



7.1 Introduction

Due to its over three hundred years of settlement and extensive development, Barbados has remaining a very limited stock of biological diversity compared to that which was here originally. The island was extensively denuded during the colonial period, its original vegetation cover having been replaced largely by tobacco, cotton and sugar cane plantations. It now has a highly developed physical infrastructure and one of the highest population densities in the world. The combined effect of these factors is that there now remain very few places that can be considered remote, or that closely resemble their pre-settlement state. Any such areas remaining today are under threat from the encroachment of various forms of physical and human development.

The more recent sources of pressure on the island's biological diversity include: extensive land subdivision for residential development; commercial, industrial and tourism development; and agricultural activity. These competing uses exert pressure on the few remaining natural areas, and highlight the need for strong strategies to conserve and manage what remains of the island's biodiversity.

This section will provide an overview of the current knowledge about the status of terrestrial and marine biodiversity including natural vegetation and forest, rare and endangered species, as well as coastal, near-shore and benthic communities¹.

7.2 Terrestrial Biodiversity

Due to the limited amount of forest cover and other undisturbed natural habitats, the terrestrial fauna, particularly vertebrate fauna, is sparse. Some species of mammals, birds, reptiles, amphibians and insects, are classified as rare, or endangered. Despite a substantial history of research and documentation, however, there remains a lot to be learned about the ecology, habits, and status of much of the flora and fauna of Barbados.

7.2.1 Natural Vegetation

Within thirty years of first settlement in 1627, about 80 per cent of the forest cover was cleared for agriculture. A subsequent three centuries of plantation monoculture and extensive and intensive

development activity have left the island with only pockets of its original natural vegetation. The decline of agricultural activity, particularly land under sugar cane cultivation, in the latter decades of the last century has seen a gradual regeneration of natural vegetation and secondary forests on abandoned agricultural lands, particularly in the Scotland District. The end use of gullies as a source of firewood has also allowed regeneration of natural vegetation.

(i) Major Plant Communities

The major natural plant communities have been classified according to the following types of environments, with which they are associated:

- Beaches, sand dunes and sandy beaches;
- Sea cliffs and sea rocks;
- Rocky land and inland cliffs;
- Gullies;
- Forests, and
- Coastal Wetlands.

Table 7.1 summarises the major species associated with each except gullies and forests.

The gullies are important environments for a large proportion of Barbados' biological diversity. These deep fissures in the coral cap provide more sheltered and moist conditions than occur in other parts of the island, and are host to vegetation characteristics that tend to be different from those in the ravines of the Scotland District. They tend to have a large and mature collection of native ferns, climbers, shrubs and trees as presented in Table 7.2.

The total tree cover on the island is reported to be two per cent or 800 hectares of the land area, including gullies, coastal wetlands, under-cliff woods and other planted woodlands. The Turner's Hall wood, occupying approximately 21 hectares in the Scotland District, is the least disturbed wooded area on the island and the best example of the original tropical mesophytic (semi-deciduous) forest. The under-cliff woods lie at the base of the coralline cliff that rims the Scotland District, and remnants of xerophytic coastal forests occur at Cluffs, Bath and Batts Rock.

Table 7.1: Major Plant Communities/Species

Flora (plants)	Ecosystem Types/Habitats	Representative Communities/Species
Terrestrial	Beaches, sand dunes, sandy beaches	Xerophytic vegetation <i>Philoxerus vermicularis</i> , <i>Ipoema pescaprae</i> , <i>Coccoloba uvifera</i>
	Sea cliffs	Halophytes and Grasses <i>Paspalum distichum</i> , <i>Sporobolus virginicus</i> , <i>Dactyloctenium aegypticum</i> , <i>Eleusine indica</i> , <i>Croton balsamifer</i> , <i>Jatropha gossypifolia</i> , <i>Lantana camara</i>
	Inland Cliffs	<i>Tabebuia pallida</i> , <i>Lantana involucrata</i> , <i>Peperomia magnoliifolia</i> , <i>Bryophyllum pinnatum</i>
Marine	Coastal wetlands	<i>Rhizophora mangle</i> , <i>Laguncularia racemosa</i> , <i>Nelumbo nucifera</i> , <i>Eleocharis geniculata</i> , <i>Abilgaardia mosotachya</i> , <i>Fimbristylis ferruginea</i> , <i>Sporobolus virginicus</i> , <i>Philoxerus vermicularis</i> , <i>Conocarpus erectus</i>

Source: National Biodiversity Strategy and Action Plan- Assessment of Land Resources, Terrestrial Flora and Agricultural Biodiversity, 1998.

Table 7.2: Gully Flora

Type	Species
Ferns	<i>Pteris vittata</i> , <i>Adiantum tenerum</i> , <i>Neurodium lanceolatum</i> , <i>Polypodium Latum</i>
Shurbs	<i>Tecoma stans</i> , <i>Psidium guajava</i> , <i>Clerodendrum aculeatum</i> . <i>Solanum recemosum</i> var. <i>igneum</i> , <i>Pisonia aculeata</i> , <i>Coccoloba venosa</i> , <i>Miconia laevigata</i> , <i>M. cornifolia</i> , <i>Piper filatatum</i>
Climbers	<i>Turbina corymbosa</i> , <i>Merremia umbellata</i> , <i>M. dissecta</i> , <i>M. aegyptica</i> , <i>Jacquemontia pentantha</i> , <i>Clitorea ternatea</i> , <i>Arbus preicatorius</i> , <i>Passiflora foetida</i>
Trees	<i>Ceiba pentandra</i> , <i>Maclura tinctoria</i> , <i>Hura crepitans</i> , <i>Citharexylum spinosum</i> , <i>Sapium hippimane</i> , <i>Cecropia Shreberiana</i> , <i>Inga laurina</i> , <i>Spondias mombin</i> , <i>Bursera simaruba</i> , <i>Aiphanes minima</i> , <i>Roystonea oleracea</i>

Source: National Biodiversity Strategy and Action Plan- Assessment of Land Resources, Terrestrial Flora and Agricultural Biodiversity, 1998.

7.2.2 Endemic, Rare and Endangered Plants

Of the 700 species of flowering plants known to exist on the island, only three species have so far been identified as endemic: the maypole (*Agave barbadensis*), a gully shrub (*Phyllanthus andersoni*), and a slender climber (*Metastelma barbadense*). None of these is rare or endangered. Twenty-three plants are considered to require protection at the national level. Of these 15 are known to exist at only one site and eight are considered rare or endangered. These are itemized in Tables 7.3 and 7.4.

7.2.3 Terrestrial Fauna

Compared to some of the larger Caribbean islands, the terrestrial fauna of Barbados is rather limited. The assessment conducted in preparation of the 1998 National Biodiversity Strategy and Action Plan (NBSAP) was restricted to mammals, birds, reptiles, amphibians and terrestrial invertebrates of social and economic importance, such as

insects and allied arthropods. These taxa, and the species associated with them are summarised in Table 7.5 along with the other terrestrial fauna.

The bird fauna is much more diverse than the mammalian fauna, but it is dominated by migratory and winter resident species. Barbados lies along the flyway for the eastern North American migratory bird populations, and as a result over 150 species have been recorded on the island. These include seabirds such as gulls and terns, and shore birds such as plovers and sandpipers. The more notable winter residents are summarised in Table 7.5 along with the other terrestrial fauna.

The populations of resident avifauna have declined due primarily to habitat loss since colonization, and to predation by introduced mammals such as the raccoon, mongoose and the green monkey. At least 36 species of resident birds have been confirmed. These include sixteen exotics, eight of which occur naturally due to expanded range.

