

Baseline survey of Birds at the Proposed Navi Mumbai International Airport (NMIA) Area

The report on surveys conducted during April to June 2014
with a note on communal roosting of birds



TRI-MONTHLY REPORT APRIL-JUNE 2014

Bombay Natural History Society



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Summary

The field visits were conducted during April 2014 to June 2014, in area falling under approximately 10-kilometre radius from the proposed site of Navi Mumbai International Airport (NMIA). Through this tri-monthly report we would like to present a brief account of the birds observed in study area during study period of April to June 2014, especially about roosting of bird-species in the study area. A type of birds known as waders were observed to be using different sites for roosting as well as for foraging. The wader-population was observed to be changing with the availability of water as well as tide level. Tree roosting species such as Indian Shag *Phalacrocorax fuscicollis*, egrets and crows were seen congregating in the evening on large trees near old human habitations at various sites in the study area. While birds like Black-headed Bunting *Emberiza melanocephala* and Baya Weaver *Ploceus philippinus* were found roosting in large numbers for short duration at particular sites.

Keywords: Navi Mumbai International Airport, Avifauna, communal roosts, tide timing, water level, congregatory bird species, wetland birds

Abbreviations used

- 1) NMIA – Navi Mumbai International Airport
- 2) BNHS – Bombay Natural History Society
- 3) JNPT – Jawaharlal Nehru Port Trust
- 4) EIA – Environmental Impact Assessment
- 5) Habitats: P – Paddy field, GS – Mixed habitat of Grassland and Shrub land, RS – Rocky Seashore, W – Wetland, MD – Mudflats, MC – Mangrove and Creeks, NH – Near Human habitation, F – Forest
- 6) Threat categories: EN – Endangered, VU – Vulnerable, NT – Near threatened
- 7) Status of birds: R – Resident, M – Migratory



A flock of waders at TSC Wetland

Chapter I

Introduction

According to the Government of Maharashtra, the existing airport at Mumbai is fast reaching saturation level and the scope for further enhancement of passenger and cargo handling facilities, aircraft maintenance and the city-side facilities is limited (EIA Report, CIDