

GOA

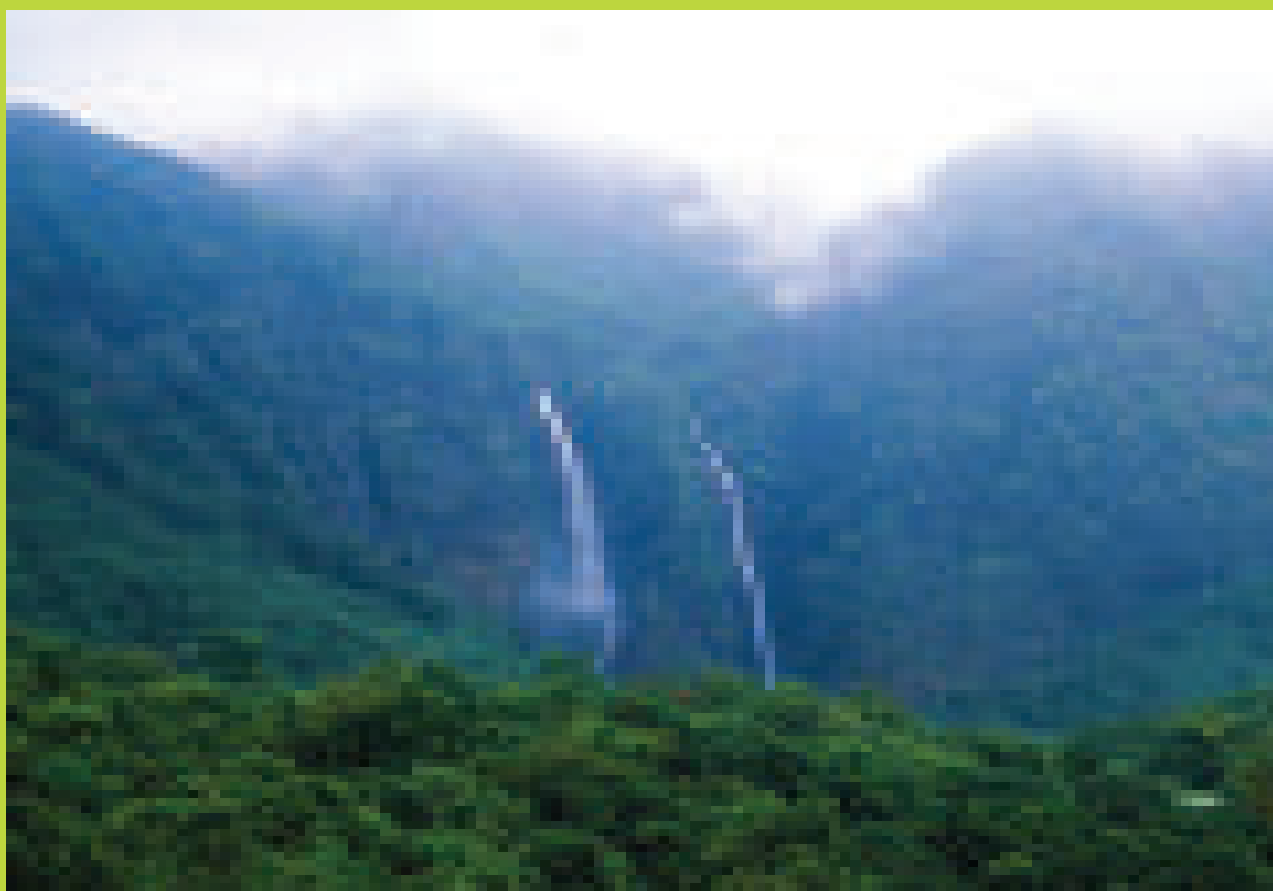


Photo: Nirmal Kulkarni

One of the most pressing issues is the Goa Government's determination to denotify some parts of Mhadei and Netravati sanctuaries for open-cast mining.

Goa (14° 53' to 15° 48' N and 73° 40' to 74° 21' E) is one of the smallest states of the country with an area of 370,200 ha. Goa became the 25th State of the Indian union on May 30, 1987 while Daman and Diu continued to retain a separate identity as Union Territory.

Goa is quite hilly, wedged between the Arabian Sea on the west and the Western Ghats (*Sahayadri* range) on the east. Goa is adjacent to the Savantvadi taluka of the Ratnagiri district of Maharashtra in the north, and on the east and south it adjoins the Dharwar district of Karnataka. The Western Ghats which run north-south, form the entire eastern boundary where Evergreen and Semi Evergreen forests provide a habitat to many threatened and restricted range species of birds. Moist Deciduous forests, mostly secondary and degraded, occur along the foothills of the *Sahayadris*.

The State can be divided into three main physical divisions (1) The coastal belt which is 133 km long with sandy bays, beaches and rocky headlands broken by the wide estuaries of the Mandovi and Zuari rivers. This area is mainly covered by coconut farms, saltpans, saline and freshwater marshes. About 2000 ha along the coast are mangroves which form creeks and estuaries. (2) The midland region which is mainly plateau (30-200 m high) adjoins the sea in many places. This area is famous for cashew trees, thorny scrub and coarse grass, but some parts are still covered with Semi Evergreen forest. Moreover, the area is used for intensive cultivation of coconut, spices, fruit and paddy, mainly in the valleys. The area is also irreversibly degraded by large-scale opencast and strip mining for iron and manganese ore (Lainer 1999a). (3) The Western Ghats, known as the *Sahayadris*, running on the eastern border with Karnataka and extending to about 125 km, form an arc. It is elevated up to 800 m. Here Tropical Wet Evergreen forest and Tropical Moist Deciduous forest occur. Most parts of Goa come under the Endemic Bird Areas (Western Ghats EBA-123) identified by BirdLife International (Stattersfield *et al* 1998), and some parts lie in the coastal plain.

