

STATUS AND CONSERVATION OF SOME RARE ENDEMIC AVIFAUNA
OF THE ANDAMAN ISLANDS : A PRELIMINARY SURVEY

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October 1993

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A Study on the Ecology, Status and Conservation Perspectives of Certain Rare Endemic Avifauna of the Andaman and Nicobar Islands

INTRODUCTION

The Andaman & Nicobar Islands (6°45'N to 13°41'N and 92°12'E to 93°57'E) have varied and rich flora and fauna (Balakrishnan 1985, Rao 1986, Rao 1989). Nine percentage of the fauna are endemic and nothing is known of their status. Amongst birds, about 39% are endemic, and there have been no systematic effort to assess the status of many species, to study their ecological requirements, to monitor the effects of habitat changes on the fauna nor to prepare specific conservation strategies that will prevent the extinction of endemic species. The status and conservation of three species, the Narcondam Hornbill *Aceros narcondami*, Nicobar Scrubfowl *Megapodius nicobariensis* and the Andaman Teal *Anas gibberifrons albogularis* are considered as of immediate importance (Rao 1989) and hence, the project was taken up with the following objectives:

1. To assess the status of endemic avifauna in the Andaman and Nicobar Islands and to identify taxa which are rare, threatened or endangered.
2. To study the ecology of the Nicobar Scrubfowl or Megapode (*Megapodius nicobariensis nicobariensis* & *M. n. abbotti*), Narcondam Hornbill (*Aceros narcondami*) and Andaman or Grey Teal (*Anas gibberifrons albogularis*).
3. To prepare a conservation management plan for rare endemic avifauna of the Andaman & Nicobar Islands.

Realizing the importance of this study, while the project is submitted to the Ministry of Environment and Forests, Government of India for funding, the work was initiated with the fund provided from SACON.

A Preliminary Survey of the Andaman Islands

Study area and methods

The Andaman Islands has a total area of 6408 Sq.km which is divided administratively into South, Middle and North Andamans. Little Andaman, though administratively part of South Andaman

lies separated far apart by the Duncan passage. From Rutland Island to Baratang Island with the other islands lying nearby comprise the South Andaman Division while that in line with Interview Island upto the Landfall Island and the distant Narcondam Island form North Andaman. Middle Andaman lies in between North and South Andamans (Fig.)

The present survey focused on the Andaman Teal observing various other species available in the following major habitats described by Champion and Seth(1968):

1. Giant Andaman evergreen forest. Climax forests in lowlands, occurring mainly along streams and in the lower valleys.
2. Andaman tropical evergreen forest. Multi-storeyed, closed canopy forests occurring on hilly terrain.
3. Andaman moist deciduous forest. Open canopy deciduous forests occurring on lower slopes, and often occupy the area between the Tidal zone and the patches of Andaman tropical evergreens.
4. Andaman hill-top evergreen forest. Stunted wind-resistant forests.
5. Littoral forest. Open formations of tall, sturdy trees with limited undergrowth. Occur on sandy beaches just above high water level.
6. Mangrove forest. Dense formations well adapted to salinity, tidal fluctuations and marshy soil.

The survey was conducted during April-May 1992 and March 1993. Since many days went for ground work in making arrangements for the survey, the actual period of observation, the field days, were much less. Programme for some days had to be altered or cancelled due to logistic reasons or unavoidable circumstances. Hence, the number of field days spent in South, North, Middle and Little Andamans were 9,7,2 and 3 respectively. Time spent in Middle Andaman is inadequate and not proportionate to the area.

Samples of different habitats were surveyed noting the species and number of birds on either side and also those flying overhead. According to the habitat, it was covered either by walk or by boat moving slowly and stopping in between to locate the birds and the calls. Specific habitats of the Andaman Teal was given emphasis during this survey. Major areas covered in the Andamans for observing birds are:

Legend:

- ROADS (Completed)
- ROADS (Under Construction)
- FORESTS
- JARAWA RESERVE
- REVENUE LAND

1 North Andaman: Kalighat, Diglipur, Ariel Bay, Kalipur, Saddle Peak National Park (from the coast to the 2nd tallest peak) Kishori Nagar, Thal Bagan, Paschimsagar, Shaerme Island wildlife sanctuary, Mayabunder, Interview Island wildlife sanctuary, Mohanpur, Karmatang and Hanspuri.

