

ASSESSING THE STATUS AND DISTRIBUTION OF AVIFAUNA WITHIN THE COASTAL TALUKAS OF SINDHUDURG DISTRICT, MAHARASHTRA

FINAL TECHNICAL REPORT - 191

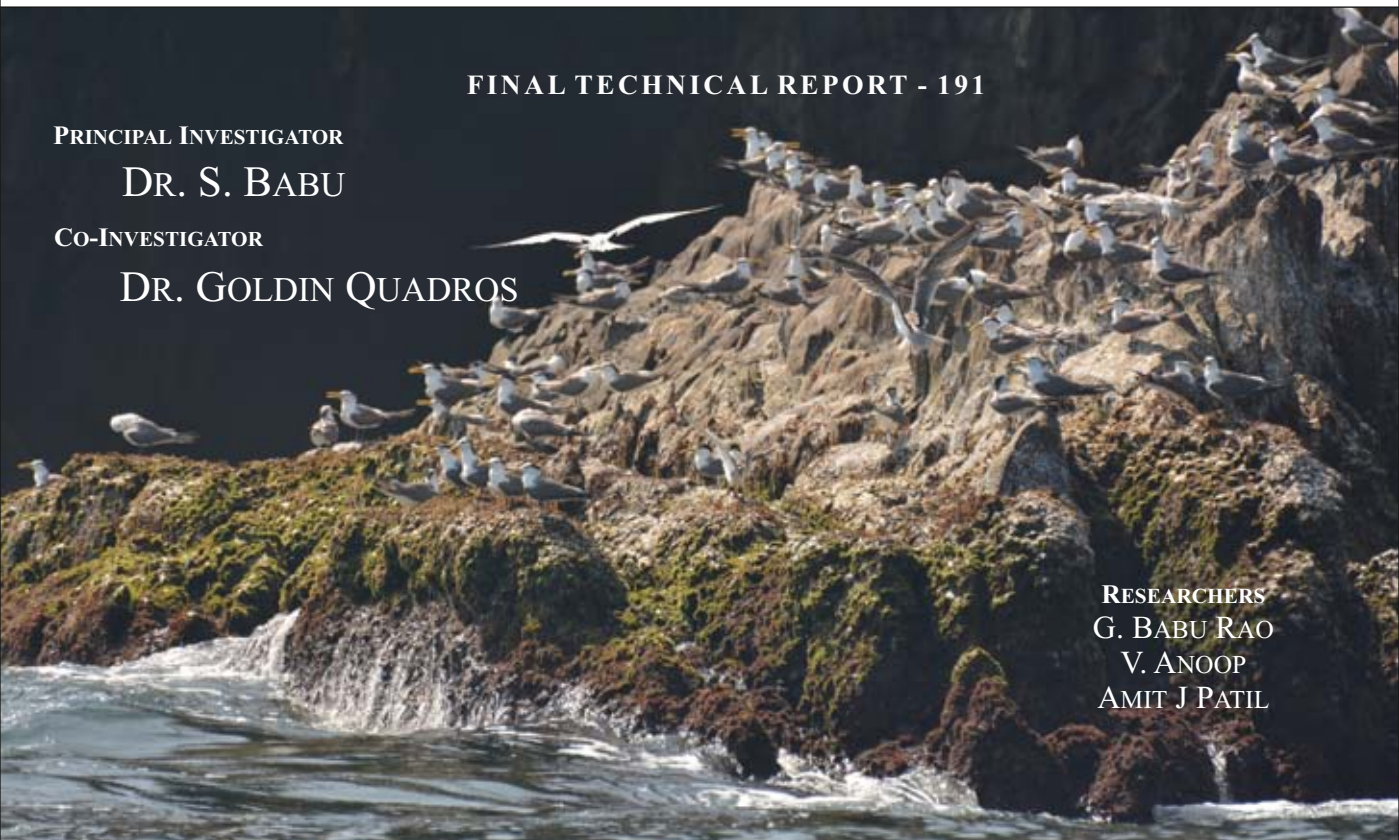
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(A Centre of Excellence under the Ministry of Environment, Forest & Climate Change, Govt. of India)

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Front Cover : Large, Centre - Vengurla Rocks
Small, below from left to right - White-bellied Sea Eagle, Nature Trail,
Eurasian Oystercatcher, Benthos collection

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Submitted to

GOI-UNDP-GEF-Sindhudurg project, Mangrove Cell, Maharashtra

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EXECUTIVE SUMMARY

Coastal habitats are among the most productive and threatened habitats in the world. Around 60% of global human populations live in the coastal ecosystems. Escalating population growth, unsustainable resource use and increasing urbanization/tourism in Asia currently threatens the coastal ecosystem and the shorebirds, which depend on it. The entire Indian coast (7,159 km) supports nearly 60 species of migratory shorebirds, through Central Asian Flyway (CAF), which are reported to decline globally. Although large share of globally threatened waterbirds are found in India, the reasons for the population decline of shorebirds remains unclear owing to little understanding about their ecology in the wintering grounds. One of the potential reasons for the decline of shorebirds in CAF is alteration of coastal habitats for tourism related activities. Sindhudurg District is an important tourist destination in the west coast of India as it is bordered by Goa. Due to its potential for the over-exploitation of marine biodiversity, MoEF & CC and Maharashtra Forest Department – Mangrove Cell in collaboration with UNDP and GEF initiated the Sindhudurg project to mainstream the coastal biodiversity into production sector. In this context, UNDP-Sindhudurg project while sanctioning a component of the project to SACON following objectives are formulated 1) Explore the relationships between environmental variables, habitat structure and impacts of human activities influencing the abundance of avian communities within the coastal areas of Deogad, Malvan and Vengurla talukas of Sindhudurg District, 2) Spatial and temporal patterns of avifaunal diversity and density of avifauna, 3) Breeding and nesting success of birds at Burnt Island and White-bellied Sea Eagle and 4) Establish a long term monitoring protocol for breeding birds at Burnt Island and also for avian population at Sindhudurg coastal and marine habitats.

Seven estuaries of different sizes of river catchment and disturbance scales, and two man-modified habitats *viz.*, saltpan and aquaculture ponds were selected for intensive sampling. Within each estuary, three bird counting stations (one each in sandy beaches, sandy mudflats and mangroves) were established. The total count method was followed to study the species richness, abundance and diversity of shorebirds in different habitats and seasons. All sampling were carried out once in a month during the lowtide. Water samples were collected in clean plastic carboys and were analyzed for



physico-chemical parameters using standard protocols. Soil sediment samples were collected and dried for quantification of moisture content and organic matter. The water quality and the sediment characteristic were also used to evaluate the anthropogenic influences at the sampling stations. Benthos samplings were done in all locations where bird sampling was conducted. In all three habitats viz., sandy beaches, sandy mudflat and mangrove the sediment from three quadrates of 0.01 m² size were collected using a hand held grab and pooled together, narcotized using 10 % MgCl₂ and sieved through a 1.0 mm mesh sieve to collect the benthos. Collected benthic organisms were preserved in 10 % formaldehyde for identification and counting.

We recorded 309 species of birds along the coastal talukas of Sindhudurg District and 24 more species were added to the list from published literature, which we could not observe during our survey. Altogether, 309 bird species belonging to 78 families and 20 orders were collated for Sindhudurg coast. Order Passeriformes was the dominant with 112 species. Eight species were endemic to the Western Ghats. Three species of vultures had been reported earlier but were not observed during present study. Sixteen species that fall under various threatened category of IUCN were recorded including the Great Knot (EN) and Wolly-necked Stork (VU). Maximum species richness was reported from Vengurla taluka (257) followed by Malvan (246) taluka. Insectivorous and Piscivorous guilds dominated the species composition in Sindhudurg coast.

The spatial and temporal patterns of coastal birds were assessed (based on two years of study from Dec 2014 to Dec 2016) in select estuaries/creeks of Sindhudurg coast. Coastal birds were broadly categorized into three size guilds: small waders (charidriiformes), large waders (egrets, herons and storks), and gulls and terns. Among the migratory species, small waders arrived the coasts early *i.e.* from August to October but gulls and terns arrived the coasts from October till January. Abundance of large waders was significantly higher in mangroves followed by sandy mudflat and beaches. Mangrove habitat was recorded with high species diversity, richness and abundance of large waders as compared to other habitats. Although large waders are resident breeders, their richness and diversity was very low in the coastal areas during the breeding season (June – August). Species richness, abundance and diversity of large waders were greater during the late winter and early summer (*i.e.* January to March). Among the small waders, Common Redshank (83%), Common Sandpiper (83%), Red-wattled Lapwing (83%), Common Greenshank (75%) and Lesser Sand Plover (75%) were recorded frequently during the sampling. Around 65% of small waders encountered in Sindhudurg district were counted in mudflats. Species richness, abundance and diversity of small waders were significantly higher in mudflats. Out of 26 species, 20 species of small waders were recorded in November month. Greater species richness, diversity values and abundance were recorded during November, December and January months.

Among the recorded gulls, three species viz., Brown-headed Gull (59.22%), Heuglin's Gull (15.82%)



and Pallas's Gull (13.64%) represented 89% of gulls counted in Sindhudurg coasts. Around 7, 5.6 and 9.81% biogeographic population of gulls was recorded from Karli, Mitbav and Mochemad sites respectively. Among the gulls, nearly 4 - 7% of 1% biogeographic population of Brown-headed Gull was recorded in Karli (4%), Mitbav (6%) and Mochemad (7%) of Sindhudurg coast. Species richness, abundance and diversity values of gulls and terns were relatively greater during the late winter (December to February). In a nutshell, the abundance, richness and diversity of large waders indicated the quality of mangroves in Sindhudurg coasts while small waders and, gulls and terns indicated the quality of mudflats and sandy beaches respectively.

The physico-chemical properties of water and soil give a proper indication of the status, productivity and sustainability of the ecosystem. We recorded the water temperature to vary between 24 and 38.8 °C and varied with the atmospheric temperature, similarly the sediment temperature also ranged between 23 and 35.6 °C. The water pH was mostly alkaline and varied between 3.4 and 9.4, with the acidic pH mostly observed during the monsoon. The salinity ranged between 0.7 and 74.5 ppt and the hyper salinity values were mostly observed during the summer which coincided with the time of sampling. During the study DO varied between 0.2 and 11.1 mg/L. The high values were obtained in the human modified ecosystems where there was proliferation of algae and sufficient aeration. The Oil and Grease content varied from 50 to 30600 mg/L, the high values coincided with the human activities like fishing and tourism. The organic matter acts as food source for detritus feeding organisms and microbes, therefore, it indicates the nutritional status of the sediment. Organic matter varied between 0.027 and 9.065% with spatial variations from the coast to the creek. The benthic fauna is involved in recycling materials in the marine ecosystem playing crucial role in food chains as the plankton do in the pelagic zone. The benthos comprised of five groups *i.e.*, Annelida comprising of Polychaetes and Nematodes, Gastropods, Bivalves, Crustaceans and Insect Larvae the total density of which varied between 3 no/m² and 790 no/m² and biomass varied between 0.0025 and 65.20025 gm/ m².

We surveyed the entire coastal stretch of Sindhudurg coasts, *i.e.*, from Vijayadurga to Terekhol for the nests of White-bellied Sea Eagle (WBSE). Forty six nests (encountered rate = 0.511 nests/km) with maximum of 27 (58.7%) nests in Malvan taluka were recorded. More than 93% of nests were placed on *Casuarina equisetifolia* (80.4%) and *Sterculia foetida* (13%) trees. We counted 14 (43.75%) more nests compared to earlier count. WBSE selected sites that has higher average tree height and lower canopy cover around the nest site (tree height =20-30 m; canopy cover = 10-20%) than random sites (tree height=10-20 m; canopy cover=20-30%). Distance to water body, altitude and extent of road influenced the nest-site selection of WBSE negatively, however dense vegetation and extent of water positively influenced the selection in Sindhudurg coast. Overall, nesting success of WBSE in Sindhudurg coasts was higher *i.e.* nearly 90 percent of chicks observed in the nest were successfully fledged.



One of the objectives framed by the funding agency was to build capacities to encourage the local youth from villages towards alternate livelihoods and hence train them in conducting nature trails. As per the mandate, we identified five nature trails along the coastal talukas *i.e.* Devgad, Malvan and Vengurla, documented the local flora and fauna and compiled a training manual. Subsequently the UNDP identified the youth from the local BMCs, and we conducted six training programs for them along the five nature trails in two sessions. The first training was held during October 2015 to check the needs of the locals and the second was conducted during October 2016 in all the five villages. The training included both field and classroom sessions where in the participants were encouraged to conduct nature trails as well as share their traditional knowledge on the local flora and fauna with the tourists/wildlife enthusiasts.

