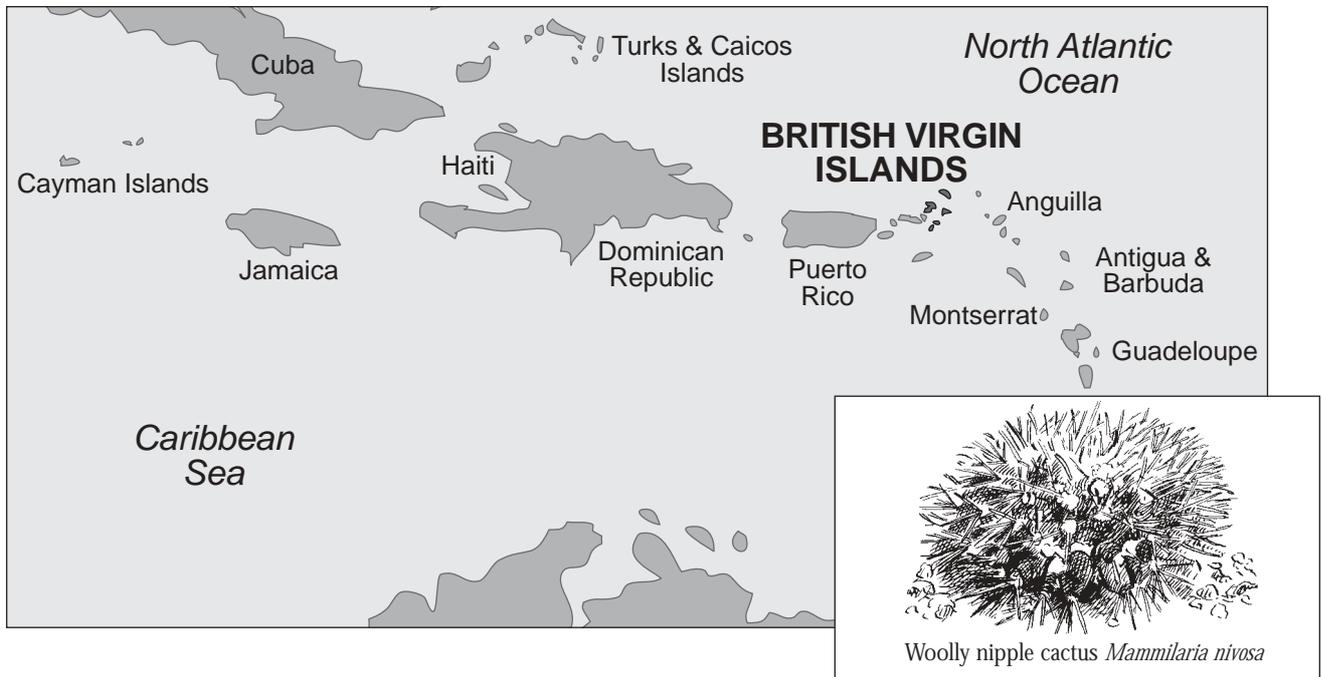


7: British Virgin Islands



Introduction

The British Virgin Islands (BVI) form part of the Puerto Rican Bank in the eastern Caribbean Sea. There are approximately 40 islands in the group. Most of the islands were uplifted from submerged volcanos and are hilly with steep slopes. By contrast, Anegada is an emergent coral limestone platform. This island is flat with a maximum altitude of 8 m. The combined land area of the islands is 153 km². The largest islands are Tortola (54 km²), Virgin Gorda (21 km²), Anegada (38 km²) and Jost van Dyke (9 km²).

The population of BVI is 17,733 (1991). Over the past ten years there has been a 47% increase in population, mainly as a result of immigration. Tortola is the most developed island and has a population of over 13,500. The main economic activity is now tourism, which has expanded considerably in recent years. Yacht chartering is especially important. The offshore financial services sector is also significant. Development of the tourist industry has had an impact on natural

habitats, putting particular pressure on coastal wetlands and mangrove communities (Scott & Carbonell 1986). As the tourism industry is based on the marine environment, this was a significant factor leading to the development of protected areas in the islands.

