • Identify national and international organizations as potential sources of funding and other support.	MALMR THA EMA CARINET UWI NIHERST	GoRTT	600,000.00	Funding for biodiversity (and more broadly environmental) research continues to be a problem in Trinidad and Tobago: • Financial support from the GoRTT, where available, has not been prioritized for research • Biodiversity research is sometimes undertaken as part of private consultancies, and because of this, the data and information are not made available for public use • The UWI and the UTT have taken steps to ensure that environmental research projects can help to fill some of the gaps in national biodiversity research • Country allocations from international sources for environmental management are not being effectively utilized. In some cases, such as T&T's GEF allocation, monies have been returned by the country because of an inability to conceptualize and offer ideas which would justify the use of the funds

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
(17) Encourage collaboration with government and other research institutions and the private sector. • Encourage close collaboration between research institutions (IMA, UWI, NIHERST) and management agencies (EMA, MALMR), to develop and applied research programme that will provide information required for more effective management. • Research institutions to consider their role in fulfilling needs for biodiversity. (UWI and NIHERST in particular should be involved) • Establish clear links with industry as partners in research. Industry should assist in funding research especially in areas that are of concern to industry and their effects on biodiversity.	EMA, MALMR, THA, UWI, TTMA All relevant orgs. Doing biodiversity Studies/Research Institutions NIHERST IMA Industry	-	-	There is very limited progress in this respect. Consultations undertaken as part of the preparation of the 4th National report to the CBD have highlighted the need for much more collaboration in favour of research – especially between government agencies and other institutions.
(18) Broaden access to, and provide opportunities for, sharing information, consideration being given to the cost of information and the need for cost-sharing information in acquisition of information • Articulate an information policy at the national and institutional levels, for the sharing of information but which recognizes ownership rights associated with the origin of such information. • Implement a central clearinghouse for data and information relevant to biodiversity, which can be accessed by researchers, managers and the public. Consideration must be given to the emerging National Environmental Information System (NEIS) • Promote institutional strengthening related to the acquisition and management of data. • Promote linkages between industry and	EMA/MALMR IMA National Library and Information System UWI Research Institutions THA	-	400,000.00	The draft National Forest Policy and draft Protected Areas Policy provides guidance for the development of an appropriate legislative framework to address access and benefit sharing. . The UWI is considering the establishment of a National Biodiversity Center to house data and information on biodiversity. There is an urgent need for institutional strengthening in terms of acquiring and managing data. Public agencies often generate data but do not analyse them in a timely fashion. Data gathering and management are also not undertaken in a national framework, limiting the scope for conduct of policy-relevant studies such as

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
government environmental planning agencies, for information sharing.				Strategic Environmental Assessments. Cooperation and collaboration between the planning agencies and industry occurs, but not sufficiently.
(19) Utilize cost effective and appropriate research techniques and technologies • Develop technical expertise and standard methodologies for specific research projects. • Train personal and encourage technology transfer • Provide adequate incentives and remuneration • Provide access to training opportunities	NIHERST UWI Institutions to be specified	-	-	This has not been addressed in any meaningful way.
Policy and Commitment				
(20) Integrate policy objectives for biodiversity conservation into policy statements for all sectors. • Establish an authority for biological diversity which will coordinate and monitor biodiversity issues in the country • Organize ministerial workshops to discuss integration of biodiversity concerns into sectoral policies and discuss their implications to plans, programmes and projects of all ministries • Establish interagency policy planning teams • Initiate a systematic review and redraft of Government policies, which affect biodiversity conservation and make policy interventions to ensure biodiversity concerns are addressed. • Conduct an assessment to determine how institutions can be strengthened to enable development of an integrative policy	EMA/THA	-	150,000.00	The EMA which is responsible for the coordination of environmental management in Trinidad and Tobago has established a dedicated Biodiversity Unit to coordinate and monitor biodiversity issues in the country. The Ministry responsible for the environment has also established a Multi-lateral Environmental Agreements Unit to coordinate and monitor the implementation of the country's international obligations to biodiversity related MEA to which the country is Party. There is little collaboration and coordination within and amongst public (government) agencies but this is

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
process				expected to improve with the finalization and implementation of the NCSA Project. Systematic review of biodiversity related policies have been conducted to inform the revisions of the Forest Policy and the development of a Protected Areas Policy.
(21) Develop a clear policy process for adoption by government entities (incl. National Budgets) and ensure that strategic action plans of these entities incorporate implications on biodiversity conservation and the environment as a whole • Introduce annual Auditing and Appraisal systems to monitor policies, plans and programmes in Ministries that impact biodiversity • Based on these Auditing and Appraisal systems, mandate where necessary, policy interventions to ensure biodiversity conservation is addressed • Each Agency should hold discussions with other appropriate agencies and stakeholders to reach agreement on a policy process using guidelines on policy formulation prepared by the Ministry of Planning and Development. • Identify indicators for monitoring progress with policy objectives, strategies and actions during this policy process. • Natural resources management agencies will develop creative financial instruments to achieve policy objects for biodiversity management. • Identify and access source of funding from international donor agencies.	EMA/THA	-	100,000.00	There has been very limited progress in this respect.

Strategies and Actions	Lead Agency/ Partners	Funding Sources	Est. Budget (US$)	Status of Implementation
(22) Make sectoral interventions to increase the sensitivity of policy to biodiversity. • Advise on interventions in Government policies in all sectors of National life.	EMA	-	25,000.00	There has been some (though limited) success in this respect. Ministries such as those responsible for Environment, Agriculture, Transport, Planning, Public Utilities, Energy and Local Government have been incorporating biodiversity considerations into their policies and programmes.
(23) Institutionalize public participation in the development of government policy for the conservation and management of biodiversity. • Incorporate stakeholder, community and public participation in the development of public sector policy. • Include as appropriate, stakeholders (e.g. NGO's and CBO's) on boards of management, and committees that manage and plan biodiversity conservation. • Mandate government and private sector developers to obtain input from communities on plans, policies and developments, which will impact biodiversity in their areas	EMA/MALMR All Government Ministries	-	100,000.00	There has been significant advancement in this respect, although many stakeholders still feel marginalized. Such marginalization is most often voiced not as a lack of involvement in consultation processes, but rather as a fair and clear articulation of public views and opinions in national planning and policy development.
Totals			$6,560,000.00	

CHAPTER 3

MAINSTREAMING BIODIVERSITY IN TRINIDAD AND TOBAGO

Cyrtopodium parviflorum

3.1 Overview

The administrative framework for the management of biodiversity is complex. There are several Ministries and State Agencies with legislative mandates to manage biodiversity. There are also a number of civil society organisations that are engaged in biodiversity management projects and activities and play stewardship and advocacy roles. In addition, there are many legal and policies instruments in effect which deal with various aspects of biodiversity management. This multi-sectoral approach to biodiversity management results in:

- Overlaps among agencies involved in the management of biological resources;
- Identifiable gaps in roles and responsibilities for biodiversity management;
- Uncertainty regarding resource utilisation;
- Conflicting legislation, for example, in the area of enforcement, penalties, etc; and
- Inadequate legislation to deal with the issues.

The current chapter provides an overview of the framework for biodiversity management in Trinidad and Tobago, and will include a description of the main success stories and challenges in biodiversity mainstreaming. Based on these, some recommendations are provided for improving mainstreaming of biodiversity considerations into national planning.

3.2 National Framework for Biodiversity Management

3.2.1 Governance and Institutional Framework

There are several public sector institutions in Trinidad and Tobago with statutory control related to the management of the country's biodiversity. Among the more important institutions are the Forestry Division, Fisheries Division, the EMA and the Tobago House of Assembly (THA). The Forestry Division has responsibility for the management of Wildlife Sanctuaries, Forest Reserves, and Prohibited Areas designated under the Forests Act. Its responsibility has been traditionally limited to the management of forest resources on State lands through the Forestry Act and therefore has limited control on private forest. The Fisheries Division is directly responsible for managing fisheries and has legislative responsibility for designating prohibited areas in the marine environment of Trinidad and Tobago. To date, restrictions for demersal trawling have been established.

THA has responsibility for local governance on the island of Tobago. Its structure somewhat mirrors that of Central Government Ministries and so there are several divisions with responsibilities corresponding to central government counterpart Ministry. THA holds responsibility for certain aspects of environmental management and regulation, forest resources management, land development control, and mining of quarrying materials. The two (2) Departments of the THA that have critical responsibilities for managing biodiversity are:- the Department of Natural Resources and the Environmental (DNRE) and the Department of Marine Resources and Fisheries. The DNRE is responsible for managing the only forest reserve on the island the Main Ridge Forest Reserve and the Tobago wildlife sanctuaries. The Department of Marine Resources and Fisheries is responsible for managing the fisheries resources around Tobago and the Buccoo Reef /Bon Accord Lagoon Complex Protected Marine Area.

The EMA's role is to 'coordinate, facilitate and oversee execution of the national environmental strategy and programmes, to promote public awareness of environmental concerns, and to establish an effective regulatory regime which will protect, enhance and conserve the environment'. The EMA has responsibility for the leading the development and implementation of environmental policies, plans and strategies; and for initiating and supporting environmental-related activities. The most powerful instruments available to the EMA, for the sustainable management and protection of biological resources

are the Environmentally Sensitive Areas (ESAs) Rules, the Environmentally Sensitive Species (ESS) Rules and the Certificate of Environmental Clearance (CEC) Rules.

The ESA rules authorise the Authority to designate areas in Trinidad and Tobago as ESAs. Such designations are meant to conserve natural resources, protect the environment and to promote sustainable socio-economic development. Through such designations, the EMA may establish limitations on use of the area and the type of activities to be undertaken within the selected area. So far, Matura Forest, Aripo Savannahs and Nariva Swamp have been designated as ESAs.

The ESS Rules allows the EMA to provide species found in Trinidad and Tobago that are threatened with extinction with special protection through its designation as environmentally sensitive. Such designations would allow the Authority to establish limitation on use and implement plans and programmes for recovery of the species. To date, the West Indian Manatee (*Trichechus manatus*), the Pawi (*Pipile pipile*) and the White-tailed Sabrewing Hummingbird (*Campylopterus ensipennis*) have been declared as ESS.

The CEC Rules establish a comprehensive framework to ensure proper management of development and to safeguard the environment from degradation. These Rules apply to proposed developers who are planning to undertake any one of the 44 designated activities which cover a range of development from agricultural to heavy industry. Such developers must obtain a CEC from the EMA prior to the commencement of their project. In effect the CEC Rules are an environmental permitting process that allows developers to conduct scheduled activities under a prescribed set of conditions which pertain to mitigating the negative environmental impacts the activity may pose, parameters for monitoring of those impacts (in addition to the aspects of the project that may negatively affect the environment) as well as any other conditions that may be required to protect any specific features (biological or otherwise) of the project area.

In addition, the Authority is required under the EMAct to develop a National Environmental Policy (NEP) which was first drafted in 1998 and revised in 2006. This policy covers all of the main environmental issues including biodiversity management. The Policy is guided by respect for the community of life, keeping within the country's carrying capacity, empowering communities to care for their own environments, the polluter pay principle and the precautionary principle. Towards this end, one of the key objectives of the Policy is to "conserve the vitality and diversity of the natural environment through the conservation of ecological systems and the biodiversity within".