2 Middle Andaman : Rangat, Kadamtala (Jarawa Reserve area and Santhanu).

3 South Andaman: Port Blair, Bambooflat, Katakatchal, Wimberlygunj, Wrightmyo, Shoal Bay Creek, Wandoor National Park (Wandoor, Alexandra island, Jolly boys' Island), Jirгатang, Middle Strait, Barratang Island (Nilambur, Baludera Creek, the Jarawa Reserve and Mangrove areas in different creeks), Sippighat, Dhanigadi, Bimblitan, Burmanullah and Chiriyatapu.

4 Little Andaman: Hut Bay, 5 km point to No.1 Nalah, '6 to 7 km' area, '12 to 15 km' area with red oil palm and species plantations, 19 km area to and at Dugong Creek.

Results and discussion

Status of the birds in general

A total of 3152 birds of 112 species were observed during this survey (Appendix 1). Maximum number of birds observed (1199) was in North Andaman, whereas the maximum species was in South Andaman (85). The number of species and birds in Middle Andaman were the minimum (Table 1) probably because of less observation.

Table 1. Abundance and Diversity of birds in Andaman Islands

Place	Total No.birds	Species	Diversity H'	Equitability
South Andaman	1006	85	3.766	0.85
North Andaman	1199	81	3.637	0.83
Little Andaman	729	58	3.496	0.86
Middle Andaman	218	43	3.362	0.89
TOTAL	3152	109	3.869	0.82

Species diversity of birds in different regions were high because of the rich avifauna since the whole data for each region covering various habitats was considered together. As it was summer with birds breeding and hence probably equally distributed

(not being in huge flocks), equitability and diversity might have gone up. Less intensity of sampling and habitats covered in Middle Andaman explain the low species diversity.

Frequency of occurrence of species in total was 1389 with the highest in North Andaman. Percentage frequency occurrence of each species in different areas was calculated to find an index for the commonness or rarity of the species. Species occurring in more than 4% of observations are considered here as common the maximum being 8.4 for the Andaman Green Imperial Pigeon and the minimum of 0.07 for single occurrences (Table 2). Accordingly in the total survey 7 species would be considered as common, namely the Andaman Green Imperial Pigeon, Andaman Redbreasted Parakeet, Andaman Blacknaped Oriole, Andaman Racket-tailed Drongo, Andaman Glossy Stare, Fairy Bluebird and Andaman Redwhiskered Bulbul. The abundance and status of species varied in different places. In South Andaman only 5 species were common while in North and Little Andamans it was 7 and in Middle only 5. Only two species were common in all the four regions, the Andaman Green Imperial Pigeon and the Andaman Glossy Stare. Andaman Redbreasted Parakeet was common in North and Little Andamans while it was Redcheeked in Middle Andaman. Andaman Hill Myna and Andaman Blacknaped Monarch were frequently observed only in Little Andaman. The Nicobar Pigeon, though more abundant in the Nicobar group of islands and reported from many islands in Andamans, was sighted only once during this survey (in Shaerme Island). Nicobar White-eye was seen only in South Andaman.

Indian Shag, Drongo-cuckoo and Ring dove were not reported earlier (Abdulali 1964, 1964a, 1966, 1967, 1971; Das 1971 and Dasgupta 1976). According to these reports about 62 forms (species or subspecies) are endemic to Andaman Islands with about 15 of them occurring in Nicobar Islands also. Presence and status of some are doubtful in different areas which are to be confirmed. Some of the subspecies are difficult to be differentiated in the field, such as the two subspecies of Pampadour Pigeon and the Andaman Pale Serpent Eagle from the Burmese Crested Serpent Eagle.

Altogether **52** of the endemic species were observed during this survey. Some of the rare endemic species seen are the Andaman Blackcrested Baza (Interview Island), Andamans Banded Crake (Katakatchal), Andaman Bluebreasted Banded Rail (Katakatchal and Wandoor) Andaman Threetoed Kingfisher (Hut Bay), Ruddy Kingfisher

(Sippighat area), Barred Cuckoo-Shrike (Interview Island), Andaman Palefooted Bush Warbler (Katakatchal). The Andaman Dark Serpent Eagle, although considered one of the rare species of the world (Mountfort & Arlott 1988), was sighted frequently.