 **Table 7.3: Plants Known From Only One Site**

Species	Family	Location
<i>Philodendron scandens</i>	Araceae	Turner's Hall Wood
<i>Dioscorea altissima</i>	Dioscoreaceae	Turner's Hall Wood
<i>Annona glabra</i>	Annonaceae	Turner's Hall Wood
<i>Hernandia sonora</i>	Hernandiaceae	Turner's Hall Wood
<i>Capparis hastata</i>	Capparaceae	Turner's Hall Wood
<i>Actinostemon caribaeus</i>	Euphorbiaceae	Turner's Hall Wood
<i>Cissus erosa</i>	Vitaceae	Turner's Hall Wood
<i>Conocarpus erectus</i>	Combretaceae	Chancery Lane Swamp
<i>Eugenia pseudopsidium</i>	Myrtaceae	Turner's Hall Wood
<i>Eugenia lambertiana</i>	Mrtaceae	Turner's Hall Wood
<i>Manilkara bidentata</i>	Sapotaceae	Turner's Hall Wood
<i>Sideroxylon foetidissimum</i>	Sapotaceae	Sion Hill Gully
<i>Forestiera rhamnifolia</i>	Oleaceae	Joes River Forest
<i>Vitex dicarciata</i>	Verbenaceae	Joes River Forest
<i>Strumpfia maritima</i>	Rubiaceae	Gemswick

Source: National Biodiversity Strategy and Action Plan- Assessment of Land Resources, Terrestrial Flora and Agricultural Biodiversity, 1998.

Table 7.4: Rare and Endangered Plants

Species	Family
<i>Coccothrinax babadensis</i>	Palmae
<i>Spiranthes lanceolatus</i>	Orchidaceae
<i>Talinum fruticosum</i>	Portulacaceae
<i>Zanthoxylon spinifex</i>	Rutaceae
<i>Cedrela odorata</i>	Meliaceae
<i>Quaraibea turbinata</i>	Bombacaceae
<i>Guazuma ulmifolia</i>	Bombaceae
<i>Psychotria microdon</i>	Rubiaceae

Source: National Biodiversity Strategy and Action Plan- Assessment of Land Resources, Terrestrial Flora and Agricultural Biodiversity, 1998.

Table 7.5: Terrestrial Fauna

Taxa	Species	Origin/Status
Mammals	Rats (<i>Rattus rattus</i> , <i>R. novogicus</i>) Green monkeys (<i>Cercopithecus aethiops sabaesus</i>) Mongoose (<i>Herpestes javanicus</i>)	Introduced and common
	Raccoon (<i>Procyon gloveralleni</i>), Hare (<i>Lepus capensis</i>)	Introduced and Rare
	Bats - six species <i>Monophyllus plethodon</i>	Indigenous Endemic sub - species
Birds	Osprey (<i>Pandion haliaetus</i>), Great blue heron (<i>Ardea herodias</i>), Little blue heron (<i>Floria caerula</i>), American redstart (<i>Setophaga ruticilla</i>).	Migratory (winter resident)
Reptilia	<i>Mastigodryas bruesi</i>	Regularly sighted
	Worm snake (<i>Leptotyphlops bilineata</i>)	Rarely seen but presumed extant
	Grass snake (<i>Liophis pfeufuscus</i>)	Endemic, not sighted since 1961, presumed extinct
	Tree lizard (<i>Anolis extremus</i>), Leaf-toed gecko (<i>Phyllodactylus pulcher</i>)	Endemic, <i>A. extremus</i> common, <i>P. pulcher</i> rare
	Teiid ground lizard (<i>Kentropyx borkiana</i>), Small silver and black ground lizard (<i>Gymnophthalmus underwoodi</i>), Gecko (<i>Hemidactylus mabouia</i>)	Other extant species
	Giant tortoise (<i>Geochelons sp</i>)	Extinct
	Red - footed tortoise (<i>Geochelones carbonaria</i>)	Introduced, captive bred
Amphibians	Cane toad (<i>Bufo marinus</i>)	Introduced; abundant and widespread.
	Whistling frog (<i>Eleutherodactylus johnstonei</i>)	Indigenesness controversial; prolific
Insects	Approximately 1 320 species	No data

Source: National Biodiversity Strategy and Action Plan- Assessment of Land Resources, Terrestrial Flora and Agricultural Biodiversity, 1998.

