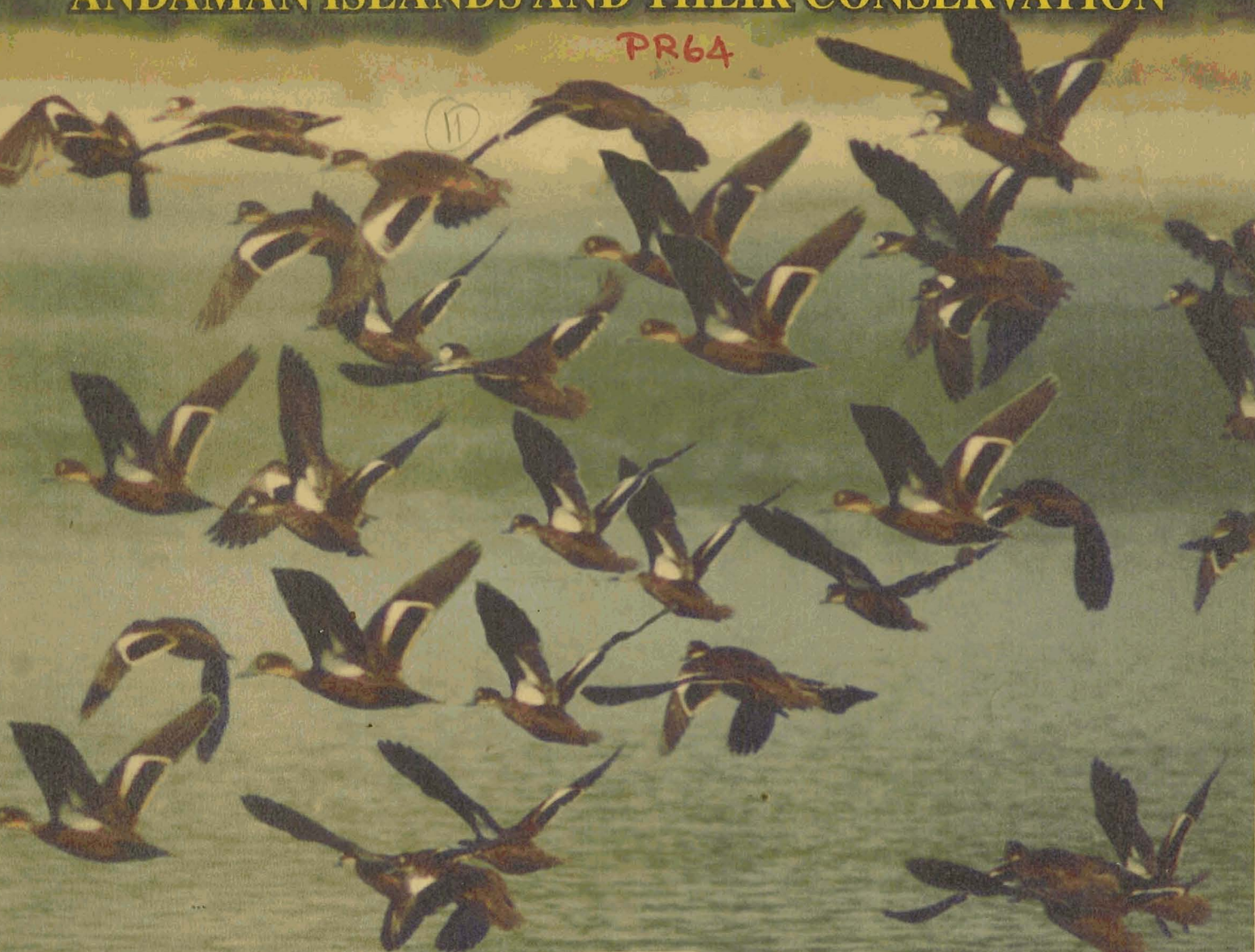


AVIFAUNAL DIVERSITY OF THE ANDAMAN ISLANDS AND THEIR CONSERVATION

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Sálim Ali Centre For Ornithology & Natural History, Coimbatore
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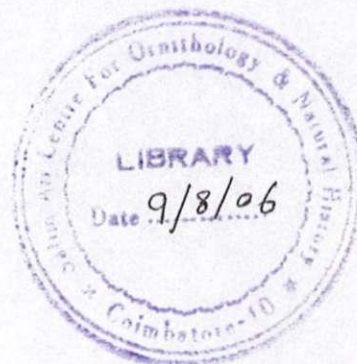
FINAL REPORT