Goa has an equable tropical climate. Winter temperatures range from 16 °C to 34 °C while in summer it is between 27 °C and 37 °C. The average annual rainfall is 3,100 mm, received mainly between June-September during the southwest monsoon period. The altitude in the State varies from sea level to 1,022 m. The relative humidity is high. Even during the dry season, it is generally above 60%.

The total human population of the State is 1.34 million (2001 census), equally divided between the urban and rural areas. The population density is 363 persons per sq. km (2001 census). The literacy rate in the state is 77%. Goa has a large floating population of migrant workers and tourists.

Vegetation

There are three forest types in the State, namely Tropical Evergreen, Tropical Semi-Evergreen, and Littoral and Swamp forests. The recorded forest area of the State is 142,438 ha, which constitutes 38.47% of the geographical area. Of the total forest cover, about 86% belongs to the Government and the remainder is privately owned. According to legal classification, 16,500 ha is reserved forests and the remaining is unclassified (Ministry of Environment and Forests 2001). The State has two districts, North Goa (1,736 sq. km with 869 sq. km forest cover) and South Goa (1,966 sq. km with 1,226 sq. km forest cover) (Ministry of Environment and Forests 2001).

December 1995 and January 1996 satellite data indicates that dense forest constitutes 1,78,500 ha, open forest 31,000 ha and mangrove 500 ha (Ministry of Environment and Forests 1999). If we compare with earlier years, the decrease in forest cover is because of encroachment near Kharpal and Khulpe villages (Ministry of Environment and Forests 2001).

IBAS AND PROTECTED AREAS

One national park and six wildlife sanctuaries cover an area of 75,496 ha constituting 20.39% of the geographical area of the State (Rodgers *et al.* 2000). The protected areas of the state are located mainly in the foothills of the Western Ghats.

Number of IBAs and IBA criteria

A1= Threatened species; A2 = Restricted Range species; A3= Biome species; A4=Congregatory species

IBAs of Goa

IBA site codes	IBA site names	IBA criteria
IN-GA-01	Bhagwan Mahavir Wildlife Sanctuary	A1, A2, A3
IN-GA-02	Carambolim Wetlands	A1, A4i, A4iii
IN-GA-03	Cotigao Wildlife Sanctuary	A1, A2, A3
IN-GA-04	Mhadei Wildlife Sanctuary	A1, A2, A3

AVIFAUNA

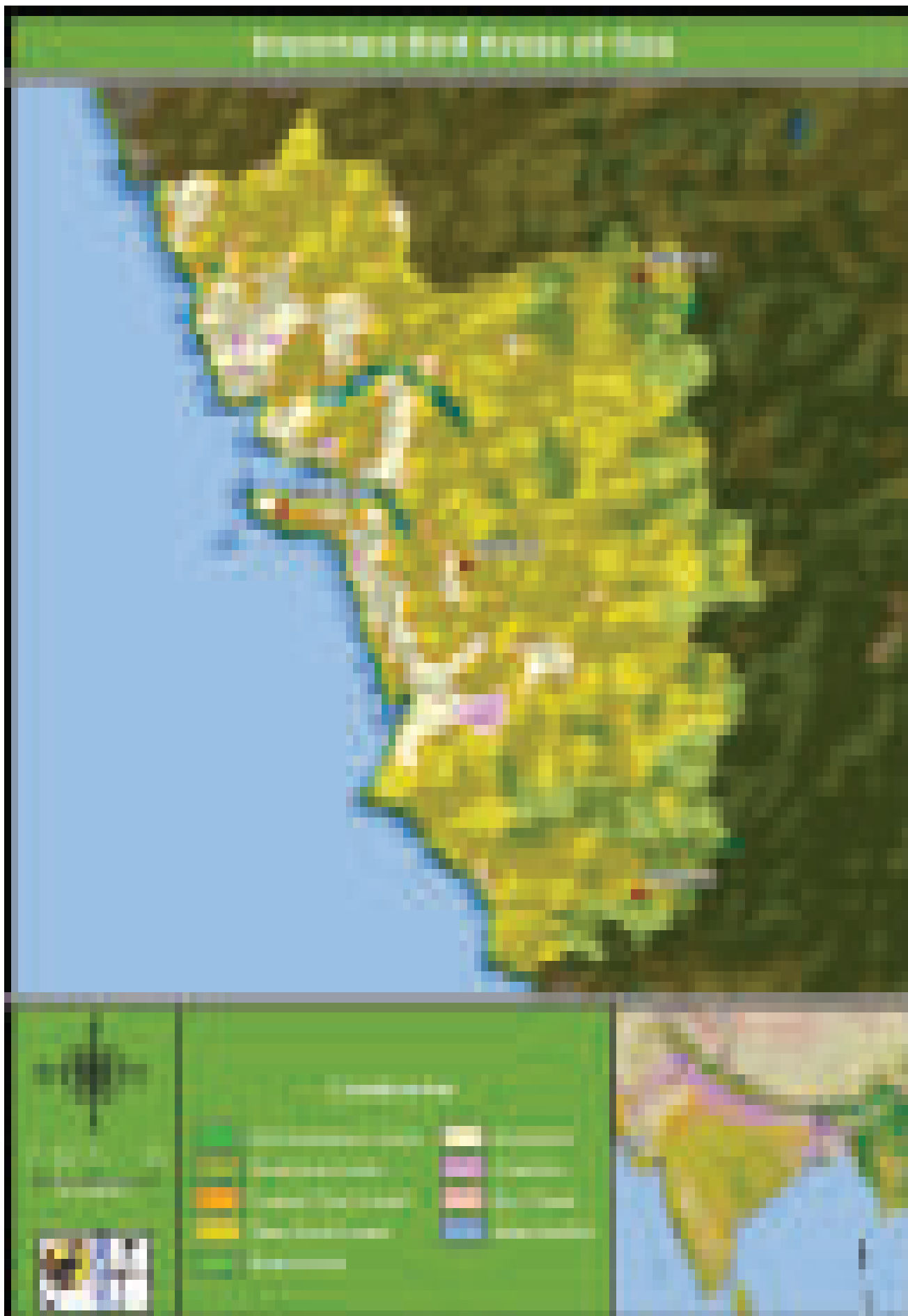
The first ornithological study in Goa was conducted by Grubb and Ali (1976). During their 16-day surveys in Molem, Canacoana and Valpoi, they collected 150 specimens of 100 species and sight-recorded 54 species. Later, Rane (1984) added 33 species. Saha and Dasgupta (1992) compiled a checklist of 208 species. Based on 13 years of fairly intensive field studies and about 1300 field trips, Lainer (1999a, b) recorded 382 species. He covered all parts of Goa to study birds. From his published papers in the Journal of the BNHS, three globally threatened species were recorded.