7.3 Impacts on Terrestrial Diversity

Plant communities provide habitats for terrestrial fauna. Though the value of these areas for roosting, nesting, feeding and protection of faunal species has not been quantified, the highly integrated nature of the ecosystems means that factors that negatively impact one aspect of the system would have repercussions for others.

The major threats to biodiversity continue to be most types of physical development. In the tourism sector the construction of hotels and marinas threaten native plant communities and nesting habitat for birds and sea turtles, inter alia. Golf course development also poses a threat in the areas under consideration. So does the introduction of exotic species. Golf course development also poses a threat in that the areas under consideration often include abandoned agricultural lands that are being recolonised by natural vegetation.

Barbados has already suffered from the introduction of three predators of major significance to native avian and reptilian fauna, the green monkey, the mongoose and the cane toad. The mongoose and cane toad are largely responsible for the likely extinctions of *Liophis perfuscus* and *Mabuya mabouya*. The introduction of further exotic species into the wild is also potentially problematic.

Continued subdivision of marginal lands for residential development will also impact on recolonized locations. While there is no immediate threat to beach, dune and sandy bushland plant communities from residential developments, some existing development approvals will destroy locations such as the Chancery Lane wetlands if implemented. Driving vehicles on beaches causes considerable damage to beach vegetation and has severely impacted Long Pond, Batts Rock and several other beach areas. In addition, the repeated proposals for clearing illegally dumped garbage from gullies and for the creation of trails could place gully species at risk if not carefully implemented.

Free range grazing by cattle, sheep and goats has been a historic practice in rural Barbados.

While no data is available by which to evaluate the impacts of this practice, it has been suggested that grazing suppressed the development of some shrubs and trees in gullies, thereby allowing grasses and other herbaceous plants to dominate. The diversity and abundance of vegetation on the landward side of the East Coast Road has been substantially affected by grazing.

Finally, over 300 years of plantation agriculture have reduced the extent of natural systems to small isolated patches, and created several monospecific agro-ecosystems, the most persistent of which has been sugar cane.

This long history of cultivation has contributed to decline in soil fertility. Subsequent increases in inputs of chemical fertilizers and pesticides as a means of improving productivity, have had unavoidable impacts on terrestrial flora and fauna. At the same time, agricultural research has contributed to an increase in the number of genomes of selected food crops for commercial exploitation, grasses for pasture improvement, and the propagation of helpful parasites for biological pest control.

7.4 Freshwater and Marine Biodiversity

The assessment of coastal and marine resources in its general context, which includes some aspects of marine biodiversity, is presented in the section on coastal and marine resources. Here a more detailed look will be taken at the status of the biodiversity of marine and freshwater ecosystems.

There are several marine and freshwater ecosystems that are known to support a rich diversity of species. These include wetlands and water catchments, rocky intertidal areas, seagrass beds and coral reefs. The marine component of the National Biodiversity Strategy and Action Plan² states that 990 genera and 1 548 species of organisms have been identified in these ecosystems (Table 7.6), and that several organisms have not yet been identified at the species level.

7.4.1 Wetlands and Water Catchments

As noted elsewhere, Graeme Hall swamp is the largest remaining wetland in Barbados. Examples of

	78		
	54		
	259		8 organisms not identified beyond family
	155		3 organisms not identified beyond family
	172		
	88		14 organisms not identified beyond family
	10		
	3		
	25		
	60		9 organisms not identified beyond family
	4		
	82		

its biodiversity have already been presented. A more detailed list of the fishes, crustaceans, insects, amphibians and aquatic flora is presented in Appendix 2. The most recent available study of the status of the swamp with respect to water quality³ reported that the lake was "hypertrophic" due to high chlorophyll and nutrient levels, but that coliform levels were "within desirable limits" to permit swimming, fishing and other recreational activities. The water in the eastern canals, were highly alkaline, hard and nutrient rich.

The surface freshwater catchments for which limited biodiversity assessments have been undertaken are Bawdens, Long Pond, Green Pond and Hillaby, Bathsheba, Consett, Codrington, Three Houses and Culpepper. The status of the catchments is unknown, but studies are necessary since it is believed that they may be impacted by agricultural chemicals in drainage water. The known biodiversity in permanent and temporary freshwater catchments is dominated by several species of shrimp such as *Atya innocuous*, *Palaemon aztecus subtilis*, *Palaemon pandaliformis*, and others. (See Appendices 3a and 3b).

7.4.2 Rocky intertidal area

Rocky intertidal area straddles the marine and terrestrial habitats where the shore is washed by the sea at low or high tides. It includes rocky cliffs, pebble beaches, low-lying platforms, and tide-pools, which provide habitats for a diverse collection of living organisms including algae, Cnidarians, Crustaceans, Mollusks, Annelids, Echinoderms and Fish. Lists of species found in these habitats are provided in Appendices 4a to 4d.

7.4.3 Sea grass beds and coral reefs

The status of sea grass beds and coral reefs has also been presented in the section on coastal and marine resources. With respect to the coral reefs, it is notable that quantitative surveys record increases in filamentous algae, a decrease in coralline algal cover and declining reef fish numbers. On the patch reefs there has been a significant loss of area covered by mono-species hard coral, while multi-species hard coral has shown signs of damage from boat moorings, bleaching and sediment smothering in several areas. Surveys have also indicated that multi-species soft coral patch reefs along the southwest coast are being seriously degraded and fish abundance has

declined. This is attributed to deteriorating water quality and to over-fishing.

The bank reefs support rich and diverse colonies of hard and soft corals, a high density of sponges and a low density of macroalgae. It is reported (Delcan, 1994) that the bank reefs are in reasonably good health, although there is evidence of physical and sediment damage as well as over-exploitation. Sea turtles, particularly hawksbills, can be seen regularly on the bank reef

7.4.4 Benthic communities

The Benthic communities include a sponge and coral community, one that is rich in coelenterates, mollusks and echinoderms, and a community dominated by mollusks. Appendix 5 provides a sample of some of the biodiversity species of these communities, as well as species associated with the dominant fisheries.

7.5 Impacts on Marine Biodiversity

The National Biodiversity Strategy and Action Plan (NBSAP) reports that there are indications that the marine ecosystem is under threat primarily from land based sources of pollution transported by surface water runoff, groundwater discharge and direct discharge or dumping into the aquatic environment. The coastal and marine habitats and their flora and fauna are being degraded primarily by deteriorating water quality resulting from increased sedimentation, eutrophication and sewage pathogens, localized increases in temperature, decreases in salinity and perhaps increases in toxins, overfishing, physical damage and use of destructive fishing methods.

Freshwater ecosystems such as the Graeme Hall swamp are also under severe impact from human activity. Table 7.7 summarises the types and sources of pollution negatively impacting marine and freshwater ecosystems.

7.6 Policy Response

Until very recently, any policy relating to the conservation and management of biological diversity was integral to land use planning policy in the case of terrestrial resources, and marine legislation which

pre-dated the Coastal Zone Management Act (1998) and the Marine Pollution Control Act (1998). Today the Town and Country Planning Act (cap 240) 1963, is still pivotal to the national policy response and legislative strategy for protection of biological resources. However, several more focused initiatives have been taken both within the revised Physical Development Plan (1998), and the NBSAP (2000).