Table 2. Frequency occurrence of birds observed in Andaman Islands

Species	Percentage frequency				
	South	North	Little	Middle	Total
Indian Shag	0	0.19	0	0	0.07
Little Green Heron	1.15	0.38	0	0	0.50
Indian Pond Heron	0.69	0.38	0	0	0.35
Cattle Egret	0.69	0.19	0	0	0.28
Large Egret	0.23	0.19	0	0	0.14
Intermediate Egret	0.23	0.19	0	0	0.14
Eastern Reef Heron	0.69	0.38	0.63	0	0.50
Andaman Teal *	0	1.14	0.31	0	0.50
Andaman Blackcrested Baza *	0	0.38	0	0	0.14
Sparrow Hawk	0.23	0.19	0	0	0.14
Andaman Crested Hawk-Eagle *	0.23	0.19	0	0.86	0.21
Whitebellied Sea Eagle	1.38	0.95	0.31	0	0.86
Burmese Crested Serpent Eagle	0	0.19	0	0	0.07
Andaman Pale Serpent Eagle *	0.23	0.38	0.31	0	0.28
Andaman Dark Serpent Eagle *	2.07	2.49	1.89	0	2.01
Andaman Bluebreasted Banded Rail *	0.46	0	0	0	0.14
Andaman Banded Crake *	0.23	0	0	0	0.07
Andamans Whitbreasted Waterhen *	2.53	0	0	0	0.79
Malay Moorhen	0	0.19	0	0	0.07
Golden Plover	0.23	0.57	0	0	0.28
Large Sand Plover	0	0.19	0	0	0.07
Little Ringed Plover	0	0	0.31	0	0.07
Lesser Sand Plover	0.46	0.19	0.63	0	0.35
Curlew	1.15	0.76	0.63	0	0.79
Redshank	1.38	0	0	0	0.43
Greenshank	0.23	0	0	0	0.07
Terek Sandpiper	0.23	0.19	0	0	0.14
Common Sandpiper	1.84	2.10	1.26	0	1.65
Turnstone	0.46	0	0.31	0	0.21
Javan Gullbilled Tern	0	0	0	0.86	0.07
Roseate Tern	0	0	0.31	0.86	0.14
Eastern Blacknaped Tern	0.23	0	0.31	1.72	0.28
Sooty Tern(?)	0	0	0.31	0.86	0.14
Noddy Tern	0	0	0	0.86	0.07
Andaman Pompadour Pigeon *	1.15	1.34	1.26	0.86	1.22
Andaman Green Imperial Pigeon *	8.06	9.00	7.57	8.62	8.35
Andaman Wood Pigeon *	0.46	0.95	1.89	2.58	1.15
Andaman Cuckoo-Dove *	0.46	0.57	0.94	0	0.57

Table 2. contd.

Species	Percentage frequency				
	South	North	Little	Middle	total
Burmese Red Turtle Dove	1.84	1.14	0.31	2.58	1.29
Ring Dove	0.23	0	0	0.86	0.14
Andaman Emerald Dove *	0.23	0.95	0.63	0	0.57
Nicobar Pigeon	0	0.19	0	0	0.07
Large Andaman Parakeet *	1.15	1.91	0	1.72	1.22
Andaman Redbreasted Parakeet *	3.22	4.98	9.46	3.44	5.32
Andaman Redcheeked Parakeet *	1.61	0.95	2.20	6.89	1.94
Indian Lorikeet	0.92	2.49	0.94	3.44	1.72
Drongo-Cuckoo	0.23	0	0	0	0.07
Cuckoo	0.46	0.19	0	1.72	0.35
Himalayan Cuckoo	0.46	0.19	0	0	0.21
Small Cuckoo	0	0.19	0	0	0.07
Emerald Cuckoo	0	0.19	0	0	0.07
Violet Cuckoo	0.23	0	0.31	0	0.14
Andaman Koel *	0.23	0.38	0.31	0	0.28
Andaman Crow - Pheasant *	3.68	3.25	3.15	3.44	3.38
Jungle Nightjar	0.46	0.19	0	0	0.21
Andaman Longtailed Nightjar *	0.23	0	0	0	0.07
Whitebellied Swiftlet *	0.92	1.14	0.31	2.58	1.00
Brownthroated Spinetail Swift	0.46	0.19	0	0	0.21
Indian Small Blue Kingfisher	0.23	0.38	0	0	0.21
Andaman Three-toed Kingfisher *	0	0	0.31	0	0.07
Andaman Storkbilled Kingfisher *	1.61	0.76	0	0	0.79
Andaman Ruddy Kingfisher *	0.23	0	0	0	0.07
Andaman Whitebreasted Kingfisher *	2.76	2.68	0.31	0.86	2.01
Blackcapped Kingfisher	0	0.19	0	0	0.07
Andaman Whitecollared Kingfisher *	2.30	1.14	1.57	0	1.51
Andaman Chestnutheaded Bee-eater *	0.92	0.95	0.94	0.86	0.93
Andaman Broadbilled Roller *	0.46	0	0.31	0	0.21
Andaman Black Woodpecker *	0.92	3.06	2.52	2.58	2.23
Andaman Spottedbreasted Pied W.P. *	0.23	1.14	1.26	0	0.79
Swallow	0	0.38	0.31	0.86	0.28
Javan House Swallow	0	0	0	0.86	0.07
Brown Shrike	1.84	0.19	0.63	1.72	0.93
Andaman Blacknaped Oriole *	1.84	4.02	5.36	3.44	3.59
Blackheaded Oriole	0.23	0.38	0	0	0.21
Large Andaman Drongo *	0	1.72	0	0.86	0.71
Small Andaman Drongo *	0.92	0	4.73	0	1.36
Andaman Racket-tailed Drongo *	3.68	6.70	2.83	5.17	4.75
Whitebreasted Swallow-Shrike *	0.23	0.76	1.26	0.86	0.71
Andaman Glossy Stare *	5.52	4.78	3.78	6.89	4.96
Andaman Whiteheaded Myna *	2.99	2.49	1.26	0	2.15

