

Community Quote

"We need educational programmes and information on developments and EIA's so we could take part in and direct developments that affecting our environment, lives and sources of income."



Senator Nafeeza Mohammed, Minister Lasse and Senator John Spence at Asa Wright.

- institutional and human capacity; including organizations outside government
- technologies used in the exploitation and use of biodiversity
- existing sector programmes including the work of NGOs and CBOs
- existing financial incentives and disincentives
- analysis of root causes of biodiversity loss in the sector

The analysis based upon this assessment :

- identified gaps in information and action, issues being addressed and issues in need of attention
- suggested possible specific measures to close the gaps identified in the assessment
- identified trends in Trinidad and Tobago's sectoral policies and programmes as they relate to impact on biodiversity
- listed preliminary strategic objectives as to how the sector can support biodiversity conservation

The assessment was a critical summary of each sector impact on biodiversity and its conservation. It included nation-wide perspectives, opinions and viewpoints from those working in the sector throughout the country. The stocktaking exercise was also an opportunity to begin the consultative process of developing the NBSAP.

The process

Orientations for Stakeholders

One of the first tasks of the project was a series of orientation sessions, for those who would be involved in the project. The project was designed to be highly participatory in nature and it was necessary to familiarize people with the Convention, its aims, why T&T was engaged in this exercise, how it was to proceed, and to request their support, assistance and participation during the project.

Orientation sessions were held for the following groups of people in October 1998:

- The Task Force
- The Project Team
- Environmental Officers from all Ministries
- Selected stakeholders, including NGO's and CBO's
- Secretaries of the THA

The orientation sessions were received with much enthusiasm by all participants. They generally expressed the need for this type of planning exercise and assured the project team of their commitment to the process.

In addition to this, Permanent Secretaries in all Ministries were written to and informed about the project. The Sector Specialists were introduced, and facilitation requested for their information gathering and assessment phase.



Working group on Awareness and education at the National Consultation.

Political sensitization sessions

On receipt of the sector specialists draft reports in early January, a series of informational sessions were organized for the political directorate of the country. This was to sensitize this important core group, to the issues of biodiversity use, management and conservation for Trinidad and Tobago. Invited to a one day retreat on the 26th or 27th January 1999 were :

- **Parliamentarians**
- **Government Ministers**
- **Senators**
- **Permanent Secretaries**
- **Secretaries of the THA**

These sessions were very poorly attended by the invited groups, with best representation coming from the Permanent Secretaries, and worst by the elected Parliamentarians and the THA. However, the information was very enthusiastically received by the participants who were interested enough to attend.

Contact Group workshops

The sector specialist reports were copied and distributed to stakeholders from each of the sectors. These stakeholders included NGO's, CBO's, business and corporate sectors, Ministry personnel, private enterprise, and other individuals who were also contacted by the sector specialists in the assessment and information gathering phase. Each report was workshopped by its own stakeholder group. For example, the Tourism stakeholders included: TIDCO, Tour Guide and Operators Association, CBO's involved in tour guiding and conservation, the Forestry Division, Tourism Action Committees (TAC) etc. A listing of stakeholders of the NBSAP is included in Appendix 2.

Six workshops were held in Trinidad, and six in Tobago, during February and March 1999. In these workshops, the consultant reports were discussed, the major issues identified and prioritized, and the initiation of strategies and actions to address the issues began.

Coming out of these dynamic sessions were a series of similar issues that stakeholders identified as affecting the conservation of biodiversity in T&T. Although they may have ranked differently in each group, the issues were identical:

- **Education and Awareness**
- **Policy and Legislation and Enforcement**
- **Information, Data and Research**
- **Valuation and Environmental Accounting**
- **Communication and Cooperation within and between Agencies, and with their Stakeholders**
- **The use of Financial Instruments for the Conservation of Biodiversity**
- **The Political Commitment to the Issue of Biodiversity Conservation**
- **The Capacity of Government Institutions to manage the country's Biodiversity Resources**

Community Quote

"We need an education process in this country that will help us to do things, not just say things."



Working group on policy and legislation at the National Consultation.

Community Recommendation

State needs to strengthen the communities to assist law enforcement agencies in protecting biodiversity. People need to be on the spot to take action against lawless behaviour.



Public consultation at Toco. Residents express their concerns on the wanton use of community resources.

Public consultations

Background information on the NBSAP, and the priority issues from the contact group workshops, were put into an issues report booklet, and circulated for a series of thirteen public consultations in May 1999. The involvement of the wider public was vital to the process of the NBSAP, to uncover the concerns of the communities and individuals who utilized biodiversity resources on a daily basis. These were held throughout the country at the following locations:

Tobago

Fairfield Complex
Roxborough Senior Comprehensive

Trinidad

Blanchisseuse Community Centre
Couva Learning Resource Centre
Toco, Victoria Pritchard Centre
Mayaro Composite School
Longdenville Community Centre
St. Augustine Senior Comprehensive
Arima Town Hall
Port-of-Spain Public Library
Princes Town Junior Secondary
Siparia Lions Civic Centre
Point Fortin Junior Sec. School

The public consultations were extremely varied in the attendance numbers ranging from 65 persons in Blanchisseuse to 5 in Mayaro. However, they were very spirited occasions and individuals were extremely vocal and knowledgeable about the resources and activities in their communities. Their views and attitudes are reflected in the quotes that illustrate the priority issues of this NBSAP.

