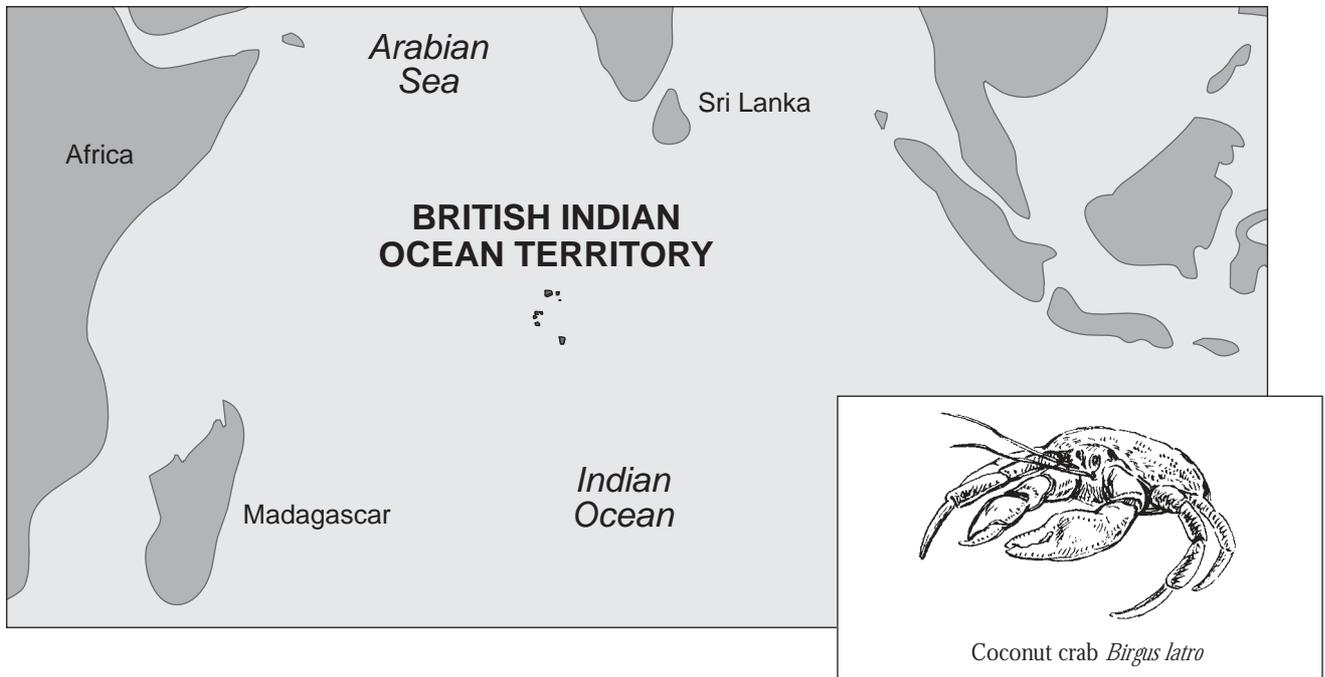


6: British Indian Ocean Territory



Introduction

The British Indian Ocean Territory (BIOT) covers 54,400 km² of ocean, including the reefs and islands of the Chagos Archipelago. The islands within the territory cover a total of around 60 km², and lie between 4 and 8°S and 70 and 75°E. The total area of near-surface coral reefs is some 4,000 km², which is approximately 1.5% of the total global area of reefs, a very major proportion of an important and increasingly threatened global heritage. The nearest neighbouring islands and reefs are those of the Maldives, with the southernmost atoll, Addu, being some 500 km to the north, separated by a channel some 2,200–3,300 m deep. The nearest continental land-area is that of Sri Lanka, which is over 1,500 km distant. To the west, the Seychelles lie over 1,800 km away, and the mainland coast of East Africa some 3,400 km distant. The Andaman and Nicobar Islands, the coast of Sumatra and Cocos Keeling Islands lie approximately 3,500 km to the east. The islands and reefs form the southernmost part of a long shallow ocean ridge, the Laccadives–Chagos Ridge, which runs almost

directly north–south. The Archipelago consists of a variety of reefs with their associated low-lying coralline islands. There are five atolls: Chagos Bank, Peros Banhos, Salomon, Egmont and Diego Garcia; and ten reefs and submerged shoals including Blenheim Reef, Speakers Bank, Pitt Bank and Centurian Bank.