A conservation policy was included in BVI's national report for UNCED and approved by its Executive Council (Anon. 1992). The stated policy is "to manage the human use of the biosphere so that it may yield the optimum sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations." Detailed objectives and goals are set out in this UNCED report.

International obligations relevant to nature conservation

British Virgin Islands is included in the UK's ratification of the following international

agreements:

- Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention)
- Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)
- Convention on Biological Diversity (CBD)
- International Convention on the Regulation of Whaling
- Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention)— Protocol on Specially Protected Areas and Wildlife

Implementation

Ramsar: BVI joined the UK's ratification of Ramsar in February 1991. The largest wetland area in the British Virgin Islands is the saline lagoon complex at the west end of Anegada, comprising Flamingo Pond, Bones Bight Pond and Red Pond. This area is protected as the Flamingo Pond Bird Sanctuary. It is regionally important as a representative habitat, being one of the largest, relatively undisturbed saline lagoons in the Lesser Antilles, and it is internationally important because of the presence of endemic species and migratory birds. The island of Anegada as a whole is considered to be a priority area for the conservation of mangroves, salt ponds and coral reef habitats within the Lesser Antilles (Putney 1982). Horseshoe Reef, which lies to the south east of the island is one of

the most extensive and diverse reefs of the Caribbean and is protected under the 1990 Order under the Fisheries Ordinance. It is expected that the BVI Government will declare the Western Salt Ponds of Anegada as their first Ramsar site in time for the 7th Conference of Parties in May 1999.

The international conservation importance of Anegada and Horseshoe Reef has been widely recognised and a draft World Heritage nomination was prepared for the Nature Conservancy Council in 1988. Following consultation with the BVI Government it was decided not to proceed with the nomination. A draft information sheet on the Western Salt Ponds of Anegada, in standard Ramsar format, has been prepared by the Conservation and Fisheries Department (Hepburn *et al.* 1992).

Other wetland areas have been identified as potential Ramsar sites (Hepburn *et al.* 1992; Jarecki 1998)

CITES: BVI implements CITES by means of the Endangered Animals and Plants Ordinance 1976. Conservation and trade in the queen conch *Strombus gigas* is addressed through CITES and the Fisheries Act, 1997. Black coral *Antipatharia spp.* has been worked locally in the past but is now protected by BVI legislation and Appendix II of CITES which allows limited, but regulated, trade.

Protected areas

Protected areas in BVI are designated under various Ordinances and with varying degrees of protection.

- **The National Parks Ordinance No. 29 1961 as amended No. 3 1978:** established the National Parks Trust, and provided for the creation of protected areas in the form of national parks to be managed by the Trust.
- **The Marine Parks and Protected Areas Ordinance No. 8 1979:** provides for the creation of a range of categories of protected area, including multiple-use management area or

marine parks and protected area.

- **The Protection of Trees and Conservation of Soil Ordinance Cap. 86, 1954:** provides for protected forestry and water areas, and the Trust currently manages Sage Mountain Protected Forest created under this Act.
- **The Wild Birds Protection Ordinance Cap. 98 1959 as amended 1980:** authorises the Governor to declare protected areas specifically as bird sanctuaries. The provisions of this Ordinance also apply to birds in any marine park or protected area designated under the Marine Parks and Protected Areas Ordinance No. 8.

Other relevant legislation includes:

- **The Fisheries Ordinance No. 18 1979:** the Fisheries Ordinance authorises the Minister of Natural Resources to declare any water area within the exclusive fishing zone (200 miles) to be a protected area. All fishermen must obtain licences and fisheries officers are empowered to confiscate fishing equipment and impose fines. In May 1990 Horseshoe Reef was declared a protected area under the Fisheries Ordinance.
- **The Beach Protection Ordinance 1985.**
- **The Bird Sanctuary (Flamingo Pond, Anegada) Order 1977.**

Several laws deal with protected areas, and this was one of a number of reasons which led to the Government requesting technical assistance from the Organization of Eastern Caribbean States in strengthening and updating its existing environmental legislation. A report was subsequently prepared on the existing legislation (Lausche 1986). Since then two new pieces of environmental legislation have been drafted: a new Protected Areas and Wildlife Act 1987, and a Coastal Conservation and Management Act 1991. This comprehensive legislation is expected to make a major contribution to improving the territory's capacity for sound environmental planning and

management (BVINPT/ECNAMP 1988).