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Executive Summary and Recommendations

Introduction

Birds are widely used as the best indicators of the ecosystem and hence for ecological evaluation and conservation planning. Identifying areas of high biodiversity value is of utmost importance in conservation and management of any ecologically important and sensitive area. Island ecosystems are highly vulnerable because of their fragile nature and many island species are threatened globally. The tropical low land forests predominant in the islands support most of the endemics and threatened birds in the world. Andaman and Nicobar Islands, one of the major island groups of India is rich in biodiversity with a higher degree of endemism, about 17% of the flowering plants, 13% of fauna including 39% of birds and 70% of butterflies. These island groups form two of the endemic bird Areas of the World. However, there has been very little effort to assess the exact status of most species or to study their ecology. A study was made recently by the Indian Institute of Remote Sensing (IIRS) on the biodiversity characterization at landscape level using detailed analysis of the vegetation. However, the project did not encompass spatial and structural information on the avifauna of the Andaman Islands. Hence, this study was taken up with the specific **objective**: to assess the avifaunal diversity and status of the endemic birds in different islands in Andaman which would help plan conservation and development strategies for the islands.

Study Area and Methods

The Andaman Islands group has more than 325 islands (21 inhabited) covering 6,408 km² and is administratively divided into South (3990 km²), Middle (1070 km²), and North Andaman (1348 km²). Little Andaman (731.6 km²), though part of South Andaman lies separated far apart by the Duncan Passage. The study involved mapping and landscape ecology using Remote sensing and GIS technology with primary data collected on the habitats, birds and secondary data on vegetation and other information. Satellite data from IRS-1D, LISS III of 2003 with the resolution of 23.5m, Survey of India maps and some image outputs from IIRS and NRSA were used. Ground truthing

was done covering different habitat types. The land cover classes were generated by Image processing in ERDAS Imagine 8.6. Landscape analysis was done using standard methods (Bio Cap). Various indices such as fragmentation (F), porosity (P), interspersion (I), biotic interference (B) and juxtaposition (J) were computed to derive the Disturbance Index (DI). Biological Richness (BR) was calculated adding the Ecosystem Uniqueness (EU), Species Richness (SR), Biodiversity Value (BV), Terrain Complexity (TC), and Disturbance Index (DI). Thus areas of different grades of disturbance and biological richness were identified and mapped.

Bird surveys were conducted covering different islands and habitats following standard methods, namely line transect and point count. A species list of the birds of the Andaman Islands was prepared and compared with that of the Nicobar Islands, the mainland India and South-East Asia to examine the affinities. Bird community data were analyzed for different islands, major group of Islands and for the whole of Andaman Islands. Habitat-wise analyses were also done. Species Diversity was calculated for the above sets of data. Presence of endemic birds (both full species and subspecies) and their abundances were considered separately.

These data were overlaid on the images and analyses were done along with several other indices calculated for identifying areas of Biological richness.

Results and Discussion

Land use/ land cover in the Andaman Islands from satellite data

Twelve Land Cover classes delineated in the present study are of physiognomic in nature and have relevance to the objectives of the project. The classes with the area in percentage are: 1) evergreen (15.63%), 2) semi-evergreen (17.19%), 3) moist deciduous (39.63%), 4) mangrove (17.09%), 5) littoral forests (0.29%), 6) degraded forests (0.28%), 7) plantation (0.27%), 8) mud- flats (1.23%), 9) agriculture / settlements (5.84%), 10) tidal creeks (1.09%), 11) water body (0.22%), an 12) sandy beaches (1.02%). Area covered by clouds was 0.21%. The forest cover is very high (90%). Moist deciduous biome is the largest, followed by semi-evergreen and evergreen