BIOT was established by an Order in Council on 8 November 1965, having been a British territory since 1814, but formerly administered as a dependency of Mauritius. At present, land use is for military purposes only. There are licensed fisheries, notably for offshore tuna fishing, and a licensed reef fishery operated by Mauritian fishermen who visit the reefs for a few months each year (BIOT Administration 1997).

International obligations relevant to nature conservation

- Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage 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)
- International Convention on the Regulation of Whaling

Implementation

Ramsar: the BIOT Administration has asked the UK to arrange to have the provisions of the Ramsar Convention extended to BIOT and will propose possible sites for listing under the Convention.

World Heritage: the World Heritage quality of the territory is recognised in the BIOT Conservation Policy Statement (October 1997) which specifies that BIOT will be treated in accordance with the requirements of the Convention subject only to defence requirements.

CITES: controls are implemented through the Green Turtles Protection Regulations 1968 and, more generally, through the Imports and Exports Control Ordinance 1984.

Protected areas

Because of its military status, the whole of the BIOT acts as a *de facto* protected area. Environmental policy of the US Navy (OPNAVINST 5090.1) applies to Diego Garcia.

BIOT legislation to designate protected areas is:

- **The Protection and Preservation of Wild Life Ordinance 1970 (Ordinance No. 1 of 1970):** provides for the protection and preservation of wildlife. Under this Ordinance the Commissioner may make regulations to declare any island or part thereof to be a 'Strict Nature Reserve' or 'Special Reserve'. A Strict Nature Reserve is defined as an area:

“set aside to permit the free interaction of natural ecological factors without any outside interference; throughout which any form of hunting or fishing, any undertaking connected with forestry, agriculture, any excavations, levelling of the ground or construction, any work involving the alteration of the soil or the character of the vegetation, any water pollution and, generally any act likely to harm or disturb the fauna or flora is forbidden; where it is forbidden to enter, traverse, camp or reside, and over which it is forbidden to fly at low altitude; and where it is forbidden knowingly to introduce non-indigenous wild life.”

A Special Reserve is defined as an area:

“in which any particular species of wild life requires protection and in which all other interests and activities shall, whenever possible, be subordinated to that end.”

At present no area has been designated as a Special Reserve, but the Strict Nature Reserves Regulations 1998, which were made on 18 September 1998 and came into operation on 1 November 1998, declared the following islands (including their international waters and the territorial sea appurtenant to them and also any reef of bank situated therein) to be Strict Nature Reserves: the Three Brothers and Resurgent Islands, Danger Island, Cow Island, Nelson Island and all islands in the Peros Banhos atoll to the east of a line drawn between the eastern most points of Moresby Island and Fouquet Island. Under these Regulations, it is now an offence for anyone to enter any of these Reserves, or to carry out various specified activities there, without the written permission of the BIOT Government.

- **The Diego Garcia Conservation (Restricted Area) Ordinance 1994 (Ordinance No. 6 of 1994).** Under this Ordinance, which came into force on 24 November 1997, a substantial part of Diego Garcia has been designated as a restricted area (i.e. an area into which entry otherwise than on official business is forbidden except as

expressly authorised by permit). The restricted area has been further divided into a Nature Reserve Area and a (more closely controlled) Strict Conservation Area. The latter includes the islets at the mouth of the Diego Garcia lagoon.