List of threatened birds with IBA site codes

Critically Endangered		
Oriental White-backed Vulture	<i>Gyps bengalensis</i>	IN-GA-03
Long-billed Vulture	<i>Gyps indicus</i>	IN-GA-02
Vulnerable		
Lesser Adjutant	<i>Leptoptilos javanicus</i>	IN-GA-01, 02
Greater Spotted Eagle	<i>Aquila clanga</i>	IN-GA-02
Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>	IN-GA-01, 03, 04

Restricted Range species

Of the 16 Restricted Range species in the Western Ghats (Stattersfield *et al.* 1998), nine are found in Goa, mainly in Bhagwan Mahavir National Park, Mhadei WLS and Cotigao WLS. There are many wetlands in Goa that attract a large number of birds from November onwards (Shanbhag *et al.* 2001). Except for the Carambolim wetlands, where more than 25,000 waterbirds could be seen, other wetlands do not meet IBA criteria.



Endemic Bird Area 123: Western Ghats		
Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>	IN-GA-01, 03,04
Blue-winged Parakeet	<i>Psittacula columboides</i>	IN-GA-01, 03,04
Malabar Grey Hornbill	<i>Ocyrceros griseus</i>	IN-GA-01, 03, 04
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>	IN-GA-01, 03, 04
Indian Rufous Babbler	<i>Turdoides subrufus</i>	IN-GA-04
White-bellied Blue Flycatcher	<i>Cyornis pallipes</i>	IN-GA-03, 04
Small Sunbird	<i>Nectarinia minima</i>	IN-GA-01, 04
White-bellied Treepie	<i>Dendrocitta leucogastra</i>	IN-GA-01, 03

THREATS AND CONSERVATION ISSUES

The main threat is habitat loss and degradation. In the western part of the Western Ghats in Goa, the lowland Evergreen and Semi-evergreen Rain forests probably once extended to the coastal plain but below 500 m almost all the forest has been cleared because of human encroachment. Livestock grazing and wood cutting in large quantities are the major threats to the forests (Stattersfield *et al.* 1998). These threats lead to the shrinking of the habitat of the many threatened and restricted range species. Some parts of important habitats for birds are destroyed by mining (Lainer 1999a). Plantation which degrades the habitat of birds is another issue. In the Bhagwan Mahavir Wildlife Sanctuary and other IBAs, the State Government opened many areas to tourists. Tourism should be regulated and controlled. Awareness programmes should be initiated with the collaboration of local NGOs and individuals, and widespread message about birds and biodiversity conservation should be initiated using the Indian Bird Conservation Network in Goa.

One of the most pressing issues is the Goa Government's determination to denotify some parts of the Mhadei and Netravati sanctuaries in order to allow open-cast mining. There are about 40 mining leases, of which only 11 mines are active, while the others are not working. The mines lease-owners want the potential mining areas to be excised from the sanctuaries. The Government of Goa, keen to garner votes, constituted a committee, which recommended that only 'active mines' may be permitted to carry on mining operations strictly within the areas assigned to them, without any future expansion, and such mines within the sanctuaries may be phased out gradually.

Another conservation issue is the Mhadei Diversion Scheme proposed by the Karnataka Government. The diversion of the Mhadei River into the Malaprabha basin will have a devastating effect on the pristine forests of the Mhadei Valley. In this ecologically rich area, the Karnataka Government has planned a chain of seven diversion dams and three main dams for the Mhadei Hydroelectric Project. Besides these projects, Karnataka has plans to divert the Katka and Palma tributaries of the Dudhsagar/Khandepar river to the Supa and Kalinadi basins. This will affect the forest areas on the banks of these tributaries.

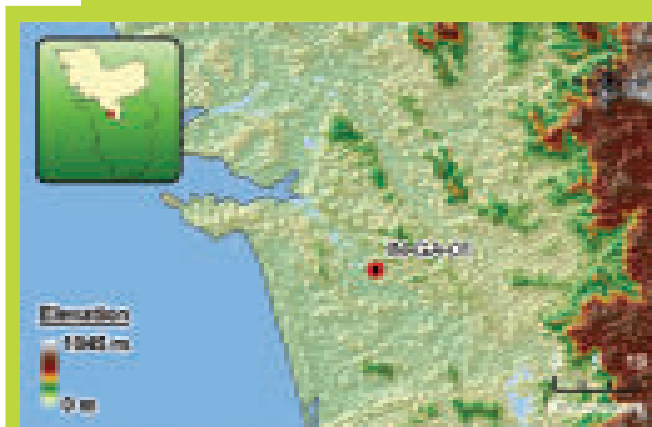
Threats to IBAs

A=Agriculture intensification/expansion; B=Dams/Dykes; C=Disturbance to Birds; D=Firewood Collection;
E=Industrialisation/Urbanisation; F=Unsustainable exploitation; G=Others; H=Natural Events

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BHAGWAN MAHAVIR WILDLIFE SANCTUARY



IBA Site	: IN-GA-01
State	: Goa
District	: South Goa
Coordinates	: 15° 19' 32" N, 74° 01' 27" E
Ownership	: State
Area	: 14, 852 ha
Altitude	: 780 m
Rainfall	: >3,000 mm
Temperature	: 15 °C to 35 °C
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Wet Evergreen Forest, Tropical Moist Deciduous Forest, Tropical Semi Evergreen Forest

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome-10: Indian Peninsula Tropical Moist Forest)
PROTECTION STATUS: National Park, established in 1978

GENERAL DESCRIPTION

Bhagwan Mahavir Wildlife Sanctuary is located in the Sanguem taluka on the eastern border of Goa, along the Western Ghats. It was earlier called the Mollem Game Sanctuary but was renamed in 1976 after the great saint Bhagwan Mahavir. The core area, consisting of 107 sq. km, was declared as Mollem National Park vide notification dated April 13 1978. National highway 4A and Mormugao-Londa railway line run through the Sanctuary. Collem Railway Station lies within the sanctuary area.