Other key public sector institutions with responsibility for biodiversity management include:

- The Ministry of Housing and the Environment which has responsibility for setting policy direction for the environmental sector; the supervision of a number of institutions, such as the EMA, and the Forestry Division; and coordinating and monitoring the implantation of the country's obligations to Multi-lateral Environmental Agreements to which the country is Party.
- The Water and Sewerage Authority (WASA) which has responsibility for the development and maintenance of waterworks and sewerage facilities, the promotion and proper use of water and for the administration of the Water and Sewage Act of 1980 and sections of the Waterworks and Water Conservation Act (1980 Revision). Under the Water and Sewerage Act, WASA may define and prohibit or regulate activities in areas for the purpose of protecting any water (surface or groundwater) against pollution known as watershed protection areas.
- Municipal Corporations which have responsibility for administration of the Regional Corporation Act of 1995 and sections of the Public Health Ordinance of 1950, and the execution of local infrastructural works, the disposal of municipal waste (solid and sewage) and the inspection of

properties for health nuisances within their municipality. Municipal Cooperation have the responsibility of managing heritage parks primarily intended for recreation within their boundaries

- The Land Settlement Agency (LSA) which has responsibility for implementing the State Lands (Regularisation of Tenure) Act of 1998 and administering the process of regularising the status of squatters residing on State lands prior to January 1998 and redeveloping their communities.
- The Ministry of Energy and Energy Industries which has responsibility for developing the energy and energy related industries and for monitoring, controlling and regulating the mining of the country's minerals – oil and gas, quarry materials and asphalt by both private sector and state agencies.
- The Ministry of Food Production, Lands and Marine Affairs which has responsibility for agricultural planning and management, soil testing and research.
- The Land Administration Division (LAD) which has responsibility for the administration and distribution of state-owned agricultural lands. The Division facilitates the leasing process and monitors fulfilment of lease conditions.
- The Land and Surveys Division (LSD) which has responsibilities for arranging surveys, verifying and approving surveys and ensuring valuations are carried out and executing leases of State lands.
- The Commissioner of State Lands which is the designated landlord of State lands.
- The Institute of Marine Affairs which has responsibilities for the collection, analysis and dissemination of data relating to the economic, technological, environmental, social and legal developments in marine affairs, generally, and the formulation and implementation of specific programmes/projects to achieve this objective
- The Town and Country Planning Division (TCPD) which is engaged primarily in development planning, development control and monitoring of development. This includes direct control of physical development on land, and ensures that development on land does not adversely affect coastal and marine areas, for example, land-falling marine structures like pipelines do not disrupt coastal processes and forms. It is empowered to allocate lands for communal parks, game and bird sanctuaries, protection of marine life, and preservation or protection of vegetation under a "tree preservation order".
- The Chaguaramas Development Authority (CDA) which is directly responsible for administering and coordinating the development of the north-west peninsula, including the offshore islands of Gaspar Grande, Gasparillo, Monos, Huevos and Chacachacare. This area has been designated as the Chaguaramas National Park.

3.2.2 Legal, Policy and Regulatory Framework

In Trinidad and Tobago, there are over 50 laws, polices, plans, strategies and programmes which seek to address biodiversity issues which directly or indirectly are compatible with the aims and objectives of the CBD. The most significant of legislation and policies are noted in the Table 3.1

TABLE 3.1: SUMMARY OF THE MAIN ISSUES COVERED BY NATIONAL LAWS, POLICIES AND PLANS RELATED TO BIODIVERSITY MANAGEMENT IN TRINIDAD AND TOBAGO

List of Main National Policies/Plans/Laws with relevance to Biodiversity	Implementation Status	Main issues addressed by the 2010 Biodiversity Indicators					
		Extent/ Fragmentation of key biomes and habitats	Abundance distribution of species/ Threatened spp.	Protected Areas & Sustainable Management of ecosystems	Alien invasive species	Marine Trophic Index	Water Quality
GENERAL ENVIRONMENTAL MANAGEMENT							
• Environmental Management Act Chapter 35:05	2	X	X	X	X	X	X
Environmentally Sensitive Species Rules 2001	1		X		X		
Noise Pollution Control Rules 2001	1		X	X			
Environmentally Sensitive Areas Rules 2001	1	X	X	X	X	X	X
Certificate of Environmental Clearance Rules 2001	1	X	X	X	X	X	X
Water Pollution Rules 2001	1			X			X
(Draft) Air Pollution Rules 2005	3		X	X			
(Draft) Waste Management Rules 2008	3			X			X
• Motor Vehicles and Road Traffic Act 1997	3			X			
• The Tobago House of Assembly Act 1996	1	X	X	X	X	X	X
• The Petroleum Act (rev. 1980)	1		X	X			X
• The Municipals Corporations Act (rev. 1980)	1	X	X	X			X
• Standards Act No. 18 of 1997	1						X
• The Pesticides and Toxic Chemicals (Amendment) Act (1986)	1		X	X			X
• Trade Ordinance No. 19 of 1958	1		X		X		
• National Environmental Policy (2005)	1	X	X	X	X	X	X
• National Biodiversity Strategy and Action Plan	1	X	X	X	X	X	X
FOREST MANAGEMENT							
• Draft Forest Policy of T&T (1942 revised in 1998 and 2010)	3	X	X	X			X
• Sawmills Act (1943)	1	X	X	X			X

List of Main National Policies/Plans/Laws with relevance to Biodiversity	Implementation Status	Main issues addressed by the 2010 Biodiversity Indicators					
		Extent/ Fragmentation of key biomes and habitats	Abundance distribution of species/ Threatened spp.	Protected Areas & Sustainable Management of ecosystems	Alien invasive species	Marine Trophic Index	Water Quality
PROTECTED AREAS							
• Policy for the Establishment and Management of a National Park System in Trinidad and Tobago (1980)	1	X	X	X			X
• Draft National Policy on Protected Areas (2010)	3	X	X	X			X
TOURISM							
• A National Tourism Policy for Trinidad and Tobago (2001)	1			X			
• The Master Tourism Plan (1996)	1			X			
CLIMATE CHANGE							
• Draft National Policy on Climate Change (2010)	3	X	X	X	X		
AGRICULTURE							
• Draft Aquaculture Policy (2001-2005)	3			X	X		X
• Agricultural Fires Act (1965)	1	X	X	X			
• Agricultural Small Holding Tenure Act (rev. 1980)	1			X			
WILDLIFE/PLANT CONSERVATION							
• Draft Wildlife Strategic Plan	3		X	X			
• Plant Protection (Amendment) Act (2001)	1	X	X	X	X		
• Conservation of Wildlife Act (1958)	1	X	X	X			
• Importation of Live Fish Act 1980	1		X		X		

List of Main National Policies/Plans/Laws with relevance to Biodiversity	Implementation Status	Main issues addressed by the 2010 Biodiversity Indicators					
		Extent/ Fragmentation of key biomes and habitats	Abundance distribution of species/ Threatened spp.	Protected Areas & Sustainable Management of ecosystems	Alien invasive species	Marine Trophic Index	Water Quality
• The Mongoose Act (rev. 1980)	1		X				
• The Animals (Diseases and Importation) Act (rev. 1980)	1		X		X		
• Cocoa (Import and Export) Act Section 3	1				X		
• Protection of New Plant Varieties Act No. 7 of 1997, Section 3	1		X		X		
• The Town and Country Planning Act (rev.1980)	1	X	X	X			X
• The Customs Act	1		X		X		
• Botanic Gardens Act (rev. 1980)	1			X			
FINANCING							
• The Green Fund (2005)	1	X	X	X			X
WATER RESOURCES							
• National Water Resource Management Policy (2003)	1	X		X			X
• The Water and Sewerage Act (rev. 1980)	1	X		X			X
• The Public Health Ordinance (Rev. 1980)	1	X		X			X
LAND USE AND PLANNING							
• Draft National Conceptual Development Plan (1999)	1	X	X	X			X
• National Physical Development Plan (1984)	4	X	X	X			
• Minerals Act (2000)	1	X	X	X			X
• Draft Hillside Development Policy (2006)		X	X	X			
• National Action Programme to Combat Land Degradation in T&T		X	X	X			X

List of Main National Policies/Plans/Laws with relevance to Biodiversity	Implementation Status	Main issues addressed by the 2010 Biodiversity Indicators					
		Extent/ Fragmentation of key biomes and habitats	Abundance distribution of species/ Threatened spp.	Protected Areas & Sustainable Management of ecosystems	Alien invasive species	Marine Trophic Index	Water Quality
• The Slum, Clearance and Housing Act (rev. 1980)	1	X		X			X
• The State Lands Act (rev. 1980)	1	X		X			
• Mining, Boring and Quarries Act (rev. 1980)	2	X		X			X
COASTAL AND MARINE (INCLUDING WETLANDS)							
• Fisheries Act (rev. 1980)						X	
• The Continental Shelf Act (rev. 1980)						X	X
• Archipelagic Waters and Exclusive Economic Zone Act (1986)				X			
• Marine Areas (Preservation and Enhancement Act) 1970	1			X		X	
• Draft Fisheries Policy (2007)	4			X		X	
• National Policy and Programmes on Wetland Conservation for Trinidad & Tobago (2001)		X	X	X			
• Sector Policy for Food Production and Marine Resources (2001-2005)	1			X		X	
• The Oil Pollution of Territorial Waters Act (rev. 1980)	1			X			X
• Harbours Act (rev. 1980)	1			X			X
COMMUNITY DEVELOPMENT							
• Community Development Policy (1996)	1	X		X			

Key for Implementation Status:

1. Implemented; 2. Implemented and under review/revision; 3. Not implemented – under review/revision; 4. Plans in place to revisit; 5. No plans in place

3.2.3 Commitment to and Synergies with other International Conventions

Trinidad and Tobago is committed to a number of multi-lateral environmental agreements which are of relevance in managing biodiversity. The Ministry responsible for the Environment has been seeking to foster a better relationship with international agencies and regional organizations in order to better meet international obligations, and to create better local to global links. The biodiversity related Conventions that Trinidad and is Party is outlined in Table 3.2.

TABLE 3.2: BIODIVERSITY-RELATED INTERNATIONAL AGREEMENTS

TREATY
Convention for the Protection and Development of the Marine Environment of the Wider Caribbean
Protocol concerning Cooperation in Combating Oil Spills in the Wider Caribbean
Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Region
Protocol Concerning Pollution from Land-Based Sources and Activities in the Wider Caribbean Region
Constitution of the Food and Agriculture Organisation of the United Nations
International Plant Protection Convention • International Plant Protection Convention – New revised text approved by Resolution 12/97 of the 29th Session of the FAO Conference in November 1997 – Declaration
Convention on Fishing and Conservation of the Living Resources of the High Seas
Convention on the Continental Shelf
International Convention for the Protection of New Varieties of Plants of 2nd December 1961 • International Convention for the Protection of New Varieties of Plants of 2nd December 1961, as revised at Geneva on10 November 1972, and 23rd October 1978
Convention on Wetlands of International Importance Especially as Waterfowl Habitat
Convention on International Trade in Endangered Species of Wild Fauna and Flora
United Nations Convention of the Law of the Sea 1982 • Amendment for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10th December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks • Agreement relating to the Implementation of Part XI of the United Nations Convention of the Law of the Sea 1982
International Tropical Timber Agreement
Vienna Convention for the Protection of the Ozone Layer 1988
Montreal Protocol on Substances that deplete the Ozone Layer
Basel Convention on the Control of Trans-boundary Movements of Hazardous Waste and Their Disposal • Ban Amendment to the Basel Convention on the Control of Trans-boundary Movements of Hazardous Waste and Their Disposal
Stockholm Convention on Persistent Organic Pollutants
Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in International Trade

TREATY
United Nations Framework Convention on Climate Change
Kyoto Protocol to the United Nations Framework Convention on Climate Change
Convention on Biological Diversity
Cartagena Protocol on Biosafety to the Convention on Biological Diversity
United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa 1994
International Convention for the Conservation of Atlantic Tunas
International Cocoa Agreement 2001
International Treaty on Plant Genetic Resources for Food and Agriculture

3.3 Success Stories in Mainstreaming Biodiversity

Trinidad and Tobago has made some strides in mainstreaming the conservation of biodiversity in the national planning process. In this regard, the NBSAP and the NEP provides the framework for informing biodiversity management in the country. Although not all activities outlined in the NBSAP have been implemented, the ones that have been implemented have been effective in address some of drivers for biodiversity loss in the country. In this regard, Table 3.3 summarizes the level of integration of the CBD Thematic Programmes and Cross-cutting issues into NBSAP activities and sectors in Trinidad and Tobago.