The Protection of Trees and Conservation of Soil Ordinance (Cap. 86) lacks regulations, but contains stronger provisions on offences, enforcement, and legal proceedings than does the National Parks Ordinance. While bye-laws or regulations may be enacted for the management of national parks and the control of public activities under either Act, Lausche (1986) describes the present lack of regulations as a major deficiency. Regulations were passed in 1991 prescribing permitted activities in marine parks and a schedule for fees.

Since 1980 the development of marine parks and protected areas has been the subject of collaboration between the Government and the Eastern Caribbean Natural Areas Management Programme. An initial survey resulted in eight marine areas being identified as warranting protection (Jackson 1981). Following endorsement of these areas by the Government, the project was extended into a second phase of research, planning and implementation. Two particular concerns were to integrate marine and terrestrial components of the protected area system, and to provide recreational areas for the local population. A parks and protected areas system plan for the British Virgin Islands, which identifies the goals, objectives and management requirements of the national parks and protected areas system, has been prepared (BVINPT/ECNAMP 1986).

At present, terrestrial parks cover about 2% of the land area. The 'system plan' sought to incorporate the existing parks into a larger system of comprehensive ecological units, in order to preserve the most important areas of the natural and cultural heritage. Twelve additional parks were proposed, but none of these has yet been declared. This is partly due to the approach adopted in BVI of preparing management plans and strengthening institutions in advance of park declaration (Cambers 1991).

Anegada has been identified as an internationally important wildlife site, with endemic and endangered plant and animal species and important wetland habitats. It has the largest reef complex in the Lesser Antilles, with Horseshoe Reef forming an extension of the fringing reef surrounding the island. Horseshoe Reef is now protected and managed for conservation; several proposals are being considered for the development of a terrestrial park for Anegada. The creation of a sanctuary for the BVI endemic and endangered Anegada rock iguana *Cyclura pinguis* within the proposed national park is currently being considered, and a management plan for the park is being prepared. The plan currently includes all central ponds plus the entire eastern end of the island, including the east-end ponds. The re-introduction of the endangered Caribbean flamingo *Phoenicopterus ruber ruber* has been a success. A total of 20 flamingoes were released on Anegada from the Bermuda Aquarium, Museum and Zoo in 1991. Later two died, but four young flamingos flew in and took up residence with the flock. In 1995, four pairs of the original introduced stock bred and raised four young. In 1997 ten pairs bred and raised eight young (Jarecki *in litt.* 1998).

Flamingo Pond Bird Sanctuary is an existing protected area at the west end of Anegada Island (18°44'N, 64°22'W). Established 1 September 1977, the sanctuary has an area of 449 ha and is Government owned.

Habitats of major significance

The British Virgin Islands comprise just over 40 islands, small cays and rocks, the marine area of the territory being well over five times the size of the land mass. Geologically, the islands belong to the Greater Antilles and, with the United States Virgin Islands, rise from the Puerto Rican shelf, here lying about 65 m below sea level. Most of the islands (with the exception of Anegada) were uplifted from submerged volcanoes and are formed from volcanic debris and metamorphosed sediments. The islands are dominated by steep-sloping hills. Historically BVI was a centre of sugar cane

production but now agricultural production is deterred by the limited water-holding capacity of the light soils, erratic rainfall patterns, and insufficient forest cover to retard steep slope erosion. The dominant natural vegetation is cactus scrub and dry woodland, although much of this has been modified.

The coastlines of BVI are generally rocky. Coral reefs surround many of the islands (UNEP/IUCN 1988; Walters 1984). North coasts of the islands are typically beaches, sometimes with mangrove ponds lying behind them. Fringing mangroves and mangrove lagoons dominate the more sheltered south coasts.