Many small rivulets flow through the Sanctuary in the monsoon, but dry up in summer. Besides flora and fauna, there are many important geological and historical features in the Sanctuary. Dudhsagar Falls, about an hour's journey from Collem Railway Station by train, is a popular tourist spot. The Devil Canyon is a splendid piece of geological rock formation. The famous Tambdi Surla Temple is about 13 kms from Mollem.

Due to luxuriant tree growth, the canopy is almost closed and the availability of grass is very limited. Evergreen vegetation is mainly seen on higher altitudes and along the riverbanks. The main vegetation types are West Coast Tropical Evergreen Forest, West Coast Semi-Evergreen Forest and Moist Deciduous Forest.

AVIFAUNA

Nearly 200 species of birds have been reported from this Sanctuary, including Western Ghats endemics. The Malabar Pied Hornbill *Anthracoceros coronatus* is found all over the Sanctuary. The Indian Black Woodpecker or White-bellied Woodpecker *Dryocopus*

javanicus can be seen in most parts of the Sanctuary. It was seen nesting in Dudhsagar area (Harvey D'Souza *pers. comm.* 2002).

According to Harvey D'Souza (*pers. comm.* 2003) the Nilgiri Wood-Pigeon *Columba ephinstonii*, Blue-winged Parakeet or Malabar Parakeet *Psittacula columboides*, Malabar Grey Hornbill *Ocyrceros griesus*, Grey-headed Bulbul *Pycnonotus priocephalus* and Small Sunbird *Nectarinia minima* are present in this IBA. The White-bellied Treepie *Dendrocitta leucogastra* is reported from Dudhsagar area, a popular tourist and birdwatching destination. These birds are listed as Restricted Range by Stattersfield *et al.* (1998) under the Western Ghats Endemic Bird Area 123.

Within its 14,852 ha, Bhagwan Mahavir Wildlife Sanctuary has excellent Wet Evergreen, Semi-evergreen and Moist Deciduous forests. Based on BirdLife International's (undated) classification of biomes, this site would lie in Biome-10 (Indian Peninsula Tropical Moist Forest) in which 15 bird species have been identified that represent this Biome's bird assemblages. Six of them have been located so far, perhaps more await discovery. Heinz Lainer (*pers. comm.* 2003) has seen Lesser Adjutant-Stork *Leptoptilos javanicus*. This site qualifies three IBA criteria: A1 (Threatened species), A2 (Restricted Range species) and A3 (Biome Restricted species).



Photo: Anron S. Iuzbo

Vulnerable	
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Nilgiri Wood-Pigeon	<i>Columba ephinstonii</i>
Endemic Bird Area 123: Western Ghats	
Nilgiri Wood-Pigeon	<i>Columba ephinstonii</i>
Blue-winged Parakeet	<i>Psittacula columboides</i>
Malabar Grey Hornbill	<i>Ocyrceros griesus</i>
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>
Small Sunbird	<i>Nectarinia minima</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>
Biome-10: Indian Peninsula Tropical Moist Forest	
Malabar Trogon	<i>Harpactes fasciatus</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
White-cheeked Barbet	<i>Megalaima viridis</i>
Crimson-throated Barbet	<i>Megalaima rubricapilla</i>
Indian Scimitar Babbler	<i>Pomatorhinus horsfieldii</i>
Loten's Sunbird	<i>Nectarinia lotenia</i>

OTHER KEY FAUNA

The Leopard *Panthera pardus* forms the apex trophic level in the Sanctuary. Large herbivores include Gaur *Bos frontalis*, Sambar *Cervus unicolor*, and Barking Deer *Muntiacus muntjak*. Mouse Deer *Moschiola meminna* is also found here. Other important mammals of the site are Pangolin *Manis crassicaudata*, Slender Loris *Loris tardigradus*, Porcupine *Hystrix indica*, Small Indian Civet *Viverricula indica* and Flying Squirrel *Petaurista petaurista*.

The White-cheeked Barbet *Megalaima viridis* is one of the Biome-10 species.

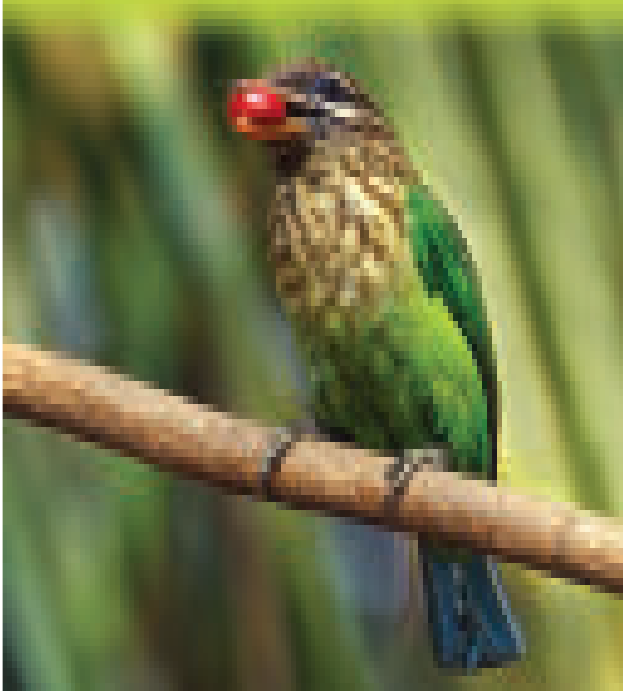


Photo: Clement Francis M.