TABLE 3.3: LEVEL OF INTEGRATION OF CBD'S THEMATIC PROGRAMMES AND CROSS-CUTTING ISSUES WITHIN THE STRATEGIES OUTLINED IN TRINIDAD AND TOBAGO'S NBSAP (2001) AND ACROSS SECTORS

CBD COP Thematic Programmes and Cross- Cutting Issues	Strategies Outlined Within the NBSAP					Main Sectors				
	Education/ Awareness	Legislation/ Enforcement	Institution/ Capacity	Information/ Research	Policy /commitment	Agriculture	Fisheries	Forestry	Tourism	Energy/ mining
Thematic Programmes										
• Agricultural Biodiversity	Low	Low	Med	Med	Low	Med	Low	Low	Low	Low
• Dry and Sub-Humid Lands Biodiversity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
• Forest Biodiversity	Med	Low	Med	Med	Med	Low	N/A	High	Med	Low
• Inland Waters biodiversity	Low	Low	Low	Med	Low	Low	Med	Low	Low	Low
• Island Biodiversity	Med	Low	Low	Med	Low	Low	Low	Med	Med	Low
• Marine/Coastal Biodiversity	High	Med	Med	Med	Low	Med	Med	Low	Med	Med
• Mountain Biodiversity	Med	Low	Low	Med	Low	Low	Low	Med	Med	Low
Cross-cutting issues										
• 2010 Biodiversity Target	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Access to genetic resources/benefit sharing	Low	Low	Low	Med	Low	High	Low	Low	Low	N/A
• Biodiversity for Development	Med	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Climate Change and Biodiversity	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Communication, Education and Public	Med	Low	Low	Low	Low	Med	Low	Med	Med	Low

CBD COP Thematic Programmes and	Strategies Outlined Within the NBSAP					Main Sectors				
Awareness										
	Education/ Awareness	Legislation/ Enforcement	Institution/ Capacity	Information/ Research	Policy /commitment	Agriculture	Fisheries	Forestry	Tourism	Energy/ mining
• Economics, Trade and Incentive measures	Low	Low	Low	Low	Low	Med	Low	Low	Med	Low
• Ecosystem Approach	Med	Low	Low	Med	Low	Low	Low	Med	Med	Low
• Global Strategy for Plant Conservation	Low	Low	Low	Med	Low	Med	Low	Low	Low	Low
• Global Taxonomy Initiative	Low	Low	Low	Med	Low	Low	Low	Med	Low	Low
• Impact Assessment	Low	Med	Med	Low	Low	Med	Med	Med	Med	Med
• Identification, Monitoring, Indicators and Assessments	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Invasive Alien Species	Low	Low	Low	Med	Low	Med	Low	Low	Med	N/A
• Liability and Redress-Art. 14(2)	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Protected Areas	Low	Low	Low	Low	Low	Low	Low	Low	Low	Low
• Sustainable use of Biodiversity	Med	Low	Low	Med	Low	Low	Low	Low	Low to Med	Low
• Tourism and Biodiversity	High	Low	Low	Med	Low	Low	Med	High	High	Low
• Traditional Knowledge, Innovations and Practices – Article 8(j)	Low	Low	Low	Low	Low	Med	Med	Med	Low	Low
• Technology transfer and cooperation	Med	Low	Low	Low	Low	Med	Med	Med	Med	Med

3.3.1 Strengthening of the Policy and Legislative Framework

Trinidad and Tobago has taken a significant step toward the strengthen of the policy and legislative framework for the management of the country's biological resources with the revision of the National Forest Policy and the development of a National Protected Areas Policy. It is envisioned that with the adoption of these policies the country would be able to implement a systematic and integrated approach to the management of the country's biodiversity through the operationalization of a new system of protected areas and the establishment of a more efficient and effective administrative system for biodiversity management.

Plans are also in place to revisit a number of other policies such as the National Environmental Policy (2006), a Draft Fisheries Policy (2007), a Draft Hillside Policy (2004) and various policies related to agriculture. The recent processes for preparation of the Draft Forest Policy, the Draft Protected Areas Policy, and the Draft Climate Change Policy have been inclusive of stakeholder views and perceptions; have applied sound science as a basis for making policy recommendations; and to varying extents, have incorporated the ecosystem approach. Having considered these a success, the Government plans to continue deepening and expanding this approach in order to bring the legislative framework up to date and make it more integrated.

3.3.2 Collaboration and Coordination in Support of Biodiversity Management

To varying degrees, Government Ministries besides the Ministry responsible for the Environment have a mandate to include environmental considerations into their work programmes. Ministries whose portfolios have a direct impact on the environment, such as the Ministry of Works and Transport; the Ministry responsible for Planning; the Ministry of Energy and Energy Affairs; the Ministry of Food Production, Land and Marine Affairs; the Ministry of Tourism; the Ministry of Tobago Development; the Ministry of Public Utilities; and the Ministry of Local Government have been playing a greater role in the extent to which they include environmental considerations in their plans and projects.

There have been several attempts both within the public sector and between the public sector and other stakeholders to improve collaboration and coordination in support of biodiversity management. These have met with varying degrees of success. There are some 100 civil society organizations involved in championing, promoting and fostering sound environmental management. Many are engaged in partnerships with the Government to address environmental issues of mutual concern, and in the implementation of natural resources co-management projects geared at environmental enhancement or remediation of degraded forest lands. This sector is diverse and includes NGOs, not-for-profit organisations, and CBOs, some of which are informal in nature and may only act once an issue affect or threaten their livelihoods. While some strictly operate in environmental sector, there are those whose main roles and functions are social in nature but who undertake environmental management activities as part of their programme of activities. Some of the more prominent NGOs operating in Trinidad and Tobago include:

- Fondes Amandes Community Reforestation Project
- The Toco Foundation
- Stakeholders Against Destruction (SAD)
- Environment Tobago
- Foundation for the Enhancement and Enrichment of Life
- Protectors of the Environment
- Grande Riviere Environmental Awareness Trust
- Nature Seekers

- Council of Presidents of the Environment
- The Tropical Re-Leaf Foundation
- Cropper Foundation
- Caribbean Forest Conservation Association
- Pointe a Pierre Wild Fowl Trust
- Asa Wright Nature Centre
- Filed Naturalist Club
- Caribbean Network for Integrated Rural Development (CNIRD)
- Caribbean Natural Resources Institute (CANARI)
- The Trust of Sustainable Livelihoods
- Agricultural Society of Trinidad and Tobago
- Trinidad and Tobago Organic Agriculture Movement
- Trinidad and Tobago Orchid Society
- Trinidad and Tobago Zoological Society
- Hunters Associations
- Sawmills Association
- Various Church, Community and Village Councils

3.3.3 The Ecosystem Approach to Management

The ecosystem service approach has taking root in Trinidad and Tobago. In April 2002, the Millennium Ecosystem Assessment (MA) hosted a workshop on scenarios in Port of Spain, Trinidad. A number of local researchers and policy-makers were invited to this meeting, and their involvement sparked interest among a core group to initiate efforts to introduce ecosystem assessments to Trinidad and Tobago. In 2003, a local NGO – The Cropper Foundation – and the University of the West Indies in partnership with several other institutions/organizations initiated and led two sub-global assessments as part of the MA - one of these assessments focused on the Northern Range of Trinidad and the other on the Caribbean Sea (CARSEA). Having been successfully completed in 2005, the Northern Range Assessment was published as the National State of the Environment Report for Trinidad and Tobago in 2005, and it was laid as an official public document in Parliament.

Trinidad and Tobago has begun adopting the ecosystem/ecosystem approach to varying degrees, including research, policy formulation (the Draft Forest Policy and the Draft Protected Areas Policy), and project design and implementation. Recognizing that ecosystem assessments are not well integrated in development planning and practice the Caribbean region, the Government of Trinidad and Tobago hopes to partner with the UNEP-World Conservation Monitoring Centre and other local entities to host a capacity development and awareness building workshop on ecosystem assessments and their applicability at the national and regional levels.

One important project which has been developed in Trinidad and Tobago and applies the ecosystem-service based approach to management is the Nariva Swamp Restoration, Carbon Sequestration and Livelihoods Project (Box 3.1). In 2008, and with funding from the World Bank, work began to track GHG emissions in the swamp and to revegetate regions of the swamp - thereby enhancing carbon sequestration functions and reducing methane emissions. In February 2009, the World Bank, acting as a trustee for the BioCarbon Fund, signed an Emissions Reduction Purchase Agreement with the EMA and the GoRTT, for carbon credits earned under the Nariva Project. This is being done under the Clean Development Mechanism of the Kyoto Protocol to the UNFCCC and it is the first of its kind in the Caribbean. Trinidad and Tobago is therefore set to engage in the global carbon market. In March 2010, a further grant from the Green Fund in Trinidad and Tobago was certified to allow for expansion of this

project. The Nariva project is hailed as an example of the type of project that should be encouraged to address biodiversity and environmental-related problems in Trinidad and Tobago because of the extent to which it addresses and includes mainstreaming considerations.

BOX 3.1: NARIVA, HOME OF A GROUND BREAKING ENVIRONMENTAL PROJECT

The Nariva Restoration and Carbon Sequestration project will see the replanting of 1,300 hectares of the Nariva Swamp in areas that were formerly deforested by large-scale rice farmers more than a decade ago.

So why choose Nariva as the site for such a revolutionary project? Nariva has been declared an Environmentally Sensitive Area under the Environmentally Sensitive Area Rules 2001 and has the most varied vegetation of all wetlands in Trinidad and Tobago, with distinct zones of swamp forest, palm swamp, herbaceous swamp and mangrove woodlands. It is home to a large number of waterfowl including migratory species, and it is the wetland in Trinidad which still sustains the Anaconda, the re-introduced Blue and Golden Macaw and the endangered Manatee. Nariva was also recognized globally when it was declared a Wetland of International Importance in 1992 under the Ramsar Convention. The Forestry Division has spearheaded the long process to have the threats to Nariva Swamp removed and the ecology of the area restored. Restoration and management plans were drawn up with the assistance of Canadian NGO Ducks Unlimited and the Institute of Marine Affairs.

The Nariva Restoration and Carbon Sequestration project is a collaborative effort of the Forestry Division, the EMA and the University of the West Indies. One of the pioneers of the project, University of the West Indies lecturer and former Chairman of the Environmental Management Authority Professor John Agard, indicated that this venture would benefit the residents in and around Nariva as it will provide job opportunities for those who possess the skills required. It is proposed that the facilitating of the nurseries and the re-planting process will be done entirely by residents of the nearby villages over a five year period. More importantly Professor Agard maintained that a project of this magnitude, scope and possibility will be an asset to Trinidad and Tobago. The replanting of approximately 1,300 hectares with native species of trees to restore the ecology of the area is only a part of this historic project. A first for Trinidad and Tobago will be the 'carbon sequestration' focus of capturing carbon dioxide in the trees and vegetation through the natural growth of these plants.

This concept has gained popularity due to the effects of climate change, largely caused by the increase of carbon dioxide in the atmosphere through the burning of fossil fuels. Reforestation is seen as one of the methods of capturing some of this excess carbon dioxide from the atmosphere and holding or sequestering it in the tissues of plants. This project falls directly in line with the EMA's mandate to provide effective leadership in attaining an environmental healthy community and conserving healthy ecosystems for present and future generations. In this regard the project will be coordinated by the Authority with the technical implementation of the Forestry Division. The EMA is utilizing a grant from the World Bank in the formulation and initial implementation of the project. It is the hope of all stakeholders involved that this project would be a model for similar projects in the Caribbean region.

Source: Press Release from EMA 2008

3.3.4 Education and Awareness

In education, there are notable efforts to integrate biodiversity into both the formal and informal sectors. Primary and secondary curricula now have a greater environmental component. One significant advancement has been an effort by the Caribbean Examinations Council (CXC) – a regional examining body – to better include environmental components into its science curricula at both the 'ordinary' and 'advanced' levels. There is also now an Environmental Sciences syllabus at the advanced level which recognizes the need for greater emphasis to be placed on the links between humans and the environment – rather than the traditional, more ecocentric approach. This subject is gaining popularity in Trinidad and Tobago.