Table 2 contd.

Species	Percentage frequency.				
	South	North	Little	Middle	Total
Indian Myna	2.53	0	0	0	0.79
Andaman Hill Myna *	1.61	3.06	3.47	2.58	2.66
Andaman Tree Pie *	0.46	0.30	0.31	0.06	0.43
Eastern Jungle Crow	1.04	0.30	1.89	0.86	1.22
Andaman Targe Cuckoo-Shrike *	2.07	1.53	0.63	1.72	1.51
Barred Cuckoo-Shrike *	0	0.19	0	0	0.07
Andaman Scarlet Minivet *	0.69	1.14	1.57	0	1.00
Eastern Small Minivet *	0.23	2.07	1.57	0.86	1.58
Fairy Bluebird	1.15	4.02	5.36	4.31	3.45
Andaman Blackheaded Bulbul *	0.23	0.30	1.89	1.72	0.79
Andaman Redwhiskered Bulbul *	5.76	2.29	8.20	7.75	5.18
Brown Flycatcher	0.46	0	0	0	0.14
Andaman Blacknaped Monarch *	0.46	0.19	3.47	0.86	1.07
Mangrove Whistler	2.76	0.38	0.31	0	1.07
Andaman Palefooted Bush Warbler *	0.23	0	0	0	0.07
Pallas's Grasshopper Warbler	0.23	0	0	0	0.07
Assam Reed Warbler	0.69	0.19	0.31	0	0.35
Eastern Great Reed Warbler	0.92	0	0	0	0.28
Siberian Yellowbrowed Leaf Warbler	0.23	0	0	0	0.07
Largebilled Leaf Warbler	0.23	0.19	0	0	0.14
Andaman Magpie-Robin *	2.76	0.57	0.94	1.72	1.43
Andaman Shama *	0	0.19	1.26	0	0.35
Andaman Ground Thrush *	0	0.19	0.31	0	0.14
Forest Wagtail	0	0.19	0	0.86	0.14
Grey Wagtail	0	0.95	0	0.86	0.43
Andaman Flowerpecker *	1.61	4.40	2.20	2.58	2.87
Andaman Olivebacked Sunbird *	1.15	1.72	1.89	2.58	1.65
Nicobar White-eye *	0.46	0.19	0	0	0.21
House Sparrow	0.23	0	0	0	0.07
TOTAL	434	522	317	116	1389

Endemic species (f>D .

Birds found nesting during the survey were: (1) Andaman Dark Serpent Eagle (Barratang Island), (2) Andaman Crow-Pheasant (Haddo, South Andaman), (3) Andaman Whitecollared Kingfisher (Wandoor, South Andaman), (4) Andaman Whiteheaded Myna (North Andaman), (5) Andaman Hill Myna (Little Andaman) and (6) Andaman

Olivebacked Sunbird (Sippighat, South Andaman). The Andaman Blackcrested Baza, although not seen nesting were showing signs of breeding; a pair chasing away Sparrow-Hawk from one location in the Interview Island. Abdulali and Grubh (1970) have recorded this species in South Andaman having enlarged gonads in the second week of April.