LAND USE

- ☐ Nature conservation and research
- ☐ Tourism and recreation

THREATS AND CONSERVATION ISSUES

- ☐ Tourism and recreation

Presently, there is no major threat to this Sanctuary as it is fully notified. There are very few settlements inside the Sanctuary. Dudhsagar waterfall that originates in Karnataka is within the boundary of the Sanctuary at one corner. At Dudhsagar (*dudh* = milk, *sagar* = sea), the water falls from a height of 200 m, the foaming water runs through a wide gorge which looks milky. This is a major tourist attraction. Unfortunately, there is no attempt by the Park authorities to inform tourists that this Sanctuary is a bird watcher’s paradise.

At present the Sanctuary is inaccessible from June till November (monsoon period). Lately, plans have been announced by the Government to build an all-weather tar road for tourists. This will involve widening of the existing road, building bridges on the numerous streams, and will result in more tourism related impacts.

KEY CONTRIBUTORS

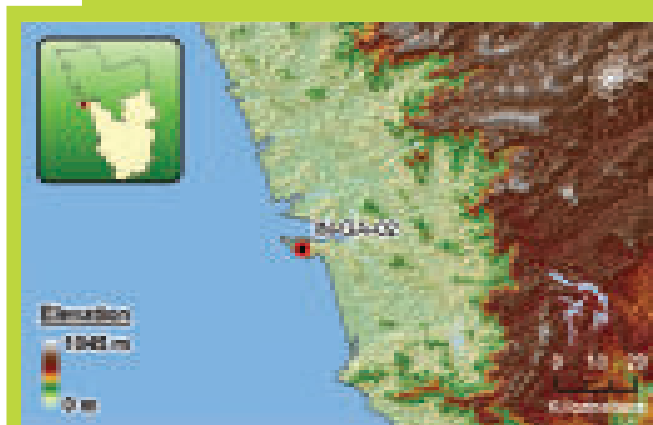
Harvey D’Souza and Heinz Lainer

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CARAMBOLIM LAKE



IBA Site Code	: IN-GA-02
State	: Goa
District	: North Goa
Coordinates	: 15° 22' 60" N, 73° 49' 60" E
Ownership	: State
Area	: 72 ha
Altitude	: 5-10 m
Rainfall	: Not available
Temperature	: Not available
Biogeographic Zone	: Western Ghats
Habitats	: Freshwater Swamp

IBA CRITERIA: A1 (Threatened Species), A4i ($\geq 1\%$ biogeographic population), A4iii ($\geq 20,000$ waterbirds)

PROTECTION STATUS: Not officially protected

GENERAL DESCRIPTION

Carambolim lake lies in Ilhas *taluka*, about 12 km from Panjim, the capital of Goa. It is spread over an area of 70 ha, of which 40 ha is under water for most of the year. In order to grow paddy, a number of minor irrigation tanks have been developed in Goa. These tanks are made by the impoundment of run-off during the monsoon. They are also a natural source of fish, because every year, before the monsoon, the remaining water is drained out to empty the tanks and the fish are harvested. The sluice gates of Carambolim lake at the southeastern side are kept closed from late July to early May next year. The impounded water is used for irrigation of paddy fields in the lower reaches on the southern side of the lake (Shanbhag *et al.* 2001). The western embankment of the lake serves as the base for the recently laid Konkani railway track, while the eastern side has been partially cleared of its scrub forests, mango and cashew groves, to pave the way for the construction of residential buildings. Coconut and mango trees fringe the remaining sides of the lake. The water depth is between 1.5 m to 3 m, depending upon the season. The lake lies between the estuarine zone of the Mandovi and Zuari rivers.

The main vegetation consists of *Nymphaea stellata*, a rooted plant with floating leaves, *Oryza rufipogon*, an emergent wild paddy, and submerged *Hydrilla verticillata*.

4000 Garganey *Anas querquedula* along with thousands of waterbirds are reported from Carambolim Lake.



Photo: Raroni S. Iuzbo

AVIFAUNA

Carambolim lake attracts thousands of birds, especially waterfowl. Shanbhag *et al.* (2001) identified 92 species of birds including 17 winter visitors. In 1997, they reported the presence of 25,590 waterfowl, of which Northern Pintail *Anas acuta* numbered 15,187, Lesser Whistling Duck *Dendrocygna javanica* numbered 4,957 and Coot *Fulica atra* numbered 347. In the winter of 1987-88, when large parts of India were affected by drought, and Goa had an adequate monsoon, over 75,000 waterfowl were seen in Carambolim (Lainer 1999). According to Lainer (1999), in a normal year, over 35,000 waterbirds could be found in this wetland.

Besides A4iii criteria, Carambolim lake also fits A4i criteria (the site is known or thought to hold, on a regular basis, $>1\%$ of a biogeographical population of a congregatory waterbird species). Over 4,000 Garganey *Anas querquedula* regularly winter at this IBA (Lainer 1999). The 1% threshold is 2,500 (Wetlands International 2002).

Close to Carambolim lake, at Corlim (Tiswadi), is located the Swiss-owned Hindustan Ciba Geigy Ltd (HCGL) Factory which produces highly toxic pesticides for agricultural use. The large factory compound contains two shallow ponds that give undisturbed shelter to Goa's only known heronry, and a safe haven to quite a number of migrant and vagrant Ciconiidae and Threskiornithidae (Lainer 1999).

The following species are breeding regularly in the heronry (population numbers for 2002 in brackets): Little Cormorant *Phalacrocorax niger* (200 pairs), Indian Shag *P. fuscicollis* (100 pairs), Oriental Darter *Anhinga melanogaster* (21 pairs), Purple Heron *Ardea purpurea* (45 pairs), Large Egret *Ardea alba* (94 pairs). Regular visitors include Grey Heron *Ardea cinerea* (up to 37), Black crowned Night-Heron *Nycticorax nycticorax* (up to 14) Painted Stork *Mycteria leucocephala* (up to 5), Asian Openbill Stork *Anastomus oscitans* (up to 37), White-necked or Woolly-necked Stork *Ciconia episcopus* (up to 40), Lesser Adjutant *Leptoptilos javanicus* (up to 22) and Lesser Whistling Duck (up to 4000).

Among the occasional and rare visitors count Black Stork *Ciconia nigra* (2), European White Stork *C. ciconia* (1), Oriental White Ibis *Threskiornis melanocephalus* (up to 89) and Eurasian Spoonbill *Platalea leucorodia* (up to 19).

The dry fields near Carambolim are well known for raptors, and a very small chat, which was discovered in 1996. It is still not known for sure if it was a Stoliczka's Bushchat *Saxicola macrorhyncha* or a species new to science!

Although this site has one Restricted Range species of Western Ghats (Malabar Parakeet *Psittacula columboides*) and one Biome-10 species of Indian Peninsula Tropical Moist Forest (Blue-faced Malkoha *Phaenicophaeus viridirostris*), it is selected as an IBA based on A4i and A4iii criteria.

Critically Endangered	
Long-billed Vulture	<i>Gyps indicus</i>
Vulnerable	
Lesser Adjutant	<i>Leptoptilos javanicus</i>
Greater Spotted Eagle	<i>Aquila clanga</i>

OTHER KEY FAUNA

Presently none of conservation significance.

LAND USE

q Irrigation

THREATS AND CONSERVATION ISSUES

q Increasing disturbance due to urbanization

One of the biggest threats faced by Carambolim lake was the construction of the railway track of the Konkan Railway Project, very close to the lake. Facing stiff resistance from environmentalists, the Konkan Railway Ltd agreed to shift the line, so as to minimize damage to the wetland. The railway project

commenced in 1990 and took eight years to complete. During the construction period in 1995 - 1996, there was a lot of disturbance near Carambolim lake as nearly 200 labourers, and 20-30 trucks moved per hour, but once the railway track was completed, birds started reappearing, and now they have become used to the movement of trains (Shanbhag *et al.* 2001). Under pressure from conservationists, the Konkan Railway Corporation Ltd., planted a large number of trees on the track embankments, to muffle the sound of the moving trains and declared the area as 'no hooting zone'. These steps have helped in restoring the bird life of this important IBA of Goa.

The long-term and irreversible disturbance is from private encroachment, night soil generated from the migrant human population, and the silt deposition, leading to the development of marshy conditions. To protect the area from further encroachment and development threats, Carambolim lake needs to be protected under the new category of Community Reserve in the modified Indian Wildlife (Protection) Act.

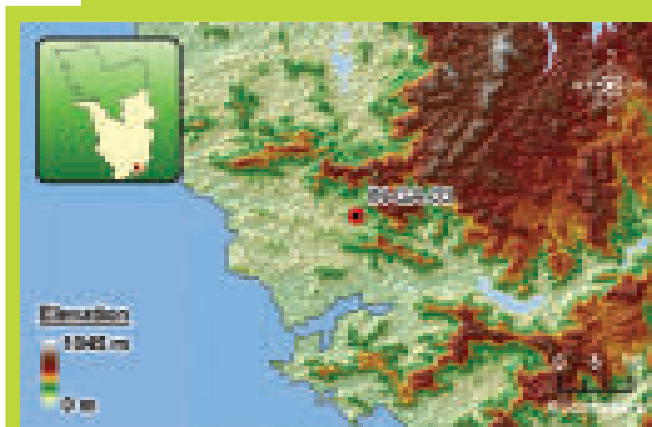
KEY CONTRIBUTORS

A. B. Shanbhag and Heinz Lainer

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COTIGAO WILDLIFE SANCTUARY



IBA Site Code	: IN-GA-03
State	: Goa
District	: South Goa
Coordinates	: 14° 59' 04" N, 74° 12' 13" E
Ownership	: State
Area	: 8,565 ha
Altitude	: 500 m
Rainfall	: Not available
Temperature	: Not available
Biogeographic Zone	: Western Ghats
Habitats	: Tropical Wet Evergreen Forest

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome-10: Indian Peninsula Tropical Moist Forest)

PROTECTION STATUS: Wildlife Sanctuary, established in December 1967

GENERAL DESCRIPTION

The Cotigao Wildlife Sanctuary, in the Canacona taluka, is 10 km southeast of Chaudi. The IBA lies partly in the Western Ghats. It was established in 1969 to protect a remote and vulnerable area of forest lining the Goa-Karnataka interstate border. The terrain is hilly and includes undulating uplands. Many small rivulets flow through the Sanctuary in the monsoon, but dry up in summer. The ancient Jeevottam Partagal Math, noted for Vedic studies, lies in the vicinity of the Sanctuary.

The main vegetation types are West Coast Tropical Evergreen Forest, West Coast Semi-Evergreen Forest, and Moist Deciduous Forest. The evergreen forests are mainly present on higher altitudes and on riversides.

AVIFAUNA

Not much is known of the bird life of Cotigao but Anil Pinto (*pers. comm.* 2002) has reported Nilgiri Wood-Pigeon *Columba elphinstonii*, a globally threatened species (BirdLife International 2001).

The site lies in the Western Ghats Endemic Bird Area (EBA 123) in which Stattersfield *et al.* (1998) have listed 16 species as Restricted Range. Six have been seen till now, but more are likely to be found once detailed studies are conducted.

Blue-winged Parakeet *Psittacula columboides* among six endemic birds is seen regularly in Cotigao WLS.