Integration of the ideas

While the sector specialists' reports formed the basis for the analysis of each sector, and provided preliminary recommendations for the conservation of biodiversity, crucial input of ideas and suggestions came out of the contact group workshops and the public consultations. The ideas from these three sources were integrated to address the strategies and actions that the country should adopt in planning for the sustainable use and management of its biodiversity resources.

The National Consultation

A public National Consultation was held at the Rudranath Capildeo Learning Resource Centre, Couva on August 4, 1999. Over 100 members of the public attended. Approximately 300 invitations were sent out to persons who had attended the other participatory sessions, including representatives of NGOs, CBOs, Ministries and other Government agencies, stakeholder organizations and associations, the media, the political directorate, the private sector, tertiary education and research institutions.



Senators Dr. Eastlyn McKenzie, Agnes Williams & Nathaniel Moore at Asa Wright Nature Centre.



Minister Lasse and Winston Nanan at the Asa Wright sensitization session.

Working groups at this session addressed the major issues that had previously been identified by workshops and discussions. These issues were as follows:

- **Education and Awareness**
- **Policy and Commitment**
- **Legislation and Enforcement**
- **Information and Research**
- **Institutional Capacity**

These five groups reviewed the recommended strategies and actions for each issue, prioritized them, included additional information they felt should be addressed, and suggested indicators that could be utilized to measure the success of implementation. Their priority strategies and actions are detailed in Appendix 1.

Community Quote

“Our human resource is our greatest asset.”

“Let this information be fed to every community”

The NBSAP is one in a class of National Sustainable Development Strategies, identified in the World Conservation Strategy (WCS) in 1980. This genre of “strategies for sustainability” has increasingly become adopted as a national planning norm. Trinidad and Tobago developed a Tropical Forestry Action Plan (TFAP, 1992), which encompassed much more than forests. The National Environmental Policy (NEP, 1998) produced after widespread consultation by the EMA, can also be regarded as a significant milestone on the direction of national actions to foster sustainable development.



Permanent Secretaries enjoying the exchange at the Asa Wright sensitization sessions.



3. The Biodiversity of Trinidad & Tobago

An overview based on a 1997 study commissioned by the EMA and executed by : Kenny, J., Comeau, P., & Katwaru, L..

In which the geographical influences of latitude and continent exert their combined effect on the biodiversity of the islands of Trinidad and Tobago.
The local range of ecosystems and species diversity is introduced.
The range of marine and terrestrial ecosystems
The 'Evil Quartet'

Off-shoot of the mainland

Trinidad and Tobago sits on the continental shelf of South America, separated by only 12 kilometres from Venezuela, and, Tobago, by 30 kilometres from Trinidad. Both islands are, therefore, geologically part of the mainland, with evidence indicating that Trinidad was only recently separated, about 11-15,000 years ago. This recent parting of the islands over very small distances locates T&T in the same bio-geographic region as tropical coastal South America.

Disconnection on such a short, geological, time scale, has not allowed for the evolution of separate species and therefore island endemism is not a critical factor in T&T. The small distance between this country and the mainland does not present a barrier to flying animals, nor to many terrestrial plants or animals. Our flora and fauna are therefore, natural extensions of South American populations, the species being identical.

However, it is believed that there are a number of sub-species of different plant varieties and endemic plant species. Of special note are some of the palms and species of reptiles found in Tobago, but not in Trinidad.

Climate

Both Trinidad and Tobago share the same general climate typical of the wet tropics. Locally, in both islands, however, there is considerable variability, with the dominant factor being rainfall. Rainfall varies from annual highs of about 3500mm to lows of about 1200mm. There also is a marked annual cycle of wet and dry periods, with frequent local thunderstorm activity in the latter half of the year. The wet season is dominated by the northward migration of the inter-tropical convergence zone and a progression of tropical waves moving to the west through middle Atlantic latitudes. Tropical depressions are not uncommon, but tropical storms and hurricanes are infrequent. As may be expected, the biota is typical of the wet humid conditions of north eastern South America.

Orinoco influence

The position of the islands, in relation to the Orinoco Delta, has a profound effect on the coastal and marine ecology, due to the heavy seasonal outflow of freshwater from this continental river. In addition, the presence of masses of low salinity waters and floating vegetation, in the passages separating the islands from the mainland, allows for the natural movement of terrestrial and freshwater species from the mainland to our



The Arena Forest Reserve, the site of the only sustainable tropical forest management system, the Shelterwood system, developed here in the 1950s.



Coralline beaches of Tobago.

shores. This notable feature of floating vegetation, torn from the river banks, is thought to be responsible for the continuing colonization of the southwestern peninsula by both plants and animals.



The Orinoco produces extreme sedimentation and reduces salinity, especially in Trinidad's waters, which experience the riverine discharges more directly. This is responsible for the brackish waters on the south coast and in the Gulf of Paria. These effects gradually dilute as fresh and oceanic waters mix.

This sediment loading of the coastal waters is less prominent in Tobago. Tobago has therefore been able to develop coral reefs off its south west coast, where turbidity and salinity are at threshold levels for reef development.