Andaman Greyrumped Swiftlet, Paradise Flycatcher, Andaman Whitebacked Munia and a few species of owls are some of the endemics that were not found this time. Paradise Flycatcher might be only a winter visitor to South Andaman and hence might have already left (Ali & Ripley 1983). However, further surveys in the Andaman Islands will bring out the status of many endemic species, especially the ones that are getting rarer including the Andaman Teal. A report on the sightings of the Teal with its habitats and conservation problems is given below:

Status of the Andaman Teal

The Andaman Grey (Oceanic) Teal *Anas gibberifrons albobularis* is the only endangered and endemic species among the 49 anatids recorded from India, except the Pinkheaded Duck *Rhodonessa caryophyllacea* which is believed to be almost extinct. Although this teal has its relatives, the other subspecies, they are distributed widely apart and in islands such as Jawa to Sulawesi, Wetar, Rennell, Australia, New Guinea and New Zealand (Howard & Moore 1991) and hence, conservation of the Andaman Teal is important even in a global context with the report of an alarming rate of decrease in its population. It was reported to be present all through the Andamans and was very common, occurring in huge flocks in the 19th and early 20th centuries (Osmaston 1906, Abdulali 1964) but getting less numerous after mid 20th century (Delacour 1956, Ali & Ripley 1983). The drastic decline was reported after the two decades of survey during 1960s and 70s by the Zoological Survey of India (Mukherjee 1984) showing an estimate at 300. However, it is not included in the list of endangered species of the world (King 1981).

Details of the habitats and the sightings of the Andaman Teal are given below:

Paschimsagar

Lying on the west coast in the North Andaman with sandy and rocky

beaches and rivulets flowing down from the streams among the mangroves and habitations, has the surrounding areas being converted into settlements. Four Andaman teals were located here resting on the sandy shore near the stone islets; observed at about 50m from the boat.

Shaerme Island Wildlife Sanctuary

On the western coast of this island a small river joins the sea, before which it has some deeper pools and marshy area that remain even in summer. This area is known as 'Bathak tikri', the teal area. It is surrounded by coastal forests, while on the eastern coast are lots of coconut and casurina besides the natural vegetation.

The marshy area where the teals are usually sighted is a part of the stream with a shallow pool in summer. Thick grasses form patches, looking like suitable nesting habitat for the teals. Only one teal was found flying over this marsh. People coming here for collecting shells reported that they used to find the teals in good numbers after monsoon and, at times with some chicks.

Interview Island Wildlife Sanctuary

A pond of about 72m depth and 5m width on one side of a small stream with muddy water was found to have 8 teals feeding and bathing near the old watch tower. This pond is a permanent waterhole for the elephants. This island has some more streams with pools of water remaining in summer which harbour the teals. In such an area (ground ka diggi) 6 teals were observed closely on the second day, some feeding and some resting on the bank under small trees. A few more are reported to be sighted in another area (Sivaganesan pers.comm.). This island has a better population of these teals even in summer probably because of the habitat availability and less disturbance. The areas where they were sighted were surrounded by forests of semievergreen or moist deciduous type. The larger trees must be having holes for nesting of this species which is not yet reported, although the birds are found in different seasons, probably all through the year (Bonny pers.comm.).

Mohanpur

About 2 km from Mayabunder is a large lake-like area with embankments constructed by the villagers on the lower part of the low-lying area in order to collect fresh water during monsoon as well as to avoid sea water coming in so that the fresh water can be used for paddy cultivation in the nearby areas. The pond is about 600 sq.m with a marshy area of fern *Acrostichum* sp., grasses and sedges such as *Paspalum* sp., *Scirpus* spp. *Eleocharis* and, *Polygonum* sp. Fishing goes on in the area. Still 6 teals could be found on the extreme end, which also flew away. More birds are reported to be using this area, especially during night. People hunting them is also not uncommon besides causing disturbance by fishing and other activities.

Hanspuri

A large pond located in the foothills with bordering tall grasses might have an area of about 5 ha. when flooded, but had shrunk to a small pool in summer where only a buffalo was wallowing. The valley has cultivation and at the foothills nearer to the forests are the settlements. The marshy forests are thick evergreen/semi-evergreen type. Forest Department also has a camp here; still poaching is reported, this species being a delicacy.

Although teals were not found in this pond, 12 of them were found in the nearby area half a kilometre from here, with rivulets running down to the creeks through mangroves of smaller bushes and trees. They were feeding from the slushy mud and moving away slowly.

Kadamtala

There is a reservoir in this area which comes inside the Jarawa Reserve in the Middle Andamans. The reservoir is made by the construction of a dam on the river for storing and supplying fresh water for drinking. The reservoir is large, of about 300 m long, 50 m wide and 2-3m deep. It is surrounded by evergreen/semi-evergreen forests. On the banks of the reservoir, there were signs of people fishing (Jarawas and villagers?); they might also be hunting these birds. One Forest department protection staff reported to have sighted 15 teals here in the previous month.