The Ministry of Education, the EMA, and a number of NGOs such as the Pointe-a-Pierre Wildfowl Trust, The Cropper Foundation, and Environment Tobago are involved in the development of biodiversity-related learning materials for schools, as well as the provision of opportunities for capacity building through workshops and outdoor experiences. Box 3.2 outlines a selected example of an effort in Tobago to address the needs of teachers and students at the secondary and primary levels, including students who may not be academically inclined.

BOX 3.2: ENVIRONMENT TOBAGO – AN IMPORTANT PLAYER IN ENVIRONMENTAL EDUCATION IN TOBAGO

In 2001 Environment Tobago succeeded in winning the BPTT "Youth in Education" Leader Award for an innovative education programme that sought to improve student learning and achievement in the academic field. The award provides funding for non-governmental organizations that offer educational support outside the mainstream system. The original proposal that was put forward concerned the newly established Secondary Centres. These schools aimed to provide an alternative education programme, in order to address the special needs of those children who had not performed well in the Secondary Entrance Exam. Children who do not achieve their full potential in mainstream schools often have different learning styles and are stimulated by more practical activities, rather than the more traditional "chalk and talk" teaching often found in classrooms. An innovative teaching methodology and curriculum was needed to address the needs of these children. Environment Tobago saw an ideal opportunity to develop a pilot programme in the three Secondary Centres in Tobago using ***environmental education*** as a tool for interdisciplinary hands-on teaching across the curricular. A number of teachers were trained, who responded very positively to the programme and started to incorporate environmental education into their own teaching practice. Environment Tobago then adapted this programme for Tobago's Primary schools. The goal was to develop a methodology and teaching guide for infusing environmental education across the Primary school curricular that can then be published and issued to schools. It is vital that, from an early age, children acquire a good knowledge and understanding of their surroundings and the natural resources of their bountiful island. Only then will they gain respect for the environment and a desire to take care of it. This is the key to a sustainable future for Tobago. Though environmental education is very important in itself, there is also a great potential to use it to teach standard curricular. Nature can be a great teaching tool to deepen children's understanding of science, mathematics, language, arts and social studies. The emphasis was on using environmental education as a tool for interdisciplinary hands-on teaching. At a young age, education should be experiential, interactive and creative in order to stimulate interest in and excitement about learning. Only then will children gain the motivation, confidence and independence necessary to achieve their full potential.

Adapted from Environment Tobago's website:
http://www.scsoft.de/et/et2.nsf/KAP1View/F28CA2DDDE482B4304256C60005062F8?OpenDocument

3.3.5 Sustainable Financing for Biodiversity Management

The Green Fund was established under the Finance Act 2004, Part XIV – Green Fund Levy- by the GoRTT. The Fund is capitalised by a tax on the gross sales and receipts of corporate companies operating in Trinidad and Tobago. The Fund has had a long journey to operationalization, and its actualization has taken close to seven years.

The Green Fund is a grant facility available to CBOs and NGOs or according to the legislation "…any other body incorporated by or under a law other than the Companies Act." CBOs are organisations based within a particular community while NGOs may be described as not for profit private sector organisations. The Fund's monies are distributed by an agency established for that purpose (the Green Fund Executing Unit) under the supervision of an advisory committee. Groups qualifying for funding must be involved in activities focusing on environmental conservation, reforestation or remediation. In this context;

1. Remediation – is defined under the EM Act of 2000 in Part VII Section 72.c as the restoration of environmentally degraded sites, containment of any wastes, hazardous substances or other environmentally dangerous conditions, or other appropriate precautionary measures to prevent significant adverse effects on human health or the environment.
2. Reforestation – is the direct human-induced conversion of non-forested land to forested land through planting, seedling and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land. *(Source: UNFCCC 2001)*
3. Conservation - a series of measures required to maintain or restore the natural habitats and the populations of species of wild fauna and flora to a favourable status. *(Source: UNFAO 1992)*

3.4 Main Challenges in Mainstreaming Biodiversity

The main challenges to mainstreaming biodiversity include:

1. ***Rationalisation, harmonisation and modernisation of the legislative and policy framework -*** There is a need for a more comprehensive and robust legislative and policy package to deal with the management of biodiversity including addressing issues of co-management of State-owned natural resources, partnering between the NGO and community sector and the State, and the institutionalization of public participation. The Government has taken some initiatives to address this concern through the drafting of a new Forest Policy and Protected Areas Policy. There is however a need to update and revise the existing legislative framework to address the needs of modern concepts in biodiversity management which would necessitate revisions to the:

    i. Environmental Management Act;
    ii. Chaguarams Development Authority Act;
    iii. Forests Act;
    iv. Conservation of Wildlife Act;
    v. Sawmills Act;
    vi. Agricultural Fires Act;
    vii. Town and Country Planning Act;
    viii. Tobago House of Assembly Act; and
    ix. Municipal Corporations Act.

2. ***Increasing the efficiency of the current process of modernisation of the country's administration process***. The administrative process of how biodiversity is managed is being modernized to make it more efficient and effective. Currently the policy framework to effect this change has been drafted but there is a need to increase the efficiency of the approval of the new administration system by enacting the enabling legislation and provision of adequate resources for the supporting environment which must be put in place in order for these laws to be implemented.

3. ***Lack of proper legal arrangements and other shortcomings in the administration of the quarry/mining industry.*** This challenge becomes more obvious each year as illegal quarrying occurs unabated and in the wake of continued adverse environmental challenges and impacts. While the MEEI has major responsibilities for management and regulation of the industry and the enforcement of lease terms and legislation, some of its functions overlap with those of the Commissioner of State Lands, EMA, TCPD, Forestry Division and municipal authorities. At present, the MEEI is actively pursuing legislative, institutional, administrative and fiscal reform to address current inadequacies. However, greater collaboration is needed among critical agencies with overlapping responsibilities. The Draft Quarry Policy of 2005 recognised some of the

shortcomings of the Minerals Act of 2000 which currently governs the operations of the quarry industry. These include:

i. Absence of regulations for granting quarry licences;
ii. Ambiguity with respect to the procedures for assigning and terminating licences;
iii. Conflicts with existing legislative provisions, for example, the EM Act;
iv. Ineffective and deficient regulatory control;
v. Inappropriate legislative mechanisms and institutional weaknesses;
vi. Absence of enforcement measures;
vii. Bias in the legislation which favours large scale entrepreneurs; and
viii. Lack of redress for investor complaints.

4. ***Establishment of a formal mechanism of collaboration among partners in biodiversity management.*** A formal mechanism of participatory management needs to be established to ensure effective collaboration among the various stakeholder organisations/institutions. Such formal mechanisms would lead to more effective and greater inter-governmental collaboration to address biodiversity management concerns. Securing meaningful people's participation in the management process is critical if lasting changes are to be made. There are mutual benefits to be derived and lessons learnt when the State and the non-governmental bodies work together. Therefore ensuring mechanism for involvement of people in the development process must be considered as a priority if the country is to address its land degradation issues.

5. ***Inadequate monitoring and enforcement of existing laws and regulations.*** This challenge retards proper biodiversity management and are considered to be among the primary underlying causes for degradation. The issue of monitoring and enforcement must include both the revision of existing regulations to include stricter penalties and to clear up ambiguities and loopholes and preparation of regulations for existing laws.

6. ***Improving people's attitudes, norms and patterns of behaviour towards biodiversity.*** Changing traditions, the popular culture and modern lifestyles have brought unsustainable uses of natural resources; deforestation and pollution arising from an attitude that nature can absorb all that the population can give. The social requirements for protecting a delicate environment and ecosystem remain a major challenge in Trinidad and Tobago. Changing the way the population values its biological resources and changing negative behaviours are critical requirements for reversing current degradation trends.

7. ***Biodiversity research remains disconnected from the needs of the country.*** Tertiary institutions, private sector and civil society conduct biodiversity research in number of areas. Such research is conducted in an un-coordinated manner and yield outputs that are of little use in effecting changes or improving the management of biodiversity. There is a need to develop a mechanism to address the disconnect between research and the biodiversity management needs of the country.

8. ***NGOs and CBOs lack the institutional capacity to be equal partners in the management process with the Government and private sector***. There is need to strengthen the capacity of the NGO and community sector so that they could be true partners in the process of biodiversity management.

9. ***Lack of Resources.*** Most State agencies lack the resources to make them good managers of the country's biodiversity. This includes the lack of technical personnel and equipment and

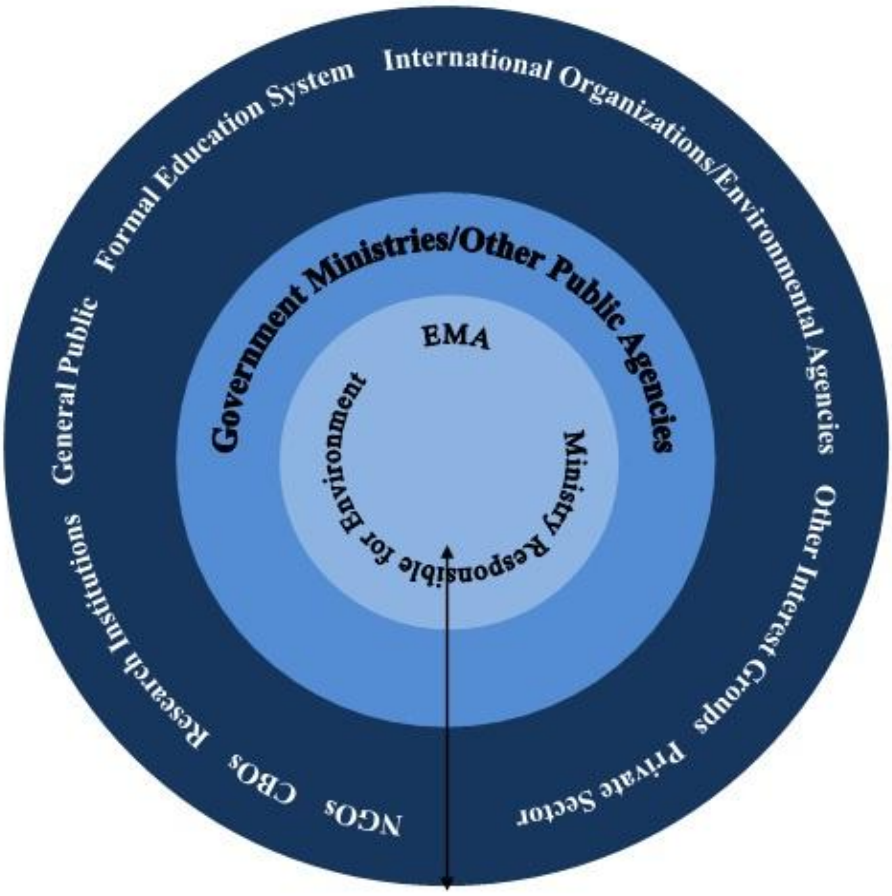
inadequate organisational structures and mechanism, all of which contribute at times to low morale and poor work ethics.

3.5 Measures to Improve Mainstreaming of Biodiversity

It is recognized that mainstreaming biodiversity in a manner that is meaningful and makes the best use of resources will not be an easy task. There are a few key steps which must be addressed urgently in order that Trinidad and Tobago's efforts to manage biodiversity are more effective. This can only be achieved through thinking strategically but acting specifically:

(a) ***Defining roles and responsibilities:*** There is a need for better coordination and collaboration amongst stakeholders involved in biodiversity management, including the definition of roles and responsibilities for achieving a joint work programme. It is unlikely that more effective management will be achieved if this enabling mechanism is not established. Figure 3.1 graphically illustrates the coordinating role which has been defined for the EMA within the EMAct, and the EMA with the support of the Government should take measures to fully establish itself in this role as soon as possible.