A survey of critical terrestrial and mangrove areas of BVI was carried out in 1981. In 1986 mangroves were designated a critical natural resource at a coastal zone management workshop. Following this, a Mangrove Management Programme was initiated with technical assistance from OECS-NRMU. Mangroves and associated wetlands have been mapped by the Conservation and Fisheries Department under this programme. Field work included noting wildlife species and disturbance at each site. Information was also compiled on land ownership and level of protection. Each site has been categorised in terms of ecological and socio-economic criteria and priorities set: critical, moderate and not critical for conservation (Blok-Meeuwig 1990). Monitoring of mangrove growth began in 1991 at four sites on Tortola with the collection of baseline data at Paraquita Bay and Lagoon, Hodge's Creek and Sea Cow's Bay (Overing 1991).

A habitat atlas of the coastal and marine areas has been prepared for the British Virgin Islands (Blair Myers *et al.* 1993) based on aerial photography, supported by the UK Government and administered through the Department of Conservation and Fisheries. The GIS-based atlas is designed to record information on the extent and location of the key resources for conservation and planning purposes. The coastal inventory shows coastal development, marinas, jetties, beaches,

dunes, mangroves, seagrass beds and coral reefs for the entire BVI.

Salt ponds of BVI are described by Jarecki (1991).

Species of major significance

Biodiversity assessment

Published information on the flora of the British Virgin Islands is generally included in accounts covering Puerto Rico and the Virgin Islands. An unpublished account of the flowering plants of BVI, prepared by J. Smith, which included an outline of the vegetation, descriptions of the endemic plants and summary of recorded species, is referred to in Davis *et al.* (1986). The conservation status of the fauna of BVI is described by Lazell (1980) and concentrates on butterfly, reptile, amphibian and bird species.

Plants

Endemic plants of BVI include the following:

Acacia anegadensis (Leguminosae): a dense, thorny evergreen acacia, endemic to Anegada, it is

known locally as 'pokemeboy' and is planted for shade.

Cynanchum anegadense (Asclepiadaceae): a 'swallow wort'.

Sida eggersii (Malvaceae): the only known large populations of this species are on Guana and Ginger but small populations are reported from Tortola, Great Thatch and Dead Chest. The species formerly occurred on Puerto Rico but has not been seen there since early this century (Kraus *in litt.* 1998).

Species endemic to BVI and US Virgin Islands include Egger's galactia *Galactia eggersii*, and cowage cherry *Malpighia woodburyana*. Both these species are potentially of conservation concern because of their restricted distribution and as such require monitoring (Kraus *in litt.* 1998).

Over 20 plant species are recorded as endemic to the Virgin Islands and Puerto Rico including the following plant species, some globally threatened, which are found in BVI (Center for Plant Conservation 1992).

Table 7.1 Total mangrove swamp areas; including associated habitats such as ponds and salinas

Island	No. of mangrove swamp systems	Mangrove swamp area (ha)
Beef Island	10	35.72
Anegada	9	439.39
Jost van Dyke	1	1.99
Tortola	29	101.18
Virgin Gorda	4	8.61
Total	53	586.89

Sources: Anon. 1992; Blok-Meeuwig 1990.

Cordia rupicola (Boraginaceae) (E): a shrub that is restricted to one population in the Guanica Forest in Puerto Rico, and may now be lost (Kraus *in litt.* 1998) and one population on Anegada, where grazing is the major threat.

Maytenus cymosa (Celastraceae) (EN): a tree species of Puerto Rico and the Virgin Islands, in BVI it is largely restricted to Gorda Peak which has the largest known population of this species where at least 100 plants persist (Oldfield, Lusty & MacKinven 1998). One specimen has been recorded along the coast at Savannah Bay. Part of the population at Gorda Peak may have been affected by a fire in June 1997 which burnt about 25% of the Park (Kraus *in litt.* 1998).

Sabal causiarum (Palmae): a palm species which is restricted to Puerto Rico and the Virgin islands. In BVI, 116 individuals have been reported on Guana Island, and 14 individuals on Anegada.