Baratang Island

Various creeks in this area with mangrove were surveyed by walk and by jeep or by boat; but no teal could be found. Baludera creek which is a promising area for the teals has marshy and swampy area with mangroves and, rivulets leading to the creek as observed in Hanspuri with the difference of having larger and taller mangrove trees.

Katakatchal

Situated between Bambooflat and Wimberlygunj in the South Andaman has mangrove swamps and marshes with small mounds of vegetation, grasses and sedges. Most of the marshes were dry which when flooded is supposed to be a good area for teals. They are reported to be seen in flocks of tens and are believed to be breeding here (Mr. Bhatt pers. comm). The nearby similar areas are converted into coconut plantations removing the vegetation, drying and destroying the habitat of this species.

Sippighat area

Marshes with swampy vegetation of fern (*Acrostichum aureum*), *Scirpus* spp, grasses and *Achanthus* spp. at certain places are described as good areas of sighting the teals when the area is flooded. These areas were dry when surveyed. The mangrove swamps and forests had no teals. In Sippighat, some areas which are deeper are used and maintained by the Water Sports Authority for training and, boating for tourists. The swamps and creeks outside this if protected might provide good habitat for these teals. Public awareness and involvement could yield better conservation measures.

Little Andaman

a) Six kilometre from Hut Bay along the road and then to the coastal area where a freshwater stream joins a creek, 6 teals were feeding in water with reeds and grasses. Grass mounds in the nearby areas when flooded might be a good nesting habitat. The birds here were the least disturbed, probably because of less hunting. Lot of fishing is going on in the sea, also cultivation of vegetables in many places.

b) Near '13 km' area on the coast a small creek is found which is

believed to be a probable site for the teal, but was almost dry with only a small pool of water. About a kilometre from here another creek which is cut off from sea from outside and to which small streams flow down during monsoon to form a lake-like area of brackish water. Fishing activities were going on. Semievergreen and moist deciduous forests surround this area which on one side leads to the spices plantations.

Potential areas not covered during the survey are Pichernullah creek and other areas in Middle Andaman, Landfall and North Reef Islands in North Andaman; Constance Bay, Colinpur and Port Mouth in South Andaman. However, North Reef was reported to be dry not having any teals during the survey period (ZSI team)

Conservation of the Andaman Teal

The recent survey of this species resulted in an alarmingly low number of 43 individuals sighted at seven localities. However, a few places could not be visited while I missed them in a few areas though sighted recently by reliable people, and a few promising sites were dry and hence they might have moved away. On the whole, their population will be only about 200.

Since their habitats are freshwater streams, ponds or impoundments and brackishwater swamps, tidal creeks or estuaries, human disturbance is the maximum because of the various activities such as irrigation, fishing, other uses by man and cattle. Habitat loss due to reclamation for agriculture and plantations, and persecution by people are the probable major reasons for its decline.

Very few of its habitats are within the protected areas. Protection measures have to be enforced more effectively providing proper facilities to the protection staff and by inculcating awareness among the local community so that they should take charge of the protection as their privilege and responsibility. Proper incentives may also be given to them for undertaking such responsibilities and developing employment generating schemes with locally available resources.

Acknowledgements

Mr. A. K. Wahal, the Chief Wildlife Warden of Andaman and Nicobar Islands, with his keen interest in scientific studies and

conservation, gave full support for the study. Mr Ajay Saxena, DCF provided valuable information regarding the Andaman Teal. The Conservators of Forest Messrs Pandey and Balachandran was of great help. The facilities given by the DFOs of different Forest Divisions in Andamans, Ms Kala, Messrs R G C Jayaraj, James Kurien, Agarwal, Prasanth, and the Range officers and other staff of the Forest Department made the fieldwork easy. The Project Manager and Divisonal Manager of Forest Plantation Development Corporation at Hut Bay and the Thahsildar of little Andaman were of immense help. The Shaji Shipping Corporation allowed me to travell by their cargo ship from Port Blair to Little Andamans. Dr Mallick the Deputy Director, Drs Sreekumar and Rao scientists of Botanical Survey of India at Haddo helped me a lot in the initial stages. The Deputy Director and scientists of the Zoological Survey of India also provided usefull information. The interest shown and support given by the District Administration were of no little importance. I record my sincere gratitude to all these people and also to many others who helped me in their possible capacities. The assistance from the staff of SACON and the inspiration from the director Dr V S Vijayan are gratefully acknowledged.