FIGURE 3.1: THE EMA AS A COORDINATING AGENCY FOR ENVIRONMENTAL MANAGEMENT IN TRINIDAD AND TOBAGO



What might be most useful to achieving better coordination is the development of a Programme of Work which is operationalized through the establishment of Working Groups based on stakeholder clusters e.g. Public Agencies; NGOs and CBOs; Research Institutions; Private Sector; and other interest groups. The mandate of Working Groups will be defined in specific Terms of Reference (TORs). Working Groups could meet occasionally and exchange views through electronic means (e.g. an intranet) which would improve logistics and minimise the occurrence of consultation fatigue since stakeholders could make inputs as their schedules allow. In addition to these Working Groups, there could also be the formation of specialist groups to address specific issues. This will ensure greater coherence in efforts. Such a mechanism, however, requires commitment, and Government will need to establish means (including incentives) to ensure ongoing participation. Within the public sector, such involvement should be institutionalized so that involvement is not seen as an 'add on'. For other stakeholders, incentives both financial (to cover time and support project activities) and otherwise could be offered.

(b). ***Setting priorities:*** It will not be feasible to address all biodiversity-related problems at once. What is therefore required is the re-ordering of priorities identified in the NBSAP which address the current problems being faced by the country. The establishment of priorities would require:

- Identification of problems with a common cause and common solution to better facilitate a multiplier effect
- Assessment of the existing environmental legislation and policies (including drafts). In this regard, emphasis should be placed on ensuring that there is coherence and agreement among the various instruments, guided by a set of defined priorities for management
- Development of a national agenda for environmental research to promote a focus on critical data and information gaps.

(c). ***Allocating resources:*** The allocation of resources (human and financial) should be guided by the process of priority setting. As a small island developing state, Trinidad and Tobago will continue to face problems of capacity. Emphasis should therefore be placed on the best orientation and use of existing entities and resources to achieve optimal output

CHAPTER 4

CONCLUSIONS: PROGRESS TOWARD THE 2010 TARGET AND IMPLEMENTATION OF THE STRATEGIC PLAN

Soldado Rock Wildlife/Game Sanctuary

4.1 Overview

The GoRTT has made every effort, within its human resource, technical and financial capacity, toward the achievement of the 2010 biodiversity target. This section will (1) draw on information presented in the preceding chapters to provide an overall assessment of Trinidad and Tobago's progress towards meeting the 2010 Biodiversity Target; (2) consider the effectiveness of implementation of the CBD in Trinidad and Tobago; and (3) summarise some of the steps which are being considered as Trinidad and Tobago begins to look beyond 2010.

4.2 Progress Assessment

On the basis of all data and information presented throughout this report, Table 4.1 provides an overall assessment of Trinidad and Tobago's progress towards meeting the 2010 Biodiversity Target. This assessment is presented in the context of individual 2010 Indicators, and represents an attempt to overlay the expanded assessment in Chapter 1 with the CBD template presented in the guidelines for preparation of national reports. It is important to note that Trinidad and Tobago has not established a set of national indicators for biodiversity and national indicators therefore do not appear in Table 4.1.

The overall conclusion based on the assessment is that Trinidad and Tobago has made some progress in meeting the 2010 Target. However, as the country attempts to address some of the deficiencies identified, there are a few measures which are considered as immediate next steps. These are as follows:

a. ***Revision of the NBSAP*** which is expected to begin in 2011

b. ***Updated Forest Inventory:***

The GoRTT has commissioned a project to map the extent and integrity of forest cover in Trinidad and Tobago. This project is being undertaken by the Forestry Division in collaboration with the EMA and with the assistance of the USDA Forest Service and the International Institute of Forestry (IITF). It is anticipated that the forest cover maps will serve as the first phase of an updated National Forestry Inventory of Trinidad and Tobago, which is expected to be completed in 2011. The mapping is being conducted using remote sensing and will be submitted in a GIS system, which will provide information on the extent and distribution of the following in Trinidad and Tobago:

- ✓ forests on both state and private lands
- ✓ wetlands
- ✓ plantations

c. ***Revision of key Policies:***

The Draft Forest Policy, the Draft Protected Areas Policy, the Draft Climate Change Policy, the Draft Hillside Development Policy, and a revised Fisheries Policy are all in various stages of revision/development. These polices, along with revised policies for agriculture, local government, tourism and physical development are expected to significantly enhance local management of biodiversity once effectively implemented. The Draft Forest Policy and Draft Protected Areas Policy are noted as being particularly successful in integrating the ecosystem service approach into planning considerations, and in making recommendations.

c. ***Continued implementation of the Environmentally Sensitive Species Rules 2001:***

Three (3) species have so far been designated under the ESS Rules based on conservation priority - the Trinidad Piping Guan or Pawi (*Pipile pipile*), the White-tailed Sabre Wing Hummingbird (*Campylopterus ensipennis*) and the West Indian Manatee (*Trichechus manatus*). Recognizing that

there is need to focus on other species of conservation priority, the EMA held discussions between 2003 and 2007 to identify other species which should receive designation as ESS. These include:

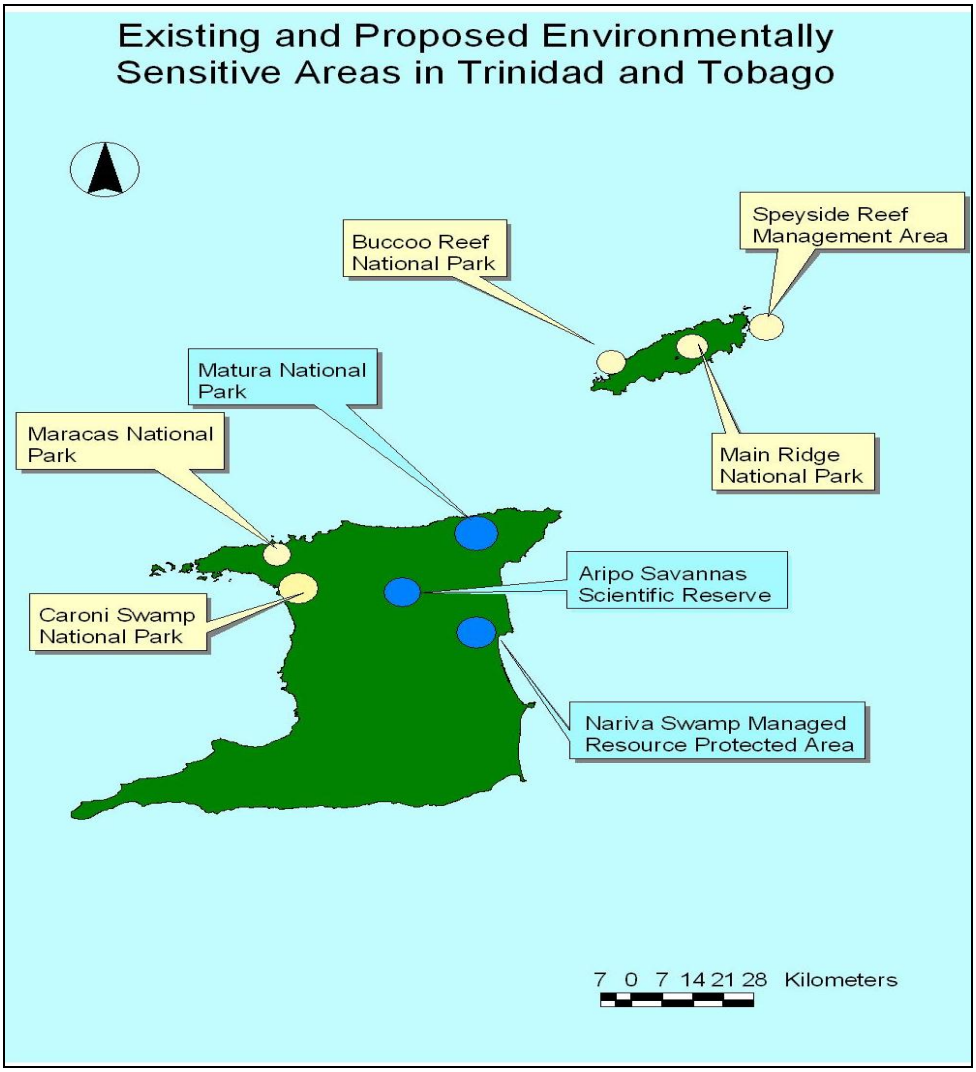
- ✓ Five (5) species of marine turtles, including Leatherback (*Dermochelys coriacea*), Green (*Chelonia mydas*), Hawksbill (*Eretmochelys imbricate*), Olive Ridley (*Lepidochelys olivacea*) and Loggerhead (*Caretta caretta*)
- ✓ Ocelot (*Leopardus pardalis*)
- ✓ Golden Tree Frog (*Phyllodytes auratus*)
- ✓ Silky Anteater (*Cyclopes didactylus*)
- ✓ Bloody Bay Poison Frog *(Mannophryne olmonae*)
- ✓ Scarlet Ibis *(Eudocimus ruber)*
- ✓ All orchids
- ✓ Goliath Grouper *(Epinephelus itajara)*
- ✓ River Otter or Neotropical Otter *(Lontra longicaudis)*
- ✓ Stony Corals (Scleractinia)
- ✓ Black Coral (*Antipathes atlantica*)

Research has already begun on some of these species in order that the relevant documentation might be prepared for designation notifications. Significant progress has so far been made on the Golden Tree Frog *Phyllodytes auratus* which is likely to be the next species to be designated as an ESS.

d. ***Continued implementation of the Environmentally Sensitive Areas Rules 2001***

As indicated in Chapters 2 and 3, there are three (3) ESAs currently designated in Trinidad and Tobago – the Aripo Savannas Strict Nature Reserve, the Nariva Swamp Managed Resource Protected Area and the Matura National Park. A number of other areas have been identified as proposed ESAs (Figure 4.1). One such is the Buccoo Reef where efforts have been underway by a number of stakeholders to improve understanding and management of the ecosystem. It was designated a protected area in 1973 under the Marine Areas (Preservation and Enhancement) Act No.1 of 1970. In 1994, the Institute of Marine Affairs (IMA) completed a management plan commissioned by the THA. In 2005, Buccoo Reef was declared a Ramsar site. In 2007, the EMA began work on the reef to define its boundaries. The definition of the boundary is an important step in efforts to advance the declaration of this site as an ESA.

FIGURE 4.1: EXISTING AND PROPOSED ENVIRONMENTALLY SENSITIVE AREAS THROUGHOUT TRINIDAD AND TOBAGO



Source: EMA 2008

TABLE 4.1: ASSESSMENT OF TRINIDAD AND TOBAGO'S PROGRESS TOWARDS MEETING THE 2010 TARGET

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
Protect the components of biodiversity					
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes					
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	• Coverage of protected areas • Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species	Significant proportions of T&T's terrestrial ecosystems are protected through declaration as forest reserves, wildlife sanctuaries and ESAs. Only one (1) marine area the Buccoo Reef has been declared as a protected area.	Illegal logging, quarrying, squatting, poor agricultural practices and other land-use pressures (industrial development, housing, road and other infrastructure) are negatively impacting on the country's biodiversity. The current system of protected area is dated and is managed by multiple agencies (THA, EMA, Forestry Division, CDA, etc.) leading to gaps in enforcement.	Important ecosystems such as forests and coastal systems are declining in extent and integrity, and the effects are increasingly becoming evident (e.g. flooding in low-lying areas). Many species are showing signs of declining populations (size and distribution)	T&T has developed a draft Protected Areas Policy (2010) which will give effect to the establishment of a new integrated system for protected areas.
Target 1.2: Areas of particular importance to biodiversity protected	• Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and distribution of selected species • Coverage of protected areas	Same as Target 1.1 above.			

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
Goal 2. Promote the conservation of species diversity					
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	• Trends in abundance and distribution of selected species • Change in status of threatened species	T&T has initiated a national reforestation programme; restoring the ecological integrity of the Nariva Swamp and developing species recovery plans for ESSs.	Difficult to ascertain the impact of these initiatives to reduce the decline of species in T&T given the lack of a formal monitoring and evaluation of the status of species.	Anecdotal evidence suggests that species vulnerability is increasing on account of land use changes, overharvesting, pollution, climate change and alien invasive species.	T&T will continue within its human, financial and technical capacity to implement programme to improve the status of species including through the enforcement of the legislative framework. There is a need however to develop and implement a national monitoring and evaluation programme to assess the status of the country's biodiversity not only to ascertain the effectiveness of programmes to reduce decline of species but also to identify species that require priority action to ensure survival.
Target 2.2: Status of threatened species improved.	• Change in status of threatened species • Trends in abundance and distribution of selected species • Coverage of protected areas				
Goal 3. Promote the conservation of genetic diversity					
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.	• Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socio-economic importance • *Biodiversity used in food and medicine (indicator under development)* • Trends in abundance and distribution of selected species	UWI, and Ministry of Food Production, Land and Marine Resource maintain limited stocks of crops and livestock at their experimental and field stations. The Cocoa Research Unit maintains a gene bank of cocoa genetic materials.	Genetic diversity of T&T agricultural stocks need to be archived and stored through the establishment of seed banks, tissue culture banks, and cryogenic storage of sperm, ova and embryos.	Genetic diversity of agricultural species being lost, others being enhanced.	The Ministry of Food Production, Land and Marine Resources is currently in the process of updating and revising various agriculture policies, and the issue of the maintenance of agriculture genetic diversity will be addressed in these revisions

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
Promote sustainable use					
Goal 4. Promote sustainable use and consumption.					
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.	• Area of forest, agricultural and aquaculture ecosystems under sustainable management • *Proportion of products derived from sustainable sources (indicator under development)* • Trends in abundance and distribution of selected species • Marine trophic index • Nitrogen deposition • Water quality in aquatic ecosystems	Harvesting of commercially important tree species and other plants are controlled through a permit/licence system operated by the Forestry Division through the Forests Act. This system is intended to ensure sustainable utilization of the country forest resources and the maintenance of its ecological integrity.	On account of unsustainable management, the integrity of ecosystems and ecosystem services is compromised: • Marine fish stocks are being depleted • Terrestrial species are under threat • Freshwater and coastal waters are being polluted	There are continuing declines in the integrity of key ecosystems and ecosystem services	These issues are being dealt with in the revision/updating of a number of policies, laws and plans.
Target 4.2. Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced.	• Ecological footprint and related concepts				
Target 4.3: No species of wild flora or fauna endangered by international trade.	• Change in status of threatened species	T&T is committed to this international effort through the implementation of CITES.	No evidence to suggest that any of the country's biodiversity has declined as a result of international trade	Enforcement capability of the Coast Guard has been strengthen through the provision of new patrol vessels.	Enabling legislation to give the force of law nationally to the implementation of CITES has been drafted.
Address threats to biodiversity					
Goal 5. Pressures from habitat loss, land use change and degradation, and unsustainable water use, reduced.					
Target 5.1. Rate of loss and degradation of natural habitats decreased.	• Trends in extent of selected biomes, ecosystems and habitats • Trends in abundance and	There has not been significant progress in this respect	Key ecosystems (terrestrial, coastal, inland freshwater) are showing signs of	Natural habitats continue to be degraded by a combination of	These issues are being dealt with in the revision/updating of a number of policies, laws

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
	distribution of selected species • Marine trophic index		degradation.	human activities (See Chapter 1).	and plans.
Goal 6. Control threats from invasive alien species					
Target 6.1. Pathways for major potential alien invasive species controlled.	• Trends in invasive alien species	Customs Services Division and the Plant Quarantine Division have surveillance at ports of entry. The Coast Guard also plays a significant role in preventing illegal imports of plants and animals from the South American mainland.	There are a number of alien species in Trinidad and Tobago – some of which are naturalized, but others which are invasive and are threatening local biodiversity. There is currently eradication programmes for the pink mealy bug and the Giant African Snail.	The problem of alien invasive species may become more critical to T&T given the country's increasing economic prosperity leading to greater movements of goods and people. The country's close proximity to the South American mainland also makes it ideal as a transhipment point for illegal wildlife trade.	Efforts are currently underway to seek to address the problems being caused by specific alien species. There is also a need for greater surveillance at ports of entry.
Target 6. 2. Management plans in place for major alien species that threaten ecosystems, habitats or species.	• Trends in invasive alien species				
Goal 7. Address challenges to biodiversity from climate change, and pollution					
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	• Connectivity/fragmentation of ecosystems	There has been little assessment of the impacts of climate change on biodiversity and therefore biodiversity is not being managed for resilience to climate change but for the maintenance of ecosystem services and functions.	Species are already showing signs of degradation due to climate change (e.g. coral reef bleaching).	The vulnerability of species to climate change is expected to get worse	The country has developed a Draft Climate Change Policy. There is a need to assess the vulnerability of the country's biodiversity to the impacts of climate change in order to develop policies/plans/programmes to address those impacts.
Target 7.2. Reduce pollution and its	• Nitrogen deposition • Water quality in aquatic	Water Pollution Rules have been enacted to	Many aquatic ecosystems (inland	Pollution problems are generally not	The implementation of the Water Pollution Rules will

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
impacts on biodiversity.	ecosystems	address this issue.	freshwater and coastal) are polluted	getting better, and in certain areas (especially highly developed areas) water quality continues to decrease	help to regulate harmful effects. A National Action Programme to address Marine Pollution from Land-based Sources and Activities has been drafted and its implementation should address this form of pollution.
Maintain goods and services from biodiversity to support human well-being					
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods					
Target 8.1. Capacity of ecosystems to deliver goods and services maintained.	• *Biodiversity used in food and medicine (indicator under development)* • Water quality in aquatic ecosystems • Marine trophic index • Incidence of Human-induced ecosystem failure	See response to targets 1.1 and 1.2	Capacity of ecosystems to deliver services is compromised in all major biomes	There continue to be declines in the capacity of ecosystems to deliver critical services	Efforts are underway to begin addressing these problems in a more integrated and concerted manner – see previous sections of this table and report
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.	• Health and well-being of communities who depend directly on local ecosystem goods and services • *Biodiversity used in food and medicine (indicator under development)*	There has been progress in this respect, but much more is needed.	There is now greater involvement of communities in the management of their resources	Certain areas throughout the country are being more effectively managed through community participation	Efforts are ongoing to promote greater participation, and create mechanism that support sustainable livelihood practices
Protect traditional knowledge, innovations and practices					
Goal 9 Maintain socio-cultural diversity of indigenous and local communities					
Target 9.1. Protect traditional knowledge, innovations and practices.	• Status and trends of linguistic diversity and numbers of speakers of indigenous languages • *Additional indicators to be developed*	Enacted intellectual properties rights legislation and an intellectual properties right office has been established which can	Traditional knowledge an innovations related to biodiversity such as the use of medicinal plant are not being	Policy framework to protect traditional knowledge is being developed through the draft Forest Policy and the draft	There is a need to conduct an assessment and archive traditional knowledge and innovation related to

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	*Indicator to be developed*	be used as a mechanism to protect traditional knowledge and innovations	passed to the next generation. Traditional knowledge is therefore in danger of being lost.	Protected Areas Policy	biodiversity
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources					
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources					
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.	*Indicator to be developed*	Access to T&T biodiversity is effected through the provisions of the Forests Act, Conservation of Wildlife Act and the Fisheries Act. Under these Acts conditions can be placed on access but it is difficult to ascertain the benefits that may be derived from access that could redound to the benefit of local communities.	Benefits derived by providing access especially to foreign researchers can only be monitored and/or assessed through international corporation.	Policy framework for access and benefit sharing is being developed through the draft Forest Policy and the draft Protected Areas Policy	An international regime on access and benefit sharing may be necessary
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions	*Indicator to be developed*				
Ensure provision of adequate resources					
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention					
Target 11.1. New and additional financial	• Official development assistance provided in	The country has established a Green	T&T does not have access to sufficient	There is a need for multi-lateral donor	Greater emphasis should be placed by international

Goals and targets	Relevant indicators	T&T's progress in addressing the issue	Current Status	Important Trends	Main steps to address the issue
resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.	support of the Convention	Fund to help finance projects related to remediation, restoration and conservation (including research and capacity building).	financial resources to implement all biodiversity-related activities	agencies to simplify the approval process for providing grant funds to facilitate management of biodiversity	donor agencies to honour commitments of financial assistance.
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	*Indicator to be developed*	There has been progress in capacity building at the community level facilitated by the Environmentally Sensitive Areas Rules.	Most State agencies lack the resources to make them good managers of the country's biodiversity. This includes the lack of technical personnel and equipment and inadequate organizational structures and mechanism.	It is envisioned that the adoption and implementation of the Protected Areas Policy would enhance the country's capacity to manage protected areas.	There is need for greater support from the international community to provide greater opportunities of training and technology transfer to local biodiversity managers, particularly the use of remote sensing technologies to monitor forest cover, forest fires, coral bleaching and impacts of sea level rise on the loss of coastal habitats.

4.3 Overall Progress in Implementing the Convention on Biological Diversity in Trinidad and Tobago

Trinidad and Tobago has made some progress in implementing the Convention's Strategic Plan. The overall assessment is that progress has been limited, and much more actions have to be taken to achieve full implementation. Trinidad and Tobago has not fully utilized/capitalized on the opportunities made available through the CBD to improve local management of biodiversity. Table 4.2 indicates Trinidad and Tobago's progress in meeting the goals and objectives of CBD's strategic plan.

TABLE 4.2: TRINIDAD AND TOBAGO'S PROGRESS IN ADDRESSING AND MEETING THE GOALS AND OBJECTIVES OF THE STRATEGIC PLAN

Strategic goals and objectives	Possible indicators	Trinidad and Tobago's Progress
Goal 1: The Convention is fulfilling its leadership role in international biodiversity issues.		
1.1 The Convention is setting the global biodiversity agenda.	CBD provisions, COP decisions and 2010 target reflected in workplans of major international forums	The CBD is the main international framework for managing biodiversity. Despite initiatives taken to build synergies with other international regime there is a need for greater efforts especially with the Ramsar Convention and the UNCCD.
1.2 The Convention is promoting cooperation between all relevant international instruments and processes to enhance policy coherence.		
1.3 Other international processes are actively supporting implementation of the Convention, in a manner consistent with their respective frameworks.		
1.4 The Cartagena Protocol on Biosafety is widely implemented.		T&T acceded to the Biosafety Protocol on 24th May 2000 and has initiated steps towards the implementation of the Protocol through the drafting of a National Biosafety Policy and a National Biosafety Framework.
1.5 Biodiversity concerns are being integrated into relevant sectoral or cross-sectoral plans, programmes and policies at the regional and global levels.	*Possible indicator to be developed: Number of regional/global plans, programmes and policies which specifically address the integration of biodiversity concerns into relevant sectoral or cross-sectoral plans, programmes and policies* *Application of planning tools such as strategic environmental assessment to assess the degree to which biodiversity concerns are being integrated* *Biodiversity integrated into the criteria of multilateral donors and regional development banks*	Not applicable
1.6 Parties are collaborating at the regional and subregional levels to implement the Convention.	*Possible indicator to be developed: Number of Parties that are part of (sub-) regional biodiversity-related agreements*	T&T is Party to the Cartagena Convention, and its SPAW Protocol which is major regional mechanism for integrating

Strategic goals and objectives	Possible indicators	Trinidad and Tobago's Progress
		the implementation of the CBD at the regional level. The Caribbean Community (CARICOM) is also developing a regional environmental policy which will provide a basis for managing biodiversity at the regional level.
Goal 2: Parties have improved financial, human, scientific, technical, and technological capacity to implement the Convention.		
2.1 All Parties have adequate capacity for implementation of priority actions in national biodiversity strategy and action plans.		One of the main problems being faced by T&T in the implementation of the NBSAP is capacity – both in terms of number of persons, and in terms of the necessary expertise. Greater emphasis should be placed by international organizations to support the capacity building needs of developing countries and in particular SIDS.
2.2 Developing country Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have sufficient resources available to implement the three objectives of the Convention.	Official development assistance provided in support of the Convention (OECD-DAC Statistics Committee)	T&T does not have access to sufficient financial resources to implement all biodiversity-related activities. In order to address this problem, at least in part, the country has established a Green Fund to help finance projects related to remediation, restoration and conservation (including research and capacity building). Greater emphasis should be placed by international donor agencies to honour commitments of financial assistance.
2.3 Developing country Parties, in particular the least developed and the small island developing States amongst them, and other Parties with economies in transition, have increased resources and technology transfer available to implement the Cartagena Protocol on Biosafety.		No progress made in this respect. International organizations have to strengthen mechanism to provide resources necessary to implement the Protocol particularly as it relates to risk assessment and management.