7.6.1 The Physical Development Plan, 1998

The Town and Country Planning Act provides the central mechanism for the regulation of land use, and in this regard it is relevant to the protection of biodiversity. It has in the past been used where possible to prevent encroachment of physical development into ecologically sensitive areas, consistent with the Physical Development Plan. The revised Physical Development Plan (1998), however, articulates the following among a set of objectives regarding the conservation and management of biodiversity:

- Establish National Heritage Conservation Areas for the protection of significant ecosystems such as remnant forests, wetlands, dunes, savannahs, and marine features;
- Protect, maintain and enhance natural heritage features in urban environments and seek to minimize adverse impacts arising from new development.

Other specific references to biodiversity include:

- Preservation of vegetation through incentives to increase tree cover in urban, rural and coastal areas;
- Creation of National Forest Candidate Sites and protection of existing forests, emerging forests and forest linkages in the National Park;
- Restriction of developments in forested gullies, and
- Requirement of tree preservation and replacement plans as part of the supporting docu-

ments for all development in the Integrated Coastal Zone Management Area, and enforcement of the Trees Preservation Act

A system of National Parks and Protected Areas has also been proposed. A comprehensive plan for its designation, including the institutional, legislative and management framework and plan for its implementation, has been developed and is awaiting final approval within the wider context of the Physical Development Plan. Unlike most of our Caribbean neighbours, protected areas for terrestrial biodiversity do not currently exist in Barbados; even to protect the critical habitats used by our most endangered species (e.g. sea turtles, snakes and lizards).

7.6.2 The Environmental and Natural Resources Management Plan and Draft Environmental Management Act

A major product of the Environmental Management and Land Use Planning for Sustainable Development Project (EMLUP), completed in 1998, was the preparation of an Environmental Management Plan (EMP) for Barbados, which is embodied within the Draft Environmental Management Act (EMA) that was also prepared under that study. The EMP identifies the following issues and opportunities that need to be addressed as a consequence of the pressures and impacts on biological diversity:

- Maintaining ecological viability of remaining natural habitats that are represented generally in small, isolated areas, including areas of natural forest (e.g. Turners Hall Wood, Hackleton's Cliff, Foster's Funland, Archer's Bay, Consett Bay). This should include projects designed to remove damaging introduced predators from sensitive areas;
- Maintaining the integrity of scenic vistas and areas, including the Scotland District, ridges, caves, coastal cliffs and public parks;
- Preservation of critical habitats for migratory and nesting species, as well as indigenous species including wildfowl, sea turtles and snakes;

Table 7.7: Source of Pollutants in Marine and Freshwater

	<ul style="list-style-type: none"> . nutrients from fertilizers, animal waste . pathogenic bacteria from animal waste . suspended matter from exposed soil . toxins from pesticides and herbicides
	<ul style="list-style-type: none"> . organic contaminants creating high biological oxygen demand (BOD) . point source discharge of effluent from sewage treatment plants, waste from rum distillery . sediments from sewage effluent . nutrients (nitrates and phosphates) causing eutrophication . chlorinated water from swimming pools . untreated domestic waste . discharge of heated water from power plant
	<ul style="list-style-type: none"> . nutrients and pathogenic bacteria from domestic waste . suspended matter from exposed soil during construction . seepage of nutrients into the coastal ground water from suck wells . toxins (heavy metals, chlorine, petroleum and other hydrocarbons)
	<ul style="list-style-type: none"> . use of dynamite in fishing . ghost fishing by lost fish traps . anchor damage from ships . storms and hurricanes
	<ul style="list-style-type: none"> . leachate containing nitrates, organic contaminants and heavy metals

- Rehabilitation of degraded natural systems including gullies, forests and dune areas;
- Control of the capture of threatened species including sea turtles and snakes;
- Control over shooting ponds;
- Improved understanding of the need for protection of reptiles and freshwater fish and shellfish;
- Improved control over the felling of trees during construction and clearance;
- Control over set fires, including for clearing fields;
- Controlling the export of rare and endangered terrestrial and marine species; and
- Control over the importation of non-indigenous species of flora and fauna.