indicating the role of humans in altering the plesioclimax of the vegetation. It would obviously mean that other biotic communities including the bird communities would have been affected substantially. Slight increase in the moist deciduous forests might be because of the mixing of the habitats, especially Teak and Padauk plantations. The areas of the islands and habitats are not matching with the available statistics probably because of the problem in delineating coastal boundaries and wherever the habitats are mixing. While comparing the areas in different major island groups, evergreen forest was found more in South Andaman, while mangrove was more in Middle Andaman. Agriculture and settlements are less in the Little Andaman because of the Tribal reserve (Ongi). According to IIRS (2003) total forest is 86% with moist deciduous forest only 14% and mangrove 12%. Forest Survey of India (FSI) reported in 1999 that 94% area of the Andaman Islands was forest land with 77.6% dense forest and 14.8% mangrove. FSI report in 2003 shows 42.1% as very dense forest 34.1% moderately dense forest, making a total of 76.2% of dense forest. A decrease in 7 km² forest area was recorded by the FSI (1999) which had happened during a period of four years (1994-98) and attributed to encroachments in Diglipur, Havelock and Little Andaman. The FSI reports of 1999 and 2003 shows a total decrease of forest cover to the extent of 642 km² (from 7606 km² to 6964 km²). This is of great concern, but it is heartening to note that with the intervention of the Judiciary commercial forestry operations have been stopped and recent encroachments removed.

Bird fauna and communities

Bird surveys were conducted in the Andaman Islands during 2003 and 2004 covering different seasons and 46 islands including 36 island sanctuaries, 4 National parks and 10 others, including Tribal Reserves. A total of 254 localities or sites were sampled covering 429.26 ha in the four main regions, namely Little (LA), South (SA), Middle (MA) and North Andaman (NA). Area surveyed in the above regions was: 81.67ha, 201.83ha, 24.99ha and 120.77ha. During the survey, the endemic birds were given more emphasis, especially the rare Andaman Teal and the Andaman Crane.

Altogether 153 species of birds were observed with 56 endemics (including subspecies). The present surveys have added three more species to the existing list of 214, namely the Grey-headed Canary Flycatcher *Culicicapa ceylonensis*, Tickell's Blue Flycatcher *Cyornis (Muscicapa) tickelliae* and Blue-fronted Robin *Cinclidium frontale*. Hence, the total species recorded in Andaman Islands comes to 217.

Of the 153 species only 35.3% are shared with the Nicobar Islands while with mainland India it was 84.3%, with Southeast Asia 88.97%, and with both these 81%. This shows the distinct nature of the avifauna of Andaman Islands from that of the Nicobar Islands and the affinity of the avifauna of Andaman Islands with Southeast Asia and also mainland India. Genera with one or two species were more in Andaman as expected and these had more affinities with other regions. The dominant families were Charadriidae and Muscicapidae and most of these were common to mainland India and Southeast Asia, as they are widely distributed or migratory.

A total of 26,487 birds of 153 species with 56 endemics (including subspecies) were counted during the censuses. The mean density of birds was 61.7/ha, maximum in the Middle Andaman followed by South, North and Little Andaman. Species richness was more in South Andaman and Little Andaman. Maximum intact forests and minimum disturbance was found in the Little Andaman by us and also the IIRS (2003). The number of endemic species including subspecies was maximum in North Andaman (53 out of 56) followed by South, Little and Middle Andaman while full species endemics observed was 12 in both North and South Andaman.

Species richness and abundance were high in the littoral forest followed by semi-evergreen and moist deciduous forests as a whole under the natural forests. Species diversity was also the maximum in the littoral forest (3.35) followed by semi-evergreen (3.27), evergreen and mangrove; among the different island groups, the maximum value was (3.49) in the mangrove and littoral mixed habitat in South Andaman (3.46). Partly disturbed and completely altered habitats recorded very different patterns of species distributions; forest edges and plantations being rich as observed elsewhere.

Endemic birds and their distribution in the Andaman Islands

Andaman islands form one of the 218 endemic bird areas of the world with 13 endemic bird species, four of which occur also in the Nicobar Islands; two of the 13 are threatened, one data deficient, eight near-threatened and two of least concern. The Red-cheeked (Longtailed) Parakeet, a subspecies endemic and, two non-endemics, namely Nicobar Pigeon and Great Stone Plover (Beach Thick-knee) are also near threatened. The Andaman Teal is raised to the full species status and is one of the threatened species.

In the case of the full species endemics 12 out of the 13, except the Narcondam Hornbill, were observed. This species is restricted to the Narcondam Island in North Andaman and this island could not be surveyed. These endemics observed were 11 each in South and North Andaman while it was 10 in Middle Andaman and only 9 in Little Andaman. Among these species the Andaman Crow – Pheasant had the maximum sightings (density/ha) followed by Andaman White-headed Myna (Starling). Andaman Cuckoo-Dove, Andaman Hawk-Owl and Andaman Crake were rare. Out of the 12 species, The Andaman Crake was given special attention as it was Data Deficient. The Andaman Crake was recorded for the first time from Little and North Andaman while earlier records were from South and Middle Andaman. Andaman Cuckoo-Dove was observed in South and Middle Andaman, more in the former. Andaman Woodpecker was low in density, but comparatively more in South Andaman. The Andaman Serpent Eagle, one of the rare birds of the world was frequent in occurrence.

The number of endemic full species was the maximum in the semi-evergreen forests followed by evergreen, littoral and moist deciduous. Endemic species including subspecies were also found more in the natural forests, especially evergreen, semi-evergreen, moist deciduous and littoral forests. Overall, the number of species was the maximum in the moist deciduous forest, probably because of more area and higher visibility. Among the island subgroups maximum number of endemic species including subspecies was in North Andaman (53) followed by South Andaman (51). Among all the habitat in separate island groups, the maximum number (45) was in evergreen forest

in South Andaman while it was in moist deciduous forest in both North and Middle Andaman and in littoral forest in Little Andaman .

Abundance of the endemic full species and subspecies in different habitats showed 1,857 and 20,149 birds respectively during the study. Maximum number of birds was in the evergreen, semi-evergreen, littoral and moist deciduous forests. However, some variations could be observed between the island groups. Middle Andaman had higher number of birds in the plantations probably because these were older plantations with profuse undergrowth giving the appearance of moist deciduous forests.

Identification and prioritization of important sites for conservation planning

Biodiversity characterization and prioritization of sites have been done in several regions and ecosystems using various parameters to help plan the conservation strategies. In this study, the number of bird species and individuals in total and of different status are given ratings and the total ratings obtained for a locality was pooled and rating per unit area was calculated. Such analyses showed a combination of habitats in a locality with the presence of evergreen, semi-evergreen, moist deciduous and littoral forests had high ratings as found in other studies. Areas with dense forest cover and less disturbance had more rare endemics and thus needs special attention. The landscape ecology study has generated Biological Richness maps with areas of different grades in each major island group. The results showed Little Andaman having as much as a third of the area as very high priority locality followed by South Andaman. In contrast, the North and Middle Andaman have only 10 percent of the area as high priority.

Conservation Problems and Prospects

The important points discussed are: 1). Habitat loss or degradation, 2).Hunting or poaching, 3). Introduced / invasive species, 4). Global warming and sea level rise, 5). Natural causes, and 6). Inadequacy of the Protected Areas.

Recommendations

1. The crucial habitats of the endangered Andaman Teal, namely Dhaninala in Rutland and Constance Bay in SA, Hanspuri and Mohanpur in NA, Jackson creek in LA should be protected as sanctuaries or conservation areas as suggested earlier.
2. Some of the major mangrove forests and the moist deciduous and semi-evergreen forests in Middle Andaman may be declared as Protected Areas, especially as the habitat of the rare endemic Andaman Crake.
3. Detailed studies on the rare endemics, namely the Andaman Cuckoo-Dove, Andaman Hawk-owl have to be taken up on priority to assess their status and understand the ecological requirements.
4. Habitat restoration studies in all major habitats need to be taken up for climate related adaptation strategies.
5. Further settlement by the mainlanders should be stopped and areas from where they are evicted should be restored with natural species.
6. Detailed investigations and regular monitoring are required for assessing the impact of climate change and sea level rise on these islands.
7. Hunting and poaching, although illegal, are frequent and should be tackled seriously with the involvement of various agencies.
8. The impact of invasive/ introduced species on the endemic flora and fauna should be studied and management actions adopted.
9. The land cover is an important determinant of the habitat of the endangered, endemic bird species and hence, it is essential to have large scale maps (1:2500 or higher) for effective understanding of the conservation needs.

10. A proper monitoring system needs to be put in place using temporal satellite data along with the GIS information on human influences on the habitat.
11. The present study addressed only Andaman group of islands. Nicobar Islands also need such an assessment.
12. In view of the tsunami impacts, the impacted habitats need to be surveyed and monitored for avian biodiversity along with other key taxa diversity.
13. An integrated approach among the various governmental agencies should be adopted for planning conservation and development.
14. Environmental Awareness programmes should be executed more systematically and intensively.