A further 12 plant species are restricted to Puerto Rico and the Virgin Islands, some are locally threatened. BVI has 15 species of cacti including *Opuntia repens*, which is endemic to Puerto Rico and the Virgin Islands and is not currently considered to be threatened in a regional context (Areces-Mallea 1997), the woolly nipple cactus *Mammillaria nivosa*, which is recorded as endangered in the Virgin Islands (Hunt 1992) but is not considered to be threatened in a regional context (Areces-Mallea 1997), and *Selenicereus urbanii* which is restricted to Guana within BVI (Kraus 1991).

The orchids of BVI are included in Ackerman (1995). Together with all species of cacti and orchids, lignum vitae *Guaiacum officinale* (EN) is also covered by the provisions of CITES. Lignum vitae is extremely rare in BVI (Kraus *in litt.* 1998).

Invertebrates

The following butterfly species are endemic to Anegada (Goodyear *in litt.* 1994):

A satyrine butterfly *Calisto anegadensis*. newly

described in 1991, this endemic butterfly occurs in the area proposed for Anegada National Park. A hesperiid butterfly *Copaodes eoa*. described in 1991, which also inhabits the proposed Park area.

Reptiles and amphibians

BVI has a range of animal species of regional and global conservation significance. The herpetofauna of BVI is particularly noteworthy. There are 24 taxa recorded, of which a quarter are endemic. The Anegada rock iguana *Cyclura pinguis* originally occurred on Puerto Rico and Saint Thomas, as well as Anegada. The range of this critically endangered species is now restricted to Anegada with a small relocated population on Guana Island.

Other endemic reptiles and amphibians include:

Anegada ground snake *Alsophis portoricensis subsp. anegadae*. occurs in Virgin Gorda Peak Forestry Park.

An anole *Anolis ernestwilliamsii*. restricted to Carrot Rock.

A frog *Eleutherodactylus schwartzi*. restricted to Virgin Gorda, now extinct on Tortola, St John (USVI).

Virgin gorda gecko *Sphaerodactylus parthenopion*. occurs on Tortola and Virgin Gorda.

Virgin gorda worm snake *Typlops richardi naugus*. occurs in Virgin Gorda Peak Forestry Park.

Anegada worm snake *Typlops richardi catapontus*. occurs within Flamingo Pond Bird Sanctuary.

Globally threatened non-endemic reptiles occurring in BVI are:

Roosevelt's giant anole *Anolis roosevelti* (CR): distribution: Puerto Rico, Virgin Islands (British), Virgin Islands (US).

Virgin Islands tree boa *Epicrates monensis granti* (EN): distribution: Puerto Rico, Virgin Islands

(British), Virgin Islands (US). This tree boa occurs within the Sage Mountain National Park, Tortola.

The population of marine turtles in the BVI is reported to have declined drastically over recent decades (Groombridge and Luxmoore 1989; Eckert, Overing & Lettsome 1992):

Green turtle *Chelonia mydas* (EN): nesting is reported from the following islands: Anegada, Beef Island, Cooper Island, Camanoë, Great Tobago, Great Thatch Island, Guana Island, Mosquito Island, Norman Island, Peter Island, Jost van Dyke, Prickly Pear, Sandy Spit, Sandy Cay, Tortola, Virgin Gorda, Necker Island and Scrub Island (Groombridge and Luxmoore 1989). Foraging turtles have been reported from Anegada, Tortola, Virgin Gorda, and Norman's Island in moderate numbers (Groombridge and Luxmoore 1989).

Hawksbill turtle *Eretmochelys imbricata* (CR): hawksbill nesting is reported to occur on the same islands as the green turtle (Groombridge and Luxmoore 1989). Foraging areas for this species include East End on Tortola, the north-east end of Virgin Gorda, and the east and west coasts of Anegada.

Leatherback turtle *Dermochelys coriacea* (EN): the nesting population has continued to decline into recent times, with less than ten females nesting annually in the late 1980s to early 1990s. Although rare, this species was still harvested in the traditional 'trunking' fishery during the early 1990s (Overing 1992).

Loggerhead turtle *Caretta caretta*, (EN): occasionally reported foraging around the BVI (Overing 1992).

Birds

Globally significant birds of BVI include:

Bahama pintail *Anas bahamensis*: nests at the salt pond on Guana and probably on other salt ponds in BVI.