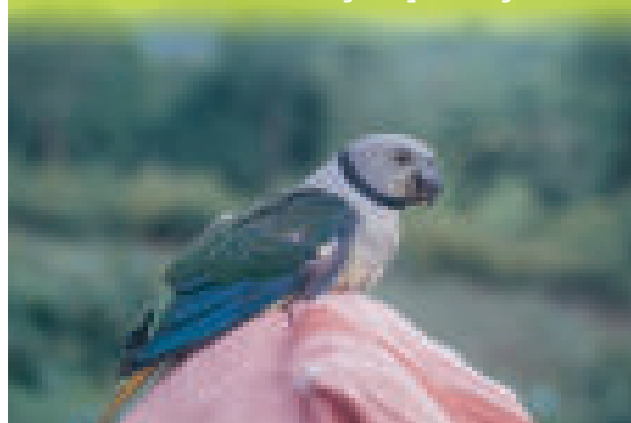


Photo: Aasad R. Rahmani

Of the 15 Biome-10 species (BirdLife International, undated), 12 are reported from Cotigao. Of the remaining three, the Ceylon Frogmouth *Batrachostomus moniliger* is likely to occur in the thick Tropical Evergreen Forest of the IBA, although it has not been listed by Lainer (1999) or Grubb and Ali (1976). The Indian Edible-nest Swiftlet *Collocalia unicolor* “may be encountered anywhere in Goa, but most frequently in *c.* 5 km deep strip along the coast” (Lainer 1999). It is also likely to occur in Cotigao, although it has not been reported from there. The Hill Swallow *Hirundo domicola*, (called Pacific Swallow *H. tahitica* by Grimmett *et al.* 1999), a bird of the southern Western Ghats, is reported as stray in Goa (Lainer 1999 calls it House Swallow).

Critically Endangered

Oriental White-backed Vulture	<i>Gyps bengalensis</i>
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Vulnerable

Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
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Endemic Bird Area 123: Western Ghats

Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
Blue-winged Parakeet	<i>Psittacula columboides</i>
Malabar Grey Hornbill	<i>Ocyrceros griseus</i>
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>
White-bellied Blue-Flycatcher	<i>Cyornis pallipes</i>
White-bellied Treepie	<i>Dendrocitta leucogastra</i>

Biome-10: Indian Peninsula Tropical Moist Forest

Small Green-billed Malkoha	<i>Phaenicophaeus viridirostris</i>
Jerdon's Nightjar	<i>Caprimulgus atripennis</i>
Malabar Trogon	<i>Harpactes fasciatus</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
White-cheeked Barbet	<i>Megalaima viridis</i>
Crimson-throated Barbet	<i>Megalaima rubricapilla</i>
Yellow-browed Bulbul	<i>Iole indica</i>
Malabar Whistling-Thrush	<i>Myiophonus horsfieldii</i>
Indian Scimitar-Babbler	<i>Pomatorhinus horsfieldii</i>
Black-headed Babbler	<i>Rhopocichla atriceps</i>
Loten's Sunbird	<i>Nectarinia lotenia</i>
Black-throated Munia	<i>Lonchura kelaarti</i>

The White-bellied Treepie *Dendrocitta leucogastra* is a Restricted Range species found in this IBA.

Photo: R. Vijaykumar Thorodaman



OTHER KEY FAUNA

The Leopard *Panthera pardus* is the apex predator in this small Sanctuary, mainly on Sambar *Cervus unicolor*, Barking Deer *Muntiacus muntjak* and Mouse Deer *Moschiola meminna*. Gaur *Bos frontalis* is also found, but an adult is too large a prey for a leopard. The Flying Squirrel *Petaurista petaurista* is present. Slender Loris *Loris tardigradus*, and Pangolin *Manis crassicaudata* are present but difficult to see due to their nocturnal habit. Small Indian Civet *Viverricula indica* and Golden Jackal *Canis aureus* are the smaller predators. Cotigao has many species of interesting reptiles, including King Cobra *Ophiophagus hannah*, but not much is known about them. Similarly, the freshwater fish have not been adequately surveyed.

LAND USE

- q Nature conservation

THREATS AND CONSERVATION ISSUES

- q Encroachment
- q Grazing

Despite the fact that Cotigao is a fully notified wildlife sanctuary, grazing is still a problem. Some encroachment has also taken place at the fringes, perhaps with the connivance of the Forest Department.

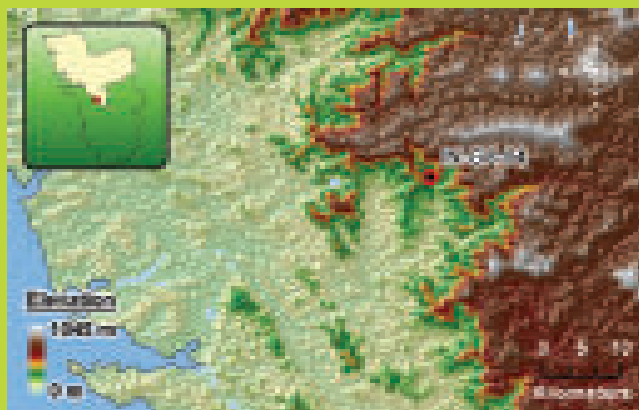
KEY CONTRIBUTOR

Heinz Lainer

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MHADEI WILDLIFE SANCTUARY AND RIVER BASIN FOREST AREA



IBA Site Code	: IN-GA-04
State	: Goa
District	: North Goa
Coordinates	: 15° 37' 34" N, 74° 12' 22" E
Ownership	: State
Area	: 20,848 ha
Altitude	: Not available
Rainfall	: 3,000 mm
Temperature	: 21 °C to °C
Biogeographic Zone	: Western Ghats
Habitats	: Riverine Vegetation, Littoral Forest

IBA CRITERIA: A1 (Threatened Species), A2 (Endemic Bird Area 123: Western Ghats), A3 (Biome-10: Indian Peninsula Tropical Moist Forest)
PROTECTION STATUS: Wildlife Sanctuary, established in May 1999

GENERAL DESCRIPTION

This IBA site was named after the river Mhadei (Mandovi) which is considered as the lifeline of Goa. The entire site occupies 43% of the geographical area of Goa State. Mhadei Wildlife Sanctuary with an area of 20,800 ha is the part of Mhadei river basin. It is considered ecologically rich and pristine. The Mhadei is an interstate river, with its catchment area spread over Goa, Karnataka and Maharashtra. The IBA is within the Western Ghats. The forest types range from Moist Deciduous, Semi-evergreen and Secondary Scrub. An annual rainfall of 3,000 mm spread roughly over five months, and high relative humidity between 70% to 80%, make ideal conditions for plant growth and diversity. Thus, thick forests, humid climate and moist soil have contributed to the species richness in this region.