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APPENDIX
BIRDS OF ANDAMAN ISLANDS

Common name	Scientific name
Indian Shag	<i>Phalacrocorax fuscicollis</i>
Little Green Heron	<i>Butorides striatus spodiogaster</i>
Indian Pond Heron	<i>Ardeola grayii</i>
Cattle Egret	<i>Bubulcus ibis coromandus</i>
Large Egret	<i>Egretta alba modesta</i>
Intermediate Egret	<i>Egretta intermedia intermedia</i>
Eastern Reef Heron	<i>Egretta sacra</i>
Andaman Teal	<i>Anas gibberifrons albogularis</i>
Andaman Blackcrested Baza	<i>Aviceda leucophotes andamanica</i>
Sparrow - Hawk	<i>Accipter nisus nisosimilis</i>
Andaman Crested Hawk - Eagle	<i>Spizaetus cirrhatus andamanensis</i>
Whitebellied Sea Eagle	<i>Haliaeetus leucogaster</i>
Burmese Crested Serpent Eagle	<i>Spilornis cheela burmanicus</i>
Andamans Pale Serpent Eagle	<i>Spilornis cheela davisoni</i>
Andaman Dark Serpent Eagle	<i>Spilornis elgini</i>
Andaman Bluebreasted Banded Rail	<i>Rallus striatus obscurior</i>
Andaman Banded Crake	<i>Rallina canningi</i>
Andamans Whitbreasted Waterhen	<i>Amauornis phoenicurus insularis</i>
Malay Moorhen	<i>Gallinula chloropus orientalis</i>
Golden Plover	<i>Pluvialis dominica fulva</i>
Large Sand Plover	<i>Charadrius leschenaultii</i>
Little Ringed Plover	<i>Charadrius dubius curonicus</i>
Lesser Sand Plover	<i>Charadrius mongolus atrifrons</i>
Curlew	<i>Numenius arquata orientalis</i>
Redshank	<i>Tringa totanus totanus</i>
Greenshank	<i>Tringa nebularia</i>
Terek Sandpiper	<i>Tringa terek</i>
Common Sandpiper	<i>Tringa hypoleucos</i>
Turnstone	<i>Arenaria interpres interpres</i>
Javan Gullbilled Tern	<i>Gelochelidon nilotica affinis</i>
Roseate Tern	<i>Sterna dougallii korustes</i>
Eastern Blacknaped Tern	<i>Sterna sumatrana sumatrana</i>
Sooty Tern	<i>Sterna fuscata nubilosa</i>
Noddy Tern	<i>Anous stolidus pileatus</i>
Andaman Pompadour Pigeon	<i>Treron pompadora chloroptera</i>
Andaman Pompadour Pigeon	<i>Treron pompadora andamanica(?)</i>
Andaman Green Imperial Pigeon	<i>Ducula aenea andamanica</i>
Andaman Wood Pigeon	<i>Columba palumboides palumboides</i>
Andaman Cuckoo - Dove	<i>Macropygia rufipennis andamanica</i>

APPENDIX contd.