Black-necked stilt *Himantopus mexicanus*: a breeding population occurs on Guana.

Bridled quail dove *Geotrygon mystacea* (LRnt): a rare species throughout the central Caribbean; the population on Guana is probably the densest known in this region.

White-crowned pigeon *Columba leucocephala*: Florida and West Indies.

Puerto Rican screech owl *Otus nudipes*: this species is confined to Puerto Rico, US Virgin Islands, BVI.

Mammals

Humpback whales *Megaptera novaeangliae* (VU) are reported to migrate off the British Virgin Islands (Gricks, 1994). Other species which may occasionally be encountered include sei whales *Balaenoptera borealis* (EN) and sperm whales *Physeter catodon* (VU).

Species protection

- **The Wild Birds Protection Ordinance, Cap 98 195:** this protects 24 species of birds and the eggs of all bird species. It also lists game species and specifies a closed season from 1 February to 15 July. The Ordinance is in need of revision. At present both the protected and game species are designated only by their local names and this leads to ambiguities. 'Wild duck' on the game list, for example, encompasses all nine duck species, including the globally threatened West Indian whistling duck *Dendrocygna arborea*, the ruddy duck *Oxyura jamaicensis*, and the masked duck *Oxyura dominica*.
- **Protection of Endangered Animals, Plants and Articles (Removal and Possession) Ordinance 1981:** this legislation seeks to prohibit the removal or possession, without a licence from the Minister, of black coral or any article principally derived therefrom. Provision is made for the addition of other species of plants, animals or articles requiring similar protection.

- **The Turtles Ordinance 1959 as amended:** the 1959 Ordinance was amended in 1986 to include the protection of leatherback turtles. The legislation now protects all species of sea turtles during a closed season from 1 April to 30 November. During this time it is unlawful to catch or take any turtle, to slaughter, sell or possess any turtle or turtle product, or to take the eggs of any turtle species.

Enforcement and surveillance of legislation relating to turtles has been a significant problem (Lima *in litt*).

- Fisheries Ordinance 1979: the Ordinance provides for the protection, regulation and control of products of the sea.
- The Marine Products (Prohibited Methods of Taking) Order 1989: prohibits the use of spearguns to harvest marine products within the 10 fathom line of Anegada, and prohibits the use of SCUBA gear to harvest any marine products within the Exclusive Fishing Zone.
- Protection of Trees and Conservation of Soil and Water Ordinance 1954: this seeks to maintain and preserve protected trees, to prevent deforestation of land on steep slopes and soil erosion in forestry areas, to maintain water supplies and to prevent siltation and pollution of water supplies.

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Conservation and Fisheries Department, Road Town, Tortola, British Virgin Islands. Tel: 809 494 5651/2; fax: 809 494 4435.

Ministry of Natural Resources and Environment (CITES Authority), Road Town, Tortola, British Virgin Islands. Tel: 1 284 494 2147; fax: 1 284 494 4283.

Town and Country Planning Department, PO Box 834, Road Town, Tortola, British Virgin Islands. Tel: 809 494 3444\33; fax: 809 494 5794.

The Conservation and Fisheries Department of the Ministry of Natural Resources and Labour is responsible for biodiversity conservation in BVI. This Department has five main functions: environmental planning and application review; environmental monitoring; environmental education and awareness; legislation, surveillance and enforcement; and fisheries management.

The National Parks Trust, a statutory body established in 1961 under the portfolio of the Ministry of Natural Resources and Labour, is responsible for the development and management of all potential and designated areas, and for the Botanic Gardens. The Department of Conservation and Fisheries and the National Parks Trust work closely in areas such as environmental monitoring and resource management. The development of a single conservation agency has been proposed (Cambers 1991).

Other agencies involved in conservation include the BVI Dive Operators Association. Members of the Association have been involved, for example, in the management of Wreck of the Rhone Marine Park, providing surveillance, monitoring the wreck and reefs, and explaining park regulations to visitors. They have also installed and maintained moorings at the dive site with support and collaboration from the National Parks Trust and Government (Geoghegan *et al.* 1991).

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