Figure 1 Landstat image of Trinidad showing sediment plumes from the Orinoco, and their area of influence on the coastal waters of Trinidad. Processing and enhancement carried out by the Remote Sensing Laboratory of the Institute of Marine Affairs of Trinidad and Tobago.

Currents, The Big Picture

The prevailing South Equatorial oceanic current, which originates in the south eastern Atlantic, sweeps in a broad band to the northwest. As this approaches South America it divides into two main streams, the northern part of which continues along the coast. This is fed with outflow of all the main rivers from the Amazon to the Orinoco, all of which are deflected to the northwest. Consequently, Trinidad and Tobago sits in an ocean stream. Nearshore, current flow is in two general streams - one to the south through the Columbus Channel, the other to the east and through the Galleon's Passage between Trinidad and Tobago. Both streams unite north of the Bocas and pass to the west-northwest as the Antillean Current.

The Orinoco and the South Equatorial current, in combination with the coastal physical features of the country, are the major influences on the coastal and marine biodiversity and fisheries of the country.

Marine Ecosystems

Oceanic influences of salinity and turbidity, especially from the Orinoco, determine the marine ecosystems of T&T. The intensity of both being

During Columbus's fourth voyage to the West Indies, he was alarmed at the swell and agitation of the waters outside Trinidad. Finding the waters of the Gulf of Paria rushing in two different directions, north and south, from the same spot, he fancied that he had reached the highest point of the earth, and that the edge of the world could not be far off.

**Edward Sullivan Esq. 1852.
Rambles and Scrambles in North
and South America**

The ecosystem types distinguished in Trinidad and Tobago are:

Climatic

1. Seasonal Formations

- (a) Evergreen Seasonal Forest
- (b) Semi-evergreen Seasonal Forest
- (c) Deciduous Seasonal Forest

2. Dry Evergreen Formations

- (a) Littoral Woodlands

3. Montane Formations

- (a) Lower Montane Rain Forest
- (b) Montane Rain Forest
- (c) Elfin Woodland

4. Intermediate Formations

- (a) Seasonal Montane Forest

Edaphic

5. Swamp formations

- (a) Swamp Forest
- (b) Palm Swamp
- (c) Herbaceous Swamp
- (d) Mangrove Woodland

6. Marsh Formations

- (a) Marsh Forest
- (b) Palm Marsh
- (c) Savannah

Source: J.S. Beard. *The Natural Vegetation of Trinidad (1946)*.

determined by the seasonal discharges of the Orinoco. The currents around T&T generally flow from the south west to the north east, producing a gradient of salinity and turbidity that decreases towards the north east. These influences are responsible for the distribution of the different marine ecosystems.

Caribbean comparisons

The biodiversity of Trinidad and Tobago is the most diverse of the islands in the Caribbean archipelago, due to the continental origin of our islands. We therefore have a rich tropical South-American natural heritage. Other Caribbean islands have different origins, eg. volcanic and coralline islands that have developed along different biological lines. Although they may have species with a high degree of endemism, they are not as biologically diverse as Trinidad and Tobago. Our marine biota though, is characteristic of the Caribbean bio-geographical province.

Our terrestrial biodiversity, being an extension of our South American origin, is clearly a relict biota typical of the immediate delta region at the time of our separation approximately 11-15,000 years ago. To this, has been added a few recent strays and colonizing species, and a larger number of exotic species of both plants and animals associated with the process of colonization by human society

Ecosystem diversity

Terrestrial or land based ecosystems

These are a result of the interplay of the environmental factors of climate, topography and soil.

Climatic factors such as moisture, temperature or elevation and wind that are important for T&T's ecosystems.

Ecosystem formations have been classified as Edaphic on the basis of soil type, topography and water table.

“Hidden behind familiar statistics is an equally sobering reality. Of the forests that do remain standing, the vast majority are no more than small or highly disturbed pieces of the fully functioning ecosystems they once were.”

The last Frontier Forests: Ecosystems & Economies on the Edge. World Resources Institute 1997

Table I TERRESTRIAL ECOSYSTEMS IN TRINIDAD AND TOBAGO

FORMATIONS	AREA (ha)
Evergreen Seasonal	98180
Semi-evergreen seasonal	13930
Deciduous Seasonal	3620
Dry Evergreen	500
Montane	22550
Swamp/Marsh/Savannas	16730
Total	155510

Source: *Forest Resource Inventory and Management (1998)*

A note on interpretation

Observation and discussions held with various interest groups, indicate that most of the plant formations identified by Beard (1946) have undergone major changes. Therefore, the figures in Table I, which have been estimated from remote-sensing data, may be misleading. Of concern are the changes which have occurred in some of these vegetation associations due to management for exploitation of forest products and fires. For example, it has been estimated that the Deciduous Formation of the north western peninsula, has been so drastically altered by fires that the landscape and vegetation in that locality does not agree with the vegetation maps. Most of this vegetation can now be classified as successional vegetation.

Species diversity

While there is no comprehensive listing of how many species of plant and animals there are in Trinidad and Tobago, some groups have been extensively studied, e.g. vascular plants, some moderately so and others not at all. However, biodiversity in T&T is special because of our comparative size, the number of species relative to our size, and the variety of ecosystems within our small landmass. Every year, new species are discovered the world over, and Trinidad and Tobago is no exception. The following list is a rough estimate of the present state of our knowledge on the number of species.