Habitats of major significance

Reefs

Both in their structure and in their isolation the reefs of the Chagos can be seen as very typical of many atolls around the world. Although distant from other reefs, their relation to reefs across the Indian Ocean of is considerable interest. They lie at the southernmost end of the Chagos Laccadive Ridge, a vast chain of atolls stretching over 2,500 km from the northernmost of the Lakshadweep (formerly Laccadive) islands in the north to Diego Garcia in the south, traversing the equator. There is clear evidence that biodiversity levels among corals increase to the south along this chain, with 64 hermatypic coral ('brain coral') genera recorded from the Chagos, only 38 from the northern Maldives; and only nine from Lakshadweep (Sheppard 1981a). It is also rich in reef fishes (Winterbottom & Anderson 1997).

Lying right in the centre of the Indian Ocean, it has also been speculated that the Chagos Archipelago may provide a crucial link between the coral reefs to the east and west. High levels of biodiversity are maintained across the Indian Ocean and the Chagos Archipelago is a crucial link in this (Veron 1995; Sheppard 1999).

Irrespective of their closest affinities, the fact that the Chagos reefs are among the most species-rich in the Laccadive–Maldivian–Chagos chain, and provide a link between west and central Indo-Pacific communities, is very interesting. Without the Chagos reefs the distance between west and central Indo-Pacific would effectively be over 5,000 km. While the faunal affinities of Chagos reefs would support the idea of some, restricted movement of species between both sides of the Indian Ocean and the Chagos, there has been no detailed analysis to date which might cast some light upon rates of flow of genetic material across the Indian Ocean, and

hence the importance of the Chagos Archipelago as a link between otherwise isolated communities.

Seagrass beds

These are not widespread, and the only known area of seagrasses of significant size lies on the eastern side of the lagoon at Diego Garcia. A number of fish species have been recorded in these seagrasses which have not yet been seen anywhere else in the Archipelago.

Terrestrial environment

On land many of the islands have undergone considerable changes since the first human settlements were established in the late 18th century. Originally heavily wooded the majority of the islands were cleared for coconut plantations, while the inhabitants also brought rats and other animals (donkeys, cats and chickens are still reported from some islands) which had considerable detrimental impacts on native flora and fauna (Bellamy 1979).

Vegetation of the main island has been substantially modified over the centuries. It consists of coconut groves (planted since the 1780s), woodland of *Casuarina* (Casuarinaceae), fan flower *Scaevola* (Goodeniaceae) scrub, marshland and relict broad-leaved woodland of fig *Ficus* (Moraceae), *Morinda* (Rubiaceae) and *Terminalia* (Combretaceae). The few islands that never had any inhabitants were generally very small and isolated. Small but important patches of hardwood forest remain on a number of these, including the Brothers (Great Chagos Bank) and also a few islands on northern Peros Banhos (see Fosberg & Bullock 1971; Davis *et al.* 1986). A feasibility study for restoring native vegetation was carried out during the 1978–1979 Joint Services Expedition (Baldwin 1975).

There is a small stand of the mangrove *Lumnitzera racemosa* on Eagle Island, with an associated peat bog: this may well be one of the most isolated mangrove communities in the world.

The smaller islands remain relatively undisturbed, and some still support isolated stands of original hardwood vegetation.

The ecology of Diego Garcia is documented by Stoddart and Taylor (1971).

Species of major significance

Biodiversity assessment

BIOT has received a relatively large amount of scientific attention. Three expeditions in the 1970s, (see for example, Sheppard 1979, 1980, 1981), developed a considerable body of data and a long list of publications on the islands and reefs of a mainly descriptive nature. These were largely funded by the UK Ministry of Defence. Another research visit in 1996 by nearly 20 island and reef scientists was designed specifically to provide information on the biological functioning of this remote coral area, and on its biogeographical importance, all with the primary intention of obtaining data on which to base conservation activity and to guide conservation policy in the future (Sheppard 1996). The Foreign and Commonwealth Office largely funded this work. A comprehensive volume *The ecology of the Chagos Archipelago* (Sheppard & Seaward 1999) was published in 1999.