Burmese Red Turtle Dove	<i>Streptopelia tranquebarica humilis</i>
Indian Little Brown Dove	<i>Streptopelia senegalensis cambayensis</i>
Ring Dove	<i>Streptopelia decaocto</i>
Andaman Emerald Dove	<i>Chalcophaps indica maxima</i>
Nicobar Pigeon	<i>Caloenus nicobarica nicobarica</i>
Large Andaman Parakeet	<i>Psittacula eupatria magnirostris</i>
Andaman Rebreasted Parakeet	<i>Psittacula alexandri abbotti</i>
Andaman Redcheeked Parakeet	<i>Psittacula longicauda tytleri</i>
Indian Lorikeet	<i>Loriculus vernalis</i>
Drongo - Cuckoo	<i>Surniculus lugubris</i>
Cuckoo	<i>Cuculus canorous subsp.</i>
Himalayan Cuckoo	<i>Cuculus saturatus saturatus</i>
Small Cuckoo	<i>Cuculus poliocephalus poliocephalus</i>
Emerald Cuckoo	<i>Chalcites maculatus</i>
Violet Cuckoo	<i>Chalcites xanthorhynchus xanthorhynchus</i>
Andaman Koel	<i>Eudynamus scolopacea dolosa</i>
Andaman Crow - Pheasant	<i>Centropus (sinensis) andamanensis</i>
Jungle Nightjar	<i>Caprimulgus indicus jotaka</i>
Andaman Longtailed Nightjar	<i>Caprimulgus macrurus andamanicus</i>
Whitebellied Swiftlet	<i>Collocalia esculenta affinis</i>
Brownthroated Spinetail Swift	<i>Chaetura gigantea indica</i>
Indian Small Blue Kingfisher	<i>Alcedo atthis bengalensis</i>
Andaman Threetoed Kingfisher	<i>Ceyx erithacus macrocarus</i>
Threetoed Kingfisher	<i>Ceyx erithacus erithacus</i>
Andaman Storkbilled Kingfisher	<i>Pelargopsis capensis osmastonii</i>
Andaman Ruddy Kingfisher	<i>Halcyon coromanda mizorhina</i>
Andaman Whitebreasted Kingfisher	<i>Halcyon smyrnensis saturator</i>
Blackcapped Kingfisher	<i>Halcyon pileata</i>
Andaman Whitecollared Kingfisher	<i>Halcyon chloris davisoni</i>
Andaman Chestnutheaded Bee-eater	<i>Merops leschenaulti andamanensis</i>
Andaman Broadbilled Roller	<i>Eurystomus orientalis gigas</i>
Andaman Black Woodpecker	<i>Dryocopus javensis hodgei</i>
Andaman Spottedbreasted Pied W.P.	<i>Picoides macei andamanensis</i>
Swallow	<i>Hirundo rustica gutturalis</i>
Javan House Swallow	<i>Hirundo tahitica javanica or mallopega</i>
Brown Shrike	<i>Lanius cristatus cristatus</i>
Andaman Blacknaped Oriole	<i>Oriolus chinensis andamanensis</i>
Blackheaded Oriole	<i>Oriolus xanthornus andamanensis</i>
Large Andaman Drongo	<i>Dicrurus andamanensis dicruriformis</i>
Small Andaman Drongo	<i>Dicrurus andamanensis andamanensis</i>
Andaman Racket-tailed Drongo	<i>Dicrurus paradiseus otiosus</i>
Whitebreasted Swallow - Shrike	<i>Artamus leucorhynchus humei</i>

APPENDIX contd.

Andaman Glossy Stare	<i>Aplonis panayensis tytleri</i>
Andaman Whiteheaded Myna	<i>Sternus erythropygius andamanensis</i>
Indian Myna	<i>Acridotheres tristis tristis</i>
Andaman Hill Myna	<i>Gracula religiosa andamanensis</i>
Andaman Tree Pie	<i>Dendrocitta bayleyi</i>
Eastern Jungle Crow	<i>Corvus macrorhynchus levaillantii</i>
Andaman Large Cuckoo - Shrike	<i>Coracina novaehollandiae andamana</i>
Barred Cuckoo - Shrike	<i>Coracina striata dobsoni</i>
Andaman Scarlet Minivet	<i>Pericrocotus flammeus andamanensis</i>
Eastern Small Minivet	<i>Pericrocotus cinnamomeus vividus</i>
Fairy Bluebird	<i>Irena puella (andamanica)</i>
Andaman Blackheaded Bulbul	<i>Pycnonotus atriceps fuscoflavescens</i>
Andaman Redwhiskered Bulbul	<i>Pycnonotus jocosus whistleri</i>
Brown Flycatcher	<i>Muscicapa latirostris (daurica daurica)</i>
Andaman Blacknaped Monarch	<i>Monarcha (Hypothymis) azurea tytleri</i>
Mangrove Whistler	<i>Pachycephala grisola (cinerea cinerea)</i>
Andaman Palefooted Bush Warbler	<i>Cettia pallidipes osmastonii</i>
Pallas's Grasshopper Warbler	<i>Locustella certhiola centralasiae</i>
Assam Reed Warbler	<i>Acrocephalus stentoreus amya</i>
Eastern Great Reed Warbler	<i>Acrocephalus orientalis</i>
Siberian Yellowbrowed L.W.	<i>Phylloscopus inornatus inornatus</i>
Largebilled Leaf Warbler	<i>Phylloscopus magnirostris</i>
Eastern Greenish Leaf Warbler	<i>Phylloscopus trochiloides trochiloides</i>
Andaman Magpie - Robin	<i>Copsychus saularis andamanensis</i>
Andaman Shama	<i>Copsychus malabaricus albiventris</i>
Andaman Ground Thrush	<i>Zoothera citrina andamanensis</i>
Forest Wagtail	<i>Motacilla (Dendronathus) indica</i>
Grey Wagtail	<i>Motacilla c. caspica (c. cinerea)</i>
Andaman Flowerpecker	<i>Dicaeum concolor virescens</i>
Andaman Olivebacked Sunbird	<i>Nectarinia jugularis andamanica</i>
Nicobar White-eye	<i>Zosterops palpebrosa nicobarica</i>
House Sparrow	<i>Passer domesticus</i>