Table 2 Species diversity in Trinidad and Tobago

Major Groups	Number of Species
Vascular Plants	2160
Birds	450
Mammals	95
Reptiles	85
Snakes	55
Amphibians	30
Freshwater fishes	45
Marine fishes	354
Butterflies	600
Nematodes	200-300

Genetic Diversity

There is little information on the genetic diversity of species in Trinidad and Tobago with the exception of its commercial application in the agricultural sector. There have been important advances in the development of genetic stock for sugar and cocoa, (Trinidad possesses one of the world's leading gene bank collections for the Cocoa industry), and in the selection process of commercial forest tree species.

Marine Ecosystems:

- Mud Bottom
- Coral Reefs & Communities
- Sea Grass Beds
- Sandy Bottoms
- Beaches
- Rocky Shores and Littoral
- Mud Flats
- Freshwater and Estuarine Systems

There are probably about 2500 species of plants and about 10 times as many animals, the majority being insects and other invertebrates.

The double *Chaconia Warszewiczia coccinea* var "D. Au Young" is a natural hybrid of our National flower. In 1957 the only known plant of the double *Chaconia* was discovered on the Blanchisseuse Road growing wild. All double *Chaconias* are descended from this original find in Trinidad.





The Blue and yellow macaw, *Ara ararauna* extirpated in the wild in Trinidad and Tobago, is now the focus of attempts to re-introduce it into the Nariva Swamp. The project is a collaborative effort of the Forestry Division, the Manatee Conservation Trust and the Cincinnati Zoo

The human handprint

It must also be noted that one of the most important factors influencing biological diversity is the human-social-developmental process, a process in which natural areas and non-renewable resources are utilized in meeting the needs and wants of the community. The demands of development, both planned and un-planned, coupled with an annual population growth rate of 1.2%, continue to apply significant pressure on natural areas and our biodiversity resources.

The influence is not a simple one of species extinctions, as is often suggested, but rather a complex interaction of circumstances that have been dubbed “The Evil Quartet”. This is discussed in Chapter 7.

Rare, endangered and extirpated populations

Studies that indicate data on population levels of plant and animal biodiversity in Trinidad and Tobago, simply do not exist (except for a study on ferns) . The labelling of a species as rare, endangered or extirpated has generally been one of hearsay among frequent users of individual resources. Such ‘common knowledge’, although not backed up by population studies, does have some basis for validity. Population studies are needed for us to understand the dynamics of the populations and to identify management options. They would also enable us to classify animal and plant populations according to the IUCN definitions of rare, endangered etc.

SIDS considerations

In the context of a Small Island Developing State (SIDS), the management and conservation of the country’s biodiversity becomes acute, as pressures and conflicts on land use continue to grow. The balance between population growth, demand and consumption of resources, and land use planning, must assume a critical focus in the management of a finite land space. In this context, sustainable development and use of non-renewable resources, needs to be internalized and reflected in policies, plans and programmes of all sectors of the country’s vision for development.

Attempts made to develop the connections between ecological fragility and economic vulnerability of SIDS, generally indicate that, due to the combination of economic and ecological factors, small island states are among the most vulnerable of developing countries.

For Trinidad and Tobago, our size, variety of ecosystems and relatively good infrastructure, make our biodiversity extremely accessible. This is a double-edged sword for us, as it is advantageous for nature-based tourism, a proposed area of economic growth, but increases the susceptibility of these resources to over-exploitation and abuse.

Some species commonly categorized as endangered, include:

- Endemic & local orchid species
- Manatee or sea cow
- Pawi or Trinidad piping guan
- Leatherback Turtle or Caldon
- Mata mata turtle
- Golden tree frog
- River otter
- Crab-eating racoon
- Blue and Yellow Macaw
- Cage birds such as the Twa Twa, the Robin, and seed eating finches.
- Numerous species of Waterfowl, including the fulvous whistling duck, the white cheeked pintail



4. Conservation and Management of Biodiversity in Trinidad & Tobago

With extracts from work commissioned by the EMA, and executed by N. Leotaud.
Biodiversity Conservation and Management in Trinidad and Tobago.

In which State institutions, Non-Governmental Organizations, the Private sector, and Community-based Organizations have all contributed to the evolution of Biodiversity management in T&T. Land use classification show a progression of conservation thinking from Forest reserves and Wildlife Sanctuaries, to the recent prohibited areas. The most recent progress for in situ conservation, National Parks and other Protected Areas, is introduced.

Institutional Framework

State agencies have been playing an important role in conducting research, management and education programmes to effect sustainable use of biodiversity and conservation. The primary agencies for the management and conservation are highlighted in Table 3 below. Their areas of responsibility are also indicated.



Agouti at a wildlife farm.

Table 3 - The primary agencies managing and conserving biodiversity in Trinidad and Tobago.