Strategic goals and objectives	Possible indicators	Trinidad and Tobago's Progress
2.4 All Parties have adequate capacity to implement the Cartagena Protocol on Biosafety.		T&T has insufficient capacity to implement the Protocol and there is a need for international organizations to support the capacity building needs of the country
2.5 Technical and scientific cooperation is making a significant contribution to building capacity.	*Indicator to be developed consistent with VII/30*	Contribution not significant.
Goal 3: National biodiversity strategies and action plans and the integration of biodiversity concerns into relevant sectors serve as an effective framework for the implementation of the objectives of the Convention.		
3.1 Every Party has effective national strategies, plans and programmes in place to provide a national framework for implementing the three objectives of the Convention and to set clear national priorities.	Number of Parties with national biodiversity strategies	T&T has adopted a NBSAP to guide the implementation of the CBD. The Plan however needs to be revised to address the current needs of the country.
3.2 Every Party to the Cartagena Protocol on Biosafety has a regulatory framework in place and functioning to implement the Protocol.		A draft National Biosafety Policy and Framework has been developed which will guide the establishment of an appropriate legislative framework. The Protocol is currently being implemented utilizing provisions under the Plant Quarantine Regulations and the Customs Act.
3.3 Biodiversity concerns are being integrated into relevant national sectoral and cross-sectoral plans, programmes and policies.	*To be developed* *Percentage of Parties with relevant national sectoral and cross-sectoral plans, programmes and policies in which biodiversity concerns are integrated*	This is not being adequately addressed. Biodiversity mainstreaming still very limited.
3.4 The priorities in national biodiversity strategies and action plans are being actively implemented, as a means to achieve national implementation of the Convention, and as a significant contribution towards the global biodiversity agenda.	*To be developed* *Number of national biodiversity strategies and action plans that are being actively implemented*	T&T has been implementing the NBSAP but not all of its priorities have been fully implemented. It is envisaged that the revision of the NBSAP will allow for the identification of a new set of priorities which will set the stage for more effective action.
Goal 4: There is a better understanding of the importance of biodiversity and of the Convention, and this has led to broader engagement across society in implementation.		
4.1 All Parties are implementing a communication, education, and public awareness (CEPA) strategy and promoting	*Possible indicator to be developed:* *Number of Parties implementing a communication, education and public*	There have been significant advancements in the implementation of

Strategic goals and objectives	Possible indicators	Trinidad and Tobago's Progress
public participation in support of the Convention.	*awareness strategy and promoting public participation* *Percentage of public awareness programmes/projects about the importance of biodiversity* *Percentage of Parties with biodiversity on their public school curricula*	CEPA activities related to biodiversity. There is now a heavier environmental component within the formal school system – from the primary to the tertiary level. And CEPA activities are also evident in the informal system.
4.2 Every Party to the Cartagena Protocol on Biosafety is promoting and facilitating public awareness, education and participation in support of the Protocol.	-	Limited public education programmes were initiated in the process of developing the draft National Biosafety Policy and Framework. These programmes have however not been sustained.
4.3 Indigenous and local communities are effectively involved in implementation and in the processes of the Convention, at national, regional and international levels.	*To be developed by the Ad Hoc Open-ended Working Group on Article 8(j)*	There are a number of participatory management programmes being implemented particularly with regards to reforestation, forest fire mitigation, monitoring and enforcement of hunting regulations, conservation of marine turtles and managing certain ESAs. It is recognized that these efforts need to be built upon through the establishment of a formalized system that is envisioned in the draft National Protected Areas Policy.
4.4 Key actors and stakeholders, including the private sector, are engaged in partnership to implement the Convention and are integrating biodiversity concerns into their relevant sectoral and cross-sectoral plans, programmes and policies.	*To be developed* *Indicator targeting private sector engagement,* *e.g. Voluntary type 2 partnerships in support of the implementation of the Convention*	There are limited partnerships with the private sector in support of biodiversity management in T&T. Much better coordination and collaboration is required in support of biodiversity management.

4.4 Summary of Recommendations for Going Forward

In Chapter 3, recommendations for improving mainstreaming were presented in three main blocks of issues – (1) Defining Roles and Responsibilities; (2) Setting Priorities and (3) Allocating Resources. The following are the main considerations which are necessary as Trinidad and Tobago begins to look beyond 2010.

1. Government Involvement and Leadership – the Backbone

National efforts to improve biodiversity can only be successful if Government is fully supportive and involved in management. The Ministry responsible for the Environment has already initiated steps to ensure that it plays a greater role in biodiversity/environmental management, and the Honourable Prime Minister of Trinidad and Tobago has articulated the need for and commitment to more concerted effort in support of effective environmental management[7].

2. Improved Collaboration and Coordination

The EMA and the Ministry responsible for the Environment must play a greater role in promoting the coordination of efforts related to biodiversity management. This should be encouraged within and between:

1. public agencies /government departments
2. the public sector and the private sector
3. non-governmental stakeholders with interest in biodiversity management (research institutions, NGOs, CBOs, civic society)

Better use should also be made of the Biodiversity Clearinghouse established by the Government because this could be used as a mechanism to promote and enhance data exchange and discourse related to biodiversity matters.

3. Better Integration of Biodiversity Considerations into all National Plans, Policies and Programmes

The framework for biodiversity management needs to be more cohesive and comprehensive, and there is a need to ensure that biodiversity considerations are mainstreamed into national planning processes. The revision of the NBSAP is a key step in this process and its revision will need to pay greater attention to the integration of CBD's Thematic Programmes and Cross-cutting issues.

4. Research as a Crucial Step in Biodiversity Planning

One of the issues raised by a number of stakeholders during the stakeholder consultations organized as a part of the process to prepare this Fourth National Report is that research and information are key in helping to map the way forward in biodiversity management. It is recognized and accepted that monitoring of Trinidad and Tobago's biodiversity is not done within a comprehensive or systematic framework, resulting in:

- major data gaps;
- out-of-date datasets that are not indicative of the current situation;
- no established indicators which could be used to consistently track changes in biodiversity, resulting in limited data and information on trends;
- conflicting information from different data sources; and
- limited accessibility to data, especially in a format to support national decision-making

[7] http://www.caricom.org/jsp/speeches/31hgc_persad_bisessar.jsp

One of the issues which must therefore be given priority is the development of a research agenda for biodiversity which is aligned to the requirements of the decision-making process and clearly identify the roles of different agencies in research and monitoring.

4. Funding and Developing Capacity as Key Supporting Mechanisms

The identification and appropriation of funds to encourage and support biodiversity-related initiatives is important to facilitate action. In this regard, multi-lateral donor agencies have to simplify project approval procedures to become more responsive to the needs of developing countries that lack financial resources and capacity, required to effectively manage its biological resources. The GoRTT also recognizes it has a responsibility to sustainably manage it biological assets and therefore has to consider how it might best allocate funding to allow for the most effective and efficient use of national funds in biodiversity management. Some considerations include:

- ✓ Applying a process of prioritization to ensure that the most critical issues are dealt with urgently
- ✓ Placing greater emphasis on revising the Green Fund legislation so that NGOs who play a role in biodiversity management but who are currently unable to access the Fund because of legal constraints can become eligible. This would significantly expand the scope for the inclusion of a greater number of entities in undertaking biodiversity work. In addition, the Green Fund would need to focus on the development of an Action Plan which sets out a framework for the projects that it supports.
- ✓ Placing more emphasis on working with the private sector to encourage support for environmental/biodiversity-related activities within a common framework
- ✓ Supporting non-governmental entities as they strive to mobilize funding and support from external sources for use in biodiversity management

It is also appreciated that more integrated and policy-relevant research and action would only be possible if there is sufficient capacity in the country to be allocated to achieving these objectives. The Government will need to consider the ways in which it can play a role in supporting the enhancement of local capacity to undertake the work that is required, through:

- ✓ Improving collaboration with NGOs/CBOs and research institutions so that the expertise within these non-governmental entities are effectively incorporated into activities
- ✓ Seeking out opportunities with the CBD and international organization/ institution which might be able to provide capacity development support
- ✓ Promoting more public awareness campaigns on biodiversity to raise the level of interest and support sustainability

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APPENDIX I – INFORMATION CONCERNING REPORTING PARTY AND PREPARATION OF NATIONAL REPORT

A. Reporting Party

Contracting Party	Republic of Trinidad and Tobago
NATIONAL FOCAL POINT	
Full name of the institution	Ministry of Housing and the Environment
Name and title of contact officer	Mrs. Veronica Belgrave Permanent Secretary
Mailing address	HDC Building, 44-46 South Quay, Port of Spain
Telephone	+ (868) 624-3378
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CONTACT OFFICER FOR NATIONAL REPORT (IF DIFFERENT FROM ABOVE)	
Full name of the institution	
Name and title of contact officer	
Mailing address	
Telephone	
Fax	
E-mail	
SUBMISSION	
Signature of officer responsible for submitting national report	
Date of submission	

B. Process of preparation of national report

The process for preparing the Fourth National Report of Trinidad and Tobago to the CBD included three (3) main considerations:

- Participatory: it was fully inclusive of stakeholder views and inputs
- Scientific credibility: it drew on published literature and other verifiable sources of information and data; it included expert judgment; and peer review process
- Legitimacy: the work was guided by and Advisory Committee, and was approved by the GoRTT

The following were the main steps in the process:

1. Convening of an Advisory Committee to provide technical guidance and oversight to the preparation of the Report. The Committee was comprised of key individuals with expertise in biodiversity management issues. The Terms of Reference for the Advisory Committee was as follows:

    - Assist in the identification of data and information sets to be included in the Report
    - Ensure that analysis and assessment of data/information is technically sound
    - Provide inputs into the identification of key stakeholders
    - Assist in making contact with key stakeholders (including Government Ministries) especially where this proves to be difficult
    - Accompany team members from The Cropper Foundation to small focused meetings with stakeholders where appropriate
    - Assist in providing intellectual leadership to the national stakeholder consultations

2. Organizing stakeholder consultations to gather stakeholder inputs. Originally, it was envisaged that two national stakeholder consultations would be organized – one in Trinidad and another in Tobago. However, on the basis of advice received from the Advisory Committee, it was agreed that there would be several smaller focus group meetings with the following clusters of stakeholders:

    - Research institutions (approximately 30 representatives)
    - Non-governmental organization and Community-based organizations (approximately 30 representatives)
    - Public agencies (approximately 30 representatives)
    - All Tobago stakeholders (15 representatives)

    Selected private sector companies were individually contacted by phone.

    The objectives of the national stakeholder focus group meetings were to provide an opportunity for:

    - Stakeholders to review a very rough draft of the Fourth National Report with a view to:

        - Providing technical feedback and inputs towards improvement of the Report

    - Identifying any programmes and projects being undertaken by stakeholders which are important but not included in the report
    - Identifying additional sources of data and information which should be included in the report

- Discussion about the challenges and needs with respect to biodiversity management in Trinidad and Tobago

- Identification of specific activities and mechanisms required to improve inter-agency and cross-sectoral integration and collaboration in support of biodiversity management

- Sharing of perspectives and promoting networking amongst stakeholders involved in biodiversity management in Trinidad and Tobago

3. Preparing a first draft of the Report based on desktop research and stakeholder inputs.

4. Performing a first round of internal peer review

5. Revising the document to include comments and additional information/data.

6. Subjecting the document to a second round of external review

7. Finalization and submission.

APPENDIX II – FURTHER SOURCES OF INFORMATION

Please see Bibliography for sources of information.