This IBA site is of great cultural significance as most of the sacred groves of Goa are located in this region. The sacred grove Nirankarachi is dominated by a unique plant species *Myristica malabarica*, which is endangered and endemic to the site.

AVIFAUNA

The Mhadei Valley has a large number of endemic and biome restricted species. More than 150 species of birds are known to

occur in the site. This site is an important part of the Western Ghats Endemic Bird Area and, of the 16 endemic bird species of this EBA (Stattersfield *et al.* 1998), seven have been recorded from Mhadei Valley.

The Ruby-throated Yellow Bulbul *Pycnonotus melanicterus gularis*, a subspecies of the Black-headed Yellow Bulbul is restricted to the Western Ghats complex and its geographical range starts from Goa southwards, i.e. from the forests of Mhadei. This bird has the distinction of being the State Bird of Goa.

BirdLife International (undated) has listed 15 species in Biome-10, of which 12 are reported from Mahadei.

Vulnerable

Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
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Endemic Bird Area 123: Western Ghats

Nilgiri Wood-Pigeon	<i>Columba elphinstonii</i>
Blue-winged Parakeet	<i>Psittacula columboides</i>
Malabar Grey Hornbill	<i>Ocyrceros griseus</i>
Grey-headed Bulbul	<i>Pycnonotus priocephalus</i>
Indian Rufous Babbler	<i>Turdoides subrufus</i>
White-bellied Blue-Flycatcher	<i>Cyornis pallipes</i>
Small Sunbird	<i>Nectarinia minima</i>

Biome-10: Indian Peninsula Tropical Moist Forest

Small Green-billed Malkoha	<i>Phaenicophaeus viridirostris</i>
Jerdon's Nightjar	<i>Caprimulgus atripennis</i>
Malabar Trogon	<i>Harpactes fasciatus</i>
Malabar Pied Hornbill	<i>Anthracoceros coronatus</i>
White-cheeked Barbet	<i>Megalaima viridis</i>
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Black-headed Babbler	<i>Rhopocichla atriceps</i>
Loten's Sunbird	<i>Nectarinia lotenia</i>
Black-throated Munia	<i>Lonchura kelaarti</i>

Excellent forest cover is present in this IBA but denotification threat looms over it.



Photo: Nirmal Kulkarni

Loten's Sunbird *Nectarinia lotenia* is Biome-10 species.

Photo: Clement Francis M.



OTHER KEY FAUNA

The conditions of this site are especially suited for reptilian fauna. More than 45 species of snakes are known to occur in the region. Of the 14 Pit Vipers found in India, 8 are reported to occur in this region including the Green Pit Viper *Trimeresurus gramineus*, and Hump-nosed Pit Viper *Hypnale hypnale*. Apart from snakes, the thick forests of Mhadei provide ideal habitat for agamids, skinks and geckos.

The highly endemic Wroughton's Freetailed Bat *Otomops wroughtoni* is found in one of the Barapeda caves near Talewadi of Khanapur on the Goa-Karnataka border. Krishnapur caves are one of the three habitats worldwide of another rare bat *Taphozous theobaldi*. Another species of bat, *Megaderma spasma*, that inhabits the Talewadi caves, is localized in the Indian subcontinent (Bates and Harrison 1997).

There are confirmed reports of the presence and movement of tigers (*Panthera tigris*) in the area, which is contiguous to Mollem, Dandeli, Mhadei and Netravati wildlife sanctuaries.

Similarly among invertebrates, endemism is high, and hundreds of species are found. Butterflies range from the Malabar Tree Nymph *Idea malabarica*, and Southern Birdwing *Troides minos*, India's largest butterfly, to the Grass Jewel *Zizeeria trochilus*, India's smallest. The Atlas Moth *Altacus atlas*, is also recorded here.

LAND USE

- q Nature conservation

THREATS AND CONSERVATION ISSUES

- q Deforestation
- q Poaching
- q Encroachment

Extensive habitat degradation and loss are a constant problem at the site. Altering the habitat structure has resulted in reduction in abundance and range of several bird species. The reasons of the habitat alterations are:

- a) *Kumeri* (shifting cultivation) which involves clearance of pristine forest and is doing irreparable damage. There has been some reduction in this practice, but the conversion of forest into cashew plantations continues unabated.
- b) Plantation of exotic species such as *Acacia* and *Eucalyptus* in natural forests openings. The monoculture plantations result in loss of plant diversity, which in turn affects the abundance of bird and other fauna.
- c) The most important conservation issue is the Mhadei Diversion Scheme proposed by the Karnataka Government. The diversion of Mhadei into the Malaprabha basin will have a devastating effect on the pristine forests of the Mhadei Valley.

In this ecologically rich area, the Karnataka Government has planned a chain of seven diversion dams and three main dams for the Mhadei Hydroelectric Project. Besides these projects, Karnataka has plans to divert Katka and Palna tributaries of Dudhsagar or Khandepar river to Supa and Kalinadi basins. This will affect the whole forest area on the banks of these tributaries.

Another grave danger comes from open-cast mining. There are about 40 mining leases, of which only 11 mines are active, while others are not working. The miners lease owners want the potential mining areas to be excised from the Sanctuary. The Government of Goa, keen to garner votes, constituted a committee, which recommended that only 'active mines' may be permitted to carry on mining operations strictly within the areas assigned to them, without any future expansion, and such mines within the Sanctuary may be phased out gradually.

KEY CONTRIBUTOR

Harvey D'Souza

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