Agency	Areas of Responsibility
Environmental Management Authority Wildlife Section, Forestry Division	Coordinating environmental management in T&T. Terrestrial wildlife in Trinidad--mainly focusing on animal species.
National Parks Section, Forestry Division	National parks and other protected areas in Trinidad (proposed and established).
Forestry Division	Forest resources of Trinidad on Forest Reserves
Fisheries Division	Marine fisheries resources of Trinidad.
Emperor Valley Zoo	Ex-situ conservation of animal diversity of T&T.
Botanical Gardens	Ex-situ conservation of plant diversity of T&T.
Ministry of Health	Insect Vector control
Chaguaramas Development Authority	Chaguaramas National Park.
Department of Environment and Natural Resources, THA	Forest resources of Tobago.
Fisheries Department, THA	Marine fisheries resources of Tobago.
Caribbean Epidemiological Centre (CAREC)	Research into epidemic affecting human populations
CARINET	Identification of Arthropods, nematodes, microorganisms and non-vascular plants
National Herbarium (UWI)	Cataloging and collection of the flora of Trinidad and Tobago
Institute of Marine Affairs (IMA)	Research on the Coastal and Marine environment & aquaculture
University of the West Indies (UWI)	Training and research
Eastern Caribbean Institute of Agriculture & Forestry (ECIAF)	Training and research
National Institute of Higher Education Science and Technology (NIHERST)	Training and research

Landmarks of Conservation in T&T

Trinidad and Tobago has had a long history of adapting to the management of its natural biodiversity resources. These trends have been related to the state of thought on the uses of these resources at various times in its history, and not necessarily on the conservation of biodiversity *per se*. However, the value of these resources have long been recognized both for their utilitarian and ecosystem values. The following landmarks are of note:

1765 The Main Ridge Reserve in Tobago, set aside as “Woods for the protection of the rains”, a first in watershed management in the Western Hemisphere.

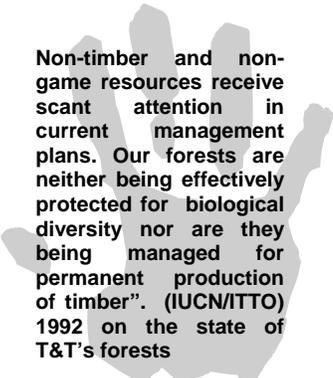
1922 – 1960 A system of 43 Forest Reserves declared for managing timber resources.

1934-1968 A system of 11 wildlife or Game Sanctuaries declared for the protection of wild animal species.

1970 Marine Preservation and Enhancement Act used to declare Buccoo Reef a Protected Area.

1972 Chaguaramas Development Act, for the protection of the Chaguaramas peninsula

1987- 1999 Prohibited Areas declared under the Forests Act, to prevent entry into sensitive areas at specific times of the year. Increasingly used to protect nesting animals and Forest Reserves from fires. Forest Reserves in the north of Trinidad and Wildlife Sanctuaries are now under this classification.



Non-timber and non-game resources receive scant attention in current management plans. Our forests are neither being effectively protected for biological diversity nor are they being managed for permanent production of timber”. (IUCN/ITTO) 1992 on the state of T&T's forests

The Ministry of Agriculture, Land and Marine Resources & the Tobago House of Assembly

The Ministry, with primary responsibility for conservation of the biological resources of T&T is the Ministry of Agriculture, Land and Marine Resources. Divisions of this Ministry, which include the Forestry Division and the Fisheries Division, are responsible respectively for the conservation of forest resources (including wildlife), and of marine fisheries resources *in situ*. The Botanical Gardens, and the Emperor Valley Zoo conserve biodiversity collections *ex situ*. The Tobago House

of Assembly (THA) is also responsible for these functions on that island, through its Department of Environment and Natural Resources.

The Forestry Division

There are inherent conflicts in the management of biodiversity by the Forestry Division, which has responsibility for Forest Reserves and the management of watersheds, Prohibited Areas and Wildlife Sanctuaries.

“Trinidad and Tobago stands alone as possessing the only commercial scale production forest estate, which approaches sustainability in all of Latin America ITTO members. However, the forest management system is tending to reduce or eliminate some commercial tree species. Much of the current production forest estate was delineated without adequate consideration for the conservation of biological diversity.

“Most of the state forests are managed for multiple uses which includes the preservation of natural plant and animal species, but which also allows for the exploitation of timber and game resources.” (IUCN/ITTO 1992)

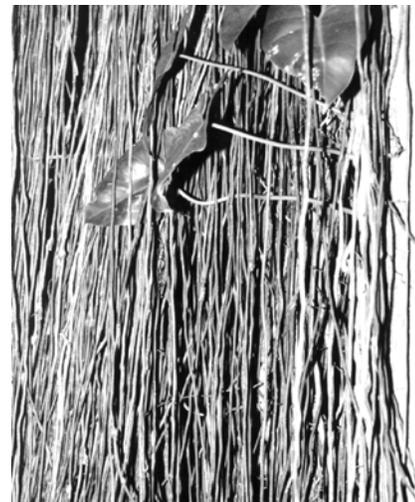
The Forestry Division has responsibility for managing the forest resources in Trinidad under the Forests Act (Chap 66.01), including the exploitation of timber species. Management and administration of the Forest Reserves are carried out within the forest Conservancies (conservancies are the regional geographical units for the purposes of forest administration and watershed management on state lands).

International obligations for conservation and management of biodiversity also fall under the purview of Forestry Division. These include the Ramsar Convention on Wetlands, Convention on the International Trade in Endangered Species of wild flora and fauna (CITES). In keeping with these obligations, the Division has worked towards putting a number of mechanisms in place for the country’s compliance. However, these initiatives, through **draft** policies and legislation, have not yet resulted in the necessary legal changes, nor effective management regimes. It has been recognized by all the NBSAP stakeholders, that management planning and execution must be a collaborative effort between State and stakeholders.