Endemic species are not common in Chagos. Some have been recorded for BIOT including one marine alga (Rhyne 1971), one hermatypic coral (brain coral) *Ctenella chaguis* (Sheppard 1981a, b) and one gastropod (Taylor 1971). In addition to these described endemics, there are a number of other specimens which may, on further investigation, prove to be new to science, and it seems likely that further species inventory work and genetic analysis will identify other new endemics from the reefs of Chagos. A lack of endemic species in such a geographically isolated group reaffirms the important stepping stone role of this group of reefs.

Plants

A checklist of vascular plants of Diego Garcia is provided by Topp and Seaward (1999). About 280 flowering plants and ferns have been recorded in the Chagos Archipelago. There are no endemic

species. No species are of particular conservation concern at present.

The 1996 Chagos Expedition provided the first opportunity to study the terrestrial lower plant flora in detail. Records were made of nine mosses, seven liverworts, 52 lichen species, 21 fungi and one alga.

The marine algae of BIOT include 105 taxa reported for the Diego Garcia Atoll and 71 taxa for the northern banks and atolls (Basson & Joliffe 1997).

Invertebrates

Sheppard (1981) described the reefs of the Chagos Archipelago as being the most speciose reefs known for hermatypic corals in the Indian Ocean. The faunal affinities of the Chagos have, as might be predicted, close affinities to both the Indonesian high diversity fauna and the East African faunas, but they also show significant differences from both of these. Thus, for the corals there are a number of genera from Indonesia which are not found in the Chagos, but also four East African genera are absent (Sheppard 1981).

The brain coral *Ctenella chaguis* is the only extant representative of the family Meandrinidae in the Indo-Pacific, although this family was widespread in the Cretaceous (Veron 1995).

Over 384 species of mollusc are recorded for BIOT.

The coconut crab *Birgus latro* (DD) occurs on all the atolls and most of the islands of the Great Chagos Bank (Dinesen 1977; Sheppard 1979, 1984; Topp pers. comm.).

Insects

A checklist of insects is provided by Hutson (1981) and Barnett and Emms (1998a). The 1996 Chagos Expedition identified 95 insect species, which included 35 previously unrecorded species (Barnett & Emms 1996, 1999). A new moth species *Stictoptera hironisi* was discovered and a new endemic subspecies of the hawkmoth *Macroglossum*

corythus was recorded in good numbers (Barnett, Emms & Holloway in press). The two other endemic subspecies of butterfly *Jamonia villida* and *Hypolimnus bolina* were also recorded, the former in very good numbers (Barnett & Emms 1998b). Six species of damselfly and dragonfly were recorded, with two being new records for the Chagos (Barnett & Emms 1997a).

The expedition also discovered a sizeable colony of the sea strider *Halobates* sp. probably *flaviventris* in Turtle Cove, Diego Garcia. This is an unusual species in that it is a marine insect found on floating seaweed and on the surface of the sea itself, in tropical and sub-tropical seas (Barnett & Emms pers. comm.).

Fish

Three species of fish are endemic to BIOT: an anemone fish, *Amphiprion chagosensis*; a goby, *Trimmatom offuscus* and a worm fish, *Paragunellichthys fehlmani*. A fourth likely endemic, a razorfish *Xyrichtys* sp. has yet to be described (Winterbottom & Anderson 1997, Winterbottom pers. comm.).

The known fish fauna for the region, some 773 species (Winterbottom & Anderson 1997), is less than the estimated figures for the Maldives (Anderson & Buttress 1996) and the Seychelles (Polunin 1984). However, the search effort in the latter two countries has been far greater, and there are undoubtedly many more species remaining to be recorded in the Chagos waters. For fish there are closer affinities to East Africa than are found on the reefs in the central and northern Maldives. Some 7.3% of Chagos fish species are restricted to the Western Indian Ocean (Winterbottom & Anderson 1997). By comparison some 15% of the Seychelles fish fauna are restricted to this region (Polunin 1984).