APPENDIX III - PROGRESS TOWARDS TARGETS OF THE GLOBAL STRATEGY FOR PLANT CONSERVATION AND PROGRAMME OF WORK ON PROTECTED AREAS

A. Progress towards Targets of the Global Strategy for Plant Conservation

Target No.	Target Goals	Progress of Trinidad and Tobago
1.	A Widely accessible working list of known plant species, as a step towards a complete world flora	An inventory of plant species for the country has been completed (under the Darwin Initiative) and is soon to be published. A process has begun to produce a forest cover map and conduct a National Forest Inventory. This is considered a major step in improving local knowledge about plant species.
2.	A preliminary assessment of the conservation status of all known plant species, at national, regional and international levels.	There exist preliminary assessments of plant conservation status in T&T but there is a need to conduct a comprehensive scientific robust assessment.
3.	Development of models with protocols for plant conservation and sustainable use, based on research and practical experience.	No formal national protocols for conservation have been developed. Harvesting of commercially important tree species and other plants are however controlled through a permit/licence system operated by the Forestry Division through the Forests Act. This system is intended to ensure sustainable utilization of the country forest resources and the maintenance of its ecological integrity. It is recognized that the system needs to be improved and steps have been taken to revise the National Forest Policy which will lead to improvements in the legislative framework governing plant conservation.
4.	At least 10 per cent of each of the world's ecological regions effectively conserved	A significant portion of a T&T forests are under some form of protection as forest reserves, prohibited areas, wildlife sanctuaries and environmentally sensitive areas. It has been recognized that the system of protected areas in T&T has to be modernized and re-established through an integrated framework. Work has been initiated to improve the national protected areas system with the development of a nation protected areas policy.
5.	Protection of 50 per cent of the most important areas for plant diversity assured	Same as 4 above.

Target No.	Target Goals	Progress of Trinidad and Tobago
6.	At least 30 per cent of production lands managed consistent with the conservation of plant diversity	Same as 4 above.
7.	60 per cent of the world's threatened species conserved in situ.	T&T is contributing to this global target by protecting its plant species Environmentally Sensitive Species Rules, the Forest Act and various other laws, policies and programmes.
8.	60 per cent of threatened plant species in accessible ex situ collections, preferably in the country of origin, and 10 per cent of them included in recovery and restoration programmes	The National Herbarium, the Botanic Gardens and a few other institutions have maintained collection of native plants. There is a need however to establish programmes for better collection and restoration of plant species
9.	70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained.	The Cocoa Research Unit of the University of the West Indies maintains a gene bank of cocoa.
10.	Management plans in place for at least 100 major alien species that threaten plants, plant communities and associated habitats and ecosystems	The Government through the Plant Quarantine Division has active surveillance of the country's port of entries to try and prevent the introduction of alien invasive species and plant diseases.
11.	No species of wild flora endangered by international trade.	T&T is contributing to this global effort through the implementation of CITES.
12.	30 per cent of plant – based products derived from sources that are sustainably managed	T&T ensures that timber and other plants extracted from its forests are conducted in a sustainable manager through the implementation of the Forests Act. It is recognized that there is a need for improvements.
13.	The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.	Scientific assessments of the countries plant resources are required to confirm that there has been reduction in declines of plant species.
14.	The importance of plant diversity and the need for its conservation incorporated into communication, education and public awareness programmes.	Actions have been taken by the Forestry Division and the EMA to communicate the importance of plant diversity to the public. However, much more is required.
15.	The number of trained people working with appropriate facilities in plant conservation	This issue is being addressed. But there is need for more effective and targeted

Target No.	Target Goals	Progress of Trinidad and Tobago
	increased, according to national needs, to achieve the targets of this Strategy.	training programmes in support of plant conservation
16.	Networks for plant conservation activities established or strengthened at national, regional and international levels.	There is need to enhance networks in support of plant conservation, especially at the regional and international levels

B. Progress towards the Targets of the Programme of Work on Protected Areas

Goals	Target	Description of T&T's Progress in Achieving/ Contributing to Target
1.1. To establish and strengthen national and regional systems of protected areas integrated into a global network as a contribution to globally agreed goals.	By 2010, terrestrially, and 2012 in the marine area, a global network of comprehensive, representative and effectively managed national and regional protected area system is established as a contribution to (i) the goal of the Strategic Plan of the Convention and the World Summit on Sustainable Development of achieving a significant reduction in the rate of biodiversity loss by 2010; (ii) the Millennium Development Goals – particularly goal 7 on ensuring environmental sustainability; and (iii) the Global Strategy for Plant Conservation	The National System for Protected Areas is being strengthened and modernized through the development of a Protected Areas Policy which is meant to guide the approach to management of protected areas in T&T. It is anticipated that this policy will provide a framework for selection, designation and management of all protected areas at the national level – in the terrestrial, coastal and marine environments. Currently significant portions of the country's forest ecosystems are protected through declarations as forest reserves, prohibited areas and Environmentally Sensitive Areas Rules. Only one (1) marine area the Buccoo Reef has been declared as a marine protected area. A regional network of protected areas and species is to be established under the Protocol Concerning Specially Protected Areas and Wildlife in the Wider Caribbean Area (SPAW Protocol).
1.2. To integrate protected areas into broader land- and seascapes and sectors so as to maintain ecological structure and function.	By 2015, all protected areas and protected area systems are integrated into the wider land- and seascape, and relevant sectors, by applying the ecosystem approach and taking into account ecological connectivity and the concept, where	There has been progress in achieving better management of Protected Areas in T&T through the Environmentally Sensitive Areas Rules 2001 which promote an ecosystem-based approach. Only three systems designated to date. There is need to put emphasis on the designation of other important areas. The National Protected Areas Policy recognizes the ecosystem approach and the need to maintain ecological connectivity

Goals	Target	Description of T&T's Progress in Achieving/ Contributing to Target
	appropriate, of ecological networks.	between protected areas. It is envisioned that once the Policy is adopted necessary legislative framework would be enacted to give effect to ecosystem approach and ecological connectivity in the establishment of a new national system of protected areas.
1.3. To establish and strengthen regional networks, transboundary protected areas (TBPAs) and collaboration between neighbouring protected areas across national boundaries.	Establish and strengthen by 2010/2012 transboundary protected areas, other forms of collaboration between neighbouring protected areas across national boundaries and regional networks, to enhance the conservation and sustainable use of biological diversity, implementing the ecosystem approach, and improving international cooperation	Trinidad and Tobago has an island state has no transboundary protected areas requiring collaboration with other countries.
1.4. To substantially improve site-based protected area planning and management.	All protected areas to have effective management in existence by 2012, using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring programmes, drawing upon existing methodologies and a long-term management plan with active stakeholder involvement	Management plans have been developed or are being developed for certain of the countries protected areas particularly Ramsar sites and ESAs. The Draft Protected Areas Policy requires that management plans be developed and implemented for all protected areas declared under the new system of protected areas. The Policy is currently being finalized and it is unlikely that all protected areas in T&T will be fully integrated into this process by 2012.
1.5. To prevent and mitigate the negative impacts of key threats to protected areas.	By 2008, effective mechanisms for identifying and preventing, and/or mitigating the negative impacts of key threats to protected areas are in place.	Preventing and mitigating negative impacts on protected areas are effected through the existing legislative framework (ESA Rules, ESS Rules, CEC Rules, EM Act, Forests Act, Conservation of Wildlife Act etc.). There is a need to improve the current mechanism and there have been recent attempts to address this issue, especially through the development of a

Goals	Target	Description of T&T's Progress in Achieving/ Contributing to Target
		National Protected Areas Policy.
2.1. To promote equity and benefit-sharing.	Establish by 2008 mechanisms for the equitable sharing of both costs and benefits arising from the establishment and management of protected areas	Access to T&T biodiversity is effected through the provisions of the Forests Act, Conservation of Wildlife Act and the Fisheries Act. Under these Acts conditions can be placed on access but it is difficult to ascertain the benefits that may be derived from access that could redound to the benefit of local communities. Benefits derived by providing access especially to foreign researchers can only be monitored and/or assessed through international corporation. An international regime on access and benefit sharing may therefore be necessary.
2.2. To enhance and secure involvement of indigenous and local communities and relevant stakeholders.	Full and effective participation by 2008, of indigenous and local communities, in full respect of their rights and recognition of their responsibilities, consistent with national law and applicable international obligations, and the participation of relevant stakeholders, in the management of existing, and the establishment and management of new, protected areas	T&T has made some progress with regards to strengthening mechanism for the involvement of local communities in the management of biological resources. It is hoped that such mechanism would be improved with the adoption of the new Forest Policy and Protected Areas Policy.
3.1. To provide an enabling policy, institutional and socio-economic environment for protected areas.	By 2008 review and revise policies as appropriate, including use of social and economic valuation and incentives, to provide a supportive enabling environment for more effective establishment and management of protected areas and protected areas systems.	Policy review has been initiated to address this issue resulting in the drafting of a new Forest Policy and Protected Areas Policy.
3.2. To build capacity for the planning, establishment and management of protected areas	By 2010, comprehensive capacity-building programmes and initiatives are implemented to develop	There has been progress in this respect especially at the community level facilitated by the Environmentally Sensitive Areas Rules. Much more is required however and it is envisioned the adoption and

Goals	Target	Description of T&T's Progress in Achieving/ Contributing to Target
	knowledge and skills at individual, community and institutional levels, and raise professional standards	implementation of the Protected Areas Policy would enhance the country's capacity to manage protected areas.
3.3. To develop, apply and transfer appropriate technologies for protected areas.	By 2010 the development, validation, and transfer of appropriate technologies and innovative approaches for the effective management of protected areas is substantially improved, taking into account decisions of the Conference of the Parties on technology transfer and cooperation.	There is need for greater support from the international community to provide greater opportunities of training and technology transfer to local biodiversity managers, particularly the use of remote sensing technologies to monitor forest cover, forest fires, coral bleaching and impacts of sea level rise on the loss of coastal habitats.
3.4. To ensure financial sustainability of protected areas and national and regional systems of protected areas.	By 2008, sufficient financial, technical and other resources to meet the costs to effectively implement and manage national and regional systems of protected areas are secured, including both from national and international sources, particularly to support the needs of developing countries and countries with economies in transition and small island developing States.	This issue is currently being addressed at the national level in the development of the National Protected Areas Policy and the operationlization of the Green Fund. Despite these national efforts, there is a need for multi-lateral donor agencies to simplify the approval process for providing grant funds to facilitate management of biodiversity.
3.5. To strengthen communication, education and public awareness.	By 2008 public awareness, understanding and appreciation of the importance and benefits of protected areas is significantly increased	The Forestry Division, Institute of Marine Affairs, the Tobago House of Assembly and the EMA all have ongoing public education and awareness programmes on protected areas and biodiversity.
4.1. To develop and adopt minimum standards and best practices for national and regional protected area systems.	By 2008, standards, criteria, and best practices for planning, selecting, establishing, managing and governance of national and regional systems of protected areas are developed and	National standards and criteria for selecting, establishing and managing protected areas have been developed and incorporated into the National Protected Areas Policy.

Goals	Target	Description of T&T's Progress in Achieving/ Contributing to Target
	adopted.	
4.2. To evaluate and improve the effectiveness of protected areas management.	By 2010**,** frameworks for monitoring, evaluating and reporting protected areas management effectiveness at sites, national and regional systems, and transboundary protected area levels adopted and implemented by Parties	A monitoring, evaluation and reporting framework for protected areas management has been developed and incorporated into the National Protected Areas Policy.
4.3. To assess and monitor protected area status and trends.	By 2010, national and regional systems are established to enable effective monitoring of protected-area coverage, status and trends at national, regional and global scales, and to assist in evaluating progress in meeting global biodiversity targets	Same as 4.2 above.
4.4 To ensure that scientific knowledge contributes to the establishment and effectiveness of protected areas and protected area systems.	Scientific knowledge relevant to protected areas is further developed as a contribution to their establishment, effectiveness, and management	Both the ESA Rules and the Draft Protected Areas Policy provide a framework for this. Within the ESAs so far designated as well as some which have been proposed for designation, ongoing research, monitoring and evaluation has been underway. It is recognized however that much more is required in this respect, and issues such as financing and capacity will need to be addressed in order to achieve greater progress.