There is a need for a permanent mandate, and support for the importance of close collaboration between Government and NGOs as well as community involvement in conservation. NGOs have played a vital role in actions for conservation of wetlands in T&T, especially with regard to the Nariva issue, through their advocacy, lobbying and media profile.

The Wildlife Section developed in 1981 from a sub-unit of the Forestry Division in the 1950s consisting of Game Wardens, supervised by a Forester, with overall responsibility held by the Director of Forestry (Chief Game Warden).

Their functions include:



Seguine vine is used in the handicraft industry for making baskets. A non-wood forest product, permits of \$1.00 are purchased for unlimited collection for one month.



River mouth, Matura, one of the prime nesting habitats of the Leatherback turtle, Dermochelys coriacea

Fighting to save Nariva

In the late 1980s, having received funding from the national Agricultural Development Bank (ADB), a small group of private rice farmers moved into state lands of the Nariva Swamp, burning large areas of the Palm Marsh forest, to plant rice. Their actions pre-empted a planned move by the state to distribute limited lands in this area for rice farming. In expanding far beyond the boundaries of the State's programme, they encroached into lands for a proposed Protected Area, and the existing wildlife sanctuary at Bush Bush. State agencies in close collaboration with the local NGO community, and spearheaded by the Pointe-a-Pierre Wildfowl Trust, kept the issue alive in the press, and remained extremely vocal on the issue. Finally the collection of over 25,000 signatures in protest of the destructive farming activities in the swamp, and the report of a Ramsar Monitoring Procedure, forced the eviction of these large squatting farmers. Subsequently, an EIA for the Nariva Swamp stressed other biodiversity and ecosystem values, economically more sustainable, than the heavily subsidized rice production.



Temporarily abandoned rice farming lands in the Nariva Swamp.

- enforcement of the Conservation of Wildlife Act 67:01
- management activities in wildlife sanctuaries
- research
- management of game and controlling over abundant wildlife
- wildlife farming ventures through its demonstration station and extension to farmers.
- managing the exploitation of species collected and kept for research, breeding, education and as pets in Trinidad.
- evaluating the impact of activities on the habitats and ecosystems.
- evaluating the socioeconomic contribution of wildlife to the national community.
- management of wildlife trade

The Wildlife Section is the centre for liaison and implementation of CITES for Trinidad and Tobago. It has incorporated a network of state agencies to aid enforcement of CITES measures, within the current limited legislative parameters. Enforcement agencies are also represented by the Police Service and the Coast Guard.

The Wildlife Section has been particularly successful in pioneering community co-management of resources in T&T through its turtle protection and Honorary Game Warden programmes. While this progressive attitude to management charts the direction that the rest of the division should also pursue, the ability of the section to maintain these programmes may be severely compromised by manpower deployment within the division.

Some areas set aside for the protection of wildlife in sanctuaries have been heavily logged and quarried, both illegally and with the acquiescence of the State, and therefore cannot be considered to be protected.

Interviews with the staff suggest that there are tremendous weaknesses in the agency. With regard to law enforcement conducted by the agency, the current staffing suggests a ratio of enforcement personnel to registered hunters of 1: 913, an extremely low ratio. The communities, who were extremely vocal on this issue, vociferously substantiated this problem of law enforcement. In addition, it is clear that the current staff lack the training to develop the kinds of habitat management and species recovery plans that are required to prevent the continued loss of the country's terrestrial biodiversity. Similarly, with respect to the sustainable harvest of the game species on these islands, it is apparent that the Section does not have the capacity to effectively monitor changes in the demographic parameters of the various game species.

The patterns in funding appropriations to the Wildlife Section also suggest a largely reactive approach to management of the country's fauna. It appears that there is currently no long-term programme to address the information, training and management needs of the section.

The National Parks Section, also a sub-unit of the Forestry Division has been evolving in response to changing needs for protected area management in T&T, but has not been afforded a legitimate structure within the Division. Their general objective in accordance with that of the World Conservation Union (IUCN) is “to protect in perpetuity those areas of the country which represent significant examples of the country’s natural heritage in such judicious ways and means which will leave it unimpaired for the benefit of future generations.” (National Parks Section, 1998b).

However, the areas under management have generally been the smallest areas of recreational and historic interest, with high public usage, a primary focus has been environmental education and sensitization in schools and communities particularly in the north east region, and the development of interpretive centres in the areas under its direct management.

Both the National Parks and Wildlife Sections obtain their staffing compliment from the main Forestry Division, as Foresters and Forest Rangers, who then have to be oriented to the different functions of these sections. Manpower deployment plans within the Division are insensitive to the particular skills that these Sections need and the necessary retraining programmes are not in place to make this transition smoothly.

Fisheries Division

The Fisheries Division is the central agency responsible for national fisheries development policy and planning, via Ministerial mandates and legislative authority under the Fisheries Act. The Division fulfills several functions in carrying out its mandate including:

- **providing extension and support services, including training of fisherfolk and marketers**
- **responsibility for conservation, stock assessment and management of the living marine resources,**
- **administering fisheries regulations,**
- **negotiating bilateral and international fisheries agreements**
- **advising the Minister and giving technical advice regarding issues related to marine fisheries, and also**
- **administering aquaculture, inland fisheries and ornamental fish farming programmes.**

The Marine Fishery Analysis Unit (MFAU) assesses the fisheries resources to inform fisheries management. It is engaged in research involving stock assessments and related management-oriented analyses in fisheries biology and economics. Activities include data collection (landings, effort, biological sampling) and development of computerized databases on fisheries resources, use and management. The research and management emphasis is on species and fisheries of primary commercial and recreational importance. The Extension and Development Unit is responsible for infrastructure and facilities, extension, awareness and community development.



Locally, rivers are very popular recreational sites. This one at Quinam Bay is used for both recreation and religious ceremonies.



Leatherback turtle *Dermochelys coriacea* found floating in Chaguaramas, with wound to its neck. Conflicting legislation still hampers efforts to protect this globally endangered species.



Even the once common iguana, is under constant pressure from hunting on public and private lands.

Other governmental, quasi-governmental, para-statal and local governmental organizations share the responsibility for the development, management and administration of marine and fishery resources and environment and related industries. The draft marine policy document (Fisheries Division, 1994) identifies 13 of these, including IMA, UWI, THA and the Ministry of Agriculture, Land and Marine Resources.

Emperor Valley Zoo

The Emperor Valley Zoo's mission states that it is an institution committed to excellence in conservation and the promotion of positive community attitudes toward wildlife and the environment. It seeks to achieve this goal by providing and efficiently managing a high standard zoological park, and allied facilities, for the purpose of education, research, captive breeding and recreation.

On November 8, 1952 the Emperor Valley Zoo opened its gates to the public. Since then the Emperor Valley Zoo has expanded and now possesses 221 species of animals and 2383 specimens. From its inception to present, this zoo has been upgrading its facilities.

The zoo's current structure is largely administrative in order to attend to zoo visitation. A proposal for re-organization has recently been developed.

Botanical Gardens

The primary goal of the Botanical Gardens is ex-situ conservation. They follow the mandate and philosophies of Botanical Garden Conservation International (BGCI) and as such their work is both local and international in its focus. BGCI was founded in 1987 to link botanic gardens as a co-operating global network for effective plant conservation. The Botanical Gardens is a member of the Caribbean regional network, and is participating in the drafting of a Regional Action Plan for the Caribbean/Latin America.

The Botanical Gardens works collaboratively with the UWI, Wildfowl Trust, communities and schools around the country, TIDCO, etc. and, for example, through public lectures and advising on horticultural practices. Partial support comes from the Friends of Botanical Gardens, a NGO established with the aim of assisting the Botanical Gardens.

The Tobago House of Assembly (THA)

The former Department of Environment, started in May 1997, was recently reorganized into the Department of Environment and Natural Resources in 1999. It serves as the coordinating agency in the THA and liaises with the EMA. Its other responsibilities are focused on water quality studies, wetlands management, studies related to tourism development and environmental education.

The Forestry Department (THA) has responsibility for managing the forest resources of Tobago. The area of Forest Reserves in Tobago is approximately 4,000 ha (CARICOM/TFAP, 1993). **Since the early 1980s**



Pink poui, *Tabebuia rosea*, landscaping the Queens Park Savannah

there has been a moratorium on timber harvesting on State Lands in Tobago. This was instituted partly in response to the serious damage inflicted upon public roads by logging activities. However, despite this existing policy, unsustainable timber harvesting continues. The Forestry Department is involved to some degree with logging activities on private lands, through the issuance of licenses for the transport of harvested logs on public roads. Limited control can be exerted on activities taking place on private land.

The Forestry Department is responsible for controlling overabundant wildlife and watershed management in Tobago. It is the island's authority for CITES and is a member of the CITES Network.

Responsibility for managing the Buccoo Reef Marine Park and the fisheries resources of Tobago is held by the Fisheries Department of the THA.

Legal Management Tools
PROHIBITED AREAS

Under the Forests Act, the designation of Prohibited Areas can be made to an area requiring additional protection from destructive practices. This designation has been used to protect wildlife species like the Leatherback Turtle during its nesting season, to curtail poaching and hunting, and, most recently, after a devastating forest fire season in 1998, to limit access to Forest Reserves that have suffered severe fire burnt losses.

The legal status, given these areas, provides general protection for the species and/or the habitat. The legal status does not infer any power or directive to develop management plans for the resources or mitigatory measures for their added protection, and as such can be regarded as lacking any clearly defined purpose or vision:

- 1) Though the wildlife sanctuaries have been declared since the 1930's-60's, they all still lack management plans, or even a basic set of activities that could be employed to protect the habitat.
- 2) Conflicting legislation for protection of sea turtles remains. Their protection on land during the nesting season has not been complemented in their marine habitat. Prohibited Areas, therefore, only offer partial protection for these creatures.
- 3) The 1998 declaration of many Forest Reserves as Prohibited Areas, to try to combat the spread of forest fires illustrates well this lack of clearly defined purpose. Prohibition, has not led to active management or shared vision of the resources, and therefore continues to leave them open to a multitude of threats. Lack of additional allocation of resources to support Prohibited Area management can be the downfall of general well-meaning efforts.
- 4) Prohibition shows that activities related to the management of the resources are reactive, rather than pro-active, since the planning mechanism is not in place. Management planning remains haphazard, fragmented and inconsistent.



Green parrot in captivity. Caged birds for the pet trade affect wild populations of our avian fauna.

Community Conservation

In an effort to protect the Leatherback Turtle *Dermochelys coriacea*, the Wildlife Section initiated a community based conservation project in 1990. Nature Seekers Incorporated (NSI) developed out of this and has become a well-organized and highly successful CBO. Among these awards are:

1992 Islands Award for the best Ecotourism project

1993 Susan Lackhan honoured at the UNEP Global 500 Awards in Beijing China.

1997 Caribbean Conservation Association Award for Best Organization

1998 British Airways Tourism for Tomorrow Award

1999 TIDCO Goldsborough Environmental Tourism Award

This recent trend of declaring some already “protected areas” (Wildlife Sanctuaries and Forest Reserves) as Prohibited Areas, illustrates the inability of Government institutions to adequately manage the natural resources under their responsibility. Management by prohibition does not confer any active management of the resource, but rather makes it easier to police any human presence. The areas where “prohibition” has worked are in those areas where there has been an active strategy of community participation in the management of the resources. Of particular note are the turtle nesting beaches in the north and east of the country.

Table 4 The enactment of Prohibited Area Status under the Forests Act

Prohibited Area	Previous designation	Proposed designation	Date Proclaimed
Aripo Savannahs	Long stretch Reserve	Scientific Reserve	1987
Caroni Swamp	Wildlife Sanctuary and Caroni Swamp Reserve	National Park	1987
Northern Range	Wildlife Sanctuary	National Park	1989
Bush Bush	Wildlife Sanctuary	National Park	1989
Trinity Hills	Wildlife Sanctuary	Scientific Reserve	1989
Matura Beach	Manzanilla Windbelt Reserve	Nature Conservation Reserve	1990
Fishing Pond	Manzanilla Windbelt Reserve	Nature Conservation Reserve	1990
Nariva Swamp	Wildlife Sanctuary and Windbelt Reserve	National Park	1993
Grande Riviere Beach			1997
23 Forest Reserves	Forest Reserves		1998
Wildlife Sanctuaries	Wildlife Sanctuaries		1999

The Environmental Management Act

Under this Act (No. 3, 2000), the EMA is in the process of designing guidelines for the declaration of Environmentally Sensitive Species (ESS) and Environmentally Sensitive Areas (ESA), with the Ministry of Agriculture, Land and Marine Resources. This is the most recent legislation that can be employed for the protection of specific species or areas for the protection of the country’s biodiversity. This potentially powerful tool is being explored to address the gaps in legislation in existing resource management agencies.

Institute of Marine Affairs (IMA)

The role of the **IMA** is to advise the Government on various aspects of the marine environment (including assistance with legal aspects) and to implement research programmes

Current nationally funded research projects include taxonomic studies on macroalgae and sponges, environmental monitoring of water, sediment and biota quality in the Gulf of Paria, inventory and monitoring of coastal wetlands and seagrass beds, analysis of nesting data for sea turtle conservation, and studies on phytoplankton, as related to pollution monitoring and identification of harmful algae. The IMA Reference Collection houses marine fish and invertebrates from our coastal waters.

The University of the West Indies collaborates with the other agencies to support marine fisheries biological research and management-oriented studies, one recent initiative being the development of a Fisheries Geographic Information System (GIS) in collaboration with the Fisheries Division. UWI also possesses the capability for fauna identification and houses some collections, engages in DNA identification, tissue culture for *ex situ* plant conservation. As a training and research institution, it possesses untapped potential for the contribution it can make to the biodiversity knowledge base and conservation in T&T, and the region.

The National Herbarium, also accommodated at UWI, houses a collection of approximately 2500 species of local flora. It is the major institution for identification of native plant species in the country.

CARINET is the biosystematic network of the Caribbean with a Secretariat housed at the Caribbean Regional Centre of CAB INTERNATIONAL, St. Augustine Trinidad. Its objective is to provide the countries of the sub-region (including Trinidad and Tobago) with the biosystematic capability (identification and classification of organisms) needed to achieve their national objectives in sustainable agriculture, biodiversity and the wise use of environmental resources.

Secondary Ministries

The principal other Ministry (in addition to the MALMR) involved with conservation of biological resources is the Ministry of the Environment, to which the Environmental Management Authority is accountable. Although the EMA has no direct responsibility for the day to day management of biodiversity, it is the focal point for the Convention on Biological Biodiversity (CBD). Of significance though, is the provisions in the EM Act, for the designation of Environmentally Sensitive Species and Areas, as mentioned above.

Non-governmental and community based organizations

There is an extremely wide variety of non-governmental organizations (NGOs) and community-based organizations (CBOs) participating in biodiversity conservation in T&T, including service clubs, environmental organizations, trusts and community groups. Some of the key players are shown in Table 5. Many of the environmental organizations belong to an



Children from the National Gas Company performing a reef story at the IMA International Year of the Reef 1997



Agalie flower *Ficus* spp. from the strangling fig tree. When dried it is known as the wood rose, and used in floral decoration.



Bracket fungi on decaying log, Arena forest.