Routine monitoring, fisheries research and resource evaluations have been undertaken on fish stocks through catch and effort logbook monitoring, and observer programmes since the current fisheries management regime in BIOT was introduced in 1991. The Marine Resources

Assessment Group (MRAG Ltd.) manages the fisheries on behalf of the BIOT Administration in the FCO. MRAG and the BIOT authorities have contributed a recent summary of this data outlining both management activities and an assessment of sustainability of fishing within the BIOT inshore fisheries (Mees, Pilling & Barry 1999).

Illegal fishing of sharks in BIOT waters is a problem. Vessels have been observed taking sharks in relatively high numbers from the northern atolls and the 1996 expedition recorded an 85% collapse of reef shark numbers from previous levels recorded in 1978. However, insufficient fishery data are available to enable a shark resource evaluation for Chagos. By-catches from licensed Mauritian inshore vessels may be considered small compared with recorded catches elsewhere in the Indian Ocean (Mees *et al.* 1999). A more significant impact on shark resources may be related to unlicensed fishing activities in the past, principally vessels from South Asia.

Reptiles and amphibians

The marine turtles include green turtle *Chelonia mydas* (EN) and hawksbill turtle *Eretmochelys imbricata* (CR), with about 300 females of each species nesting annually. The most important nesting sites for the hawksbill turtle are Peros Banos and Diego Garcia. Green turtles nest mainly in the Chagos Bank. The leatherback turtle *Dermochelys coriacea* (EN) is a vagrant in the area.

Birds

The total bird list consists of 91 species, with large breeding populations of 16 species (Bourne 1971; Feare 1984; Hutson 1975; Symens 1997; Sheppard & Topp 1999). Although BIOT has no endemic birds, there are internationally important seabird colonies, particularly on the rat-free islands. BIOT's seabird community includes thriving populations of species which are rapidly declining in other parts of the Indian Ocean, such as red-footed booby *Sula sula*, masked booby *S. dactylatra* and lesser noddy *Anous tenuirostris*.

Species protection

- **The Wild Life Protection Regulations 1984:** these Regulations set out prohibited acts with respect to flora and fauna. Under the Regulations most types of animals are protected. It is prohibited intentionally to destroy, damage, or take any birds nest that is being built or used, or any birds egg or turtles egg, and to disturb nesting or dependent young birds. It is also prohibited to take or be in possession of any animal, specified seashell or coral or any specified flora. No species have been specified under the legislation.
- **Fishery Limits Ordinance:** a 200-mile Fishery Management Conservation Zone was established as from 1 October 1991 and a fisheries regime covering all BIOT fishing waters was established on the same day by the Fisheries (Conservation and Management) Ordinance 1991. Commercial fishing within this zone is only allowed under licence. Tuna fishing is prohibited within 12 nautical miles of land. Inshore fishing for demersal species is only permitted from 1 April to 31 October, by hook and line, and not within lagoons. Effort controls are further implemented in both fisheries by limited licensing, based on the best scientific information and adopting the precautionary approach.

Hunting of green turtle *Chelonia mydas* has been completely banned since 1968 (Frazier 1981).

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The territory is administered from the Foreign and Commonwealth Office in London by a Commissioner who is assisted by the representative, an officer-in-charge of the Royal Navy complement on the island of Diego Garcia, at the joint UK-US naval base. Enforcement of conservation measures, such as for the existing bird sanctuaries, is the responsibility of the senior UK representative stationed on the island in his role as Magistrate. The United States Navy Officer in command of the Facility on Diego Garcia has responsibility for the implementation of US naval policy on the environment at the base.

The Friends of the Chagos is a UK registered charity established in 1992 to promote conservation, scientific and historical research, as well as to advance education about the Chagos Archipelago. As a non-political association, it aims, for example by promoting scientific expeditions (most recently in 1996), to monitor the status of the marine and terrestrial environment. It provides a channel for bringing relevant environmental problems to the Government's attention, and establishes links with other groups concerned with reef ecology, particularly in the Indian Ocean. The Friends of Chagos also encourage research into the history of the Chagos Archipelago, and seek to educate and make available the results of its work to a wider audience.

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