7.6.3 The Coastal Zone Management Plan

The Coastal Zone Management Plan (CZMP), which is embodied in the 1998 Coastal Zone Management Act, provides for the conservation and management of coastal and marine biodiversity. It also provides for the designation of marine reserves, which may include submarine areas along with adjacent land that is ecologically linked, as restricted areas.

In addition, the CZMP provides for the conservation and management of Natural Heritage Conservation Areas (OS 2) and Coastal Landscape Protection Zones (OS 3) established under the 1998 Physical Development Plan. The CZMP also articulates the following policies:

- Preservation of existing vegetation by landowners through encouragement from the Coastal Zone Management Unit (CZMU);
- Protection and rehabilitation guidelines for coastal and marine habitats including coral reefs, seagrass beds, ravines and other freshwater ecosystems and littoral vegetation;
- Cooperation between the CZMU and the

Fisheries Division in implementing the CZMP provision for regulating shallow-shelf reef and coastal pelagic fisheries, and for managing coastal habitats such as coral reefs and sea grass beds;

- Protection and management of turtle nesting sites, and
- Determination of threshold levels for marine water quality.

7.6.4 Fisheries Management Plan (1997), Fisheries Act (1993/96)

The Fisheries Management Plan (FMP), which is prepared in accordance with the Fisheries Act, provides for protection of the marine environment and conservation of marine biodiversity through the following:

- Integrating the fishing industry into the policy and decision making process on fisheries;
- Promoting the development and use of fishing gear and practices that minimize waste in the catch of target species and minimize by-catch of non-target species;
- Effective monitoring, control and surveillance of fishing activities;
- Protecting and restoring populations of endangered marine species, and
- Preserving rare and fragile ecosystems and ecologically sensitive areas, in particular coral reefs, estuaries, mangroves, seagrass beds, and spawning and nursery areas.

7.6.5 National Biodiversity Strategy and Action Plan 1998

Finally, and perhaps most pertinently, the Ministry of Physical Development and Environment has recently concluded a consultancy for the preparation of a country study on biodiversity, which involved the preparation of a Draft National Biodiversity Strategy and Action Plan (NBSAP). The study consolidated the body of documented knowledge on all aspects of the island's biodiversity, and established a database of terrestrial flora

and fauna. The draft NBSAP identifies priorities and initiatives for conserving biodiversity, as well as appropriate methodologies for implementation, and proposes management plans for specific species, including alien and exotic species.

7.7 Conclusion

The policy responses detailed above indicate the seriousness with which the Government of Barbados intends to approach the management of its very limited and pressured biodiversity resources. It is time that actions to implement these policies be undertaken in order to avoid further degradation of natural habitats and loss of native species. It is expected that, ultimately, a consolidated institutional structure to achieve a well-integrated approach to the management of biodiversity will be developed. Such an approach is laid out in the proposed Institutional Arrangements for Environmental Management and Land Use Planning in Barbados, another product of the EMLUP study, which proposes the creation of a Natural Heritage Unit responsible for the environment. With such a structure in place, supported by the legislative power of the proposed Environmental Management Act, the groundwork will be laid for achieving the goals of sustainable biodiversity management.



Notes

1. Most of the information presented in this section of the report is derived from the recently completed country study of biodiversity, which included preparation of a National Biodiversity Strategy and Action Plan (1998) and the Barbados National Report to the Conference of the Parties to the Convention on Biological Diversity (2000), both of which were prepared for the Government of Barbados by Simmons and Associates Inc. The latter included an extensive survey of the research and literature available on the Biodiversity of Barbados.
2. Simmons and Associates, 1998, National Biodiversity Strategy and Action Plan Technical Report: Marine Resources. Prepared for the Government of Barbados, Ministry of Health and the Environment.
3. For this Simmons and Associates cited Catteneo *et al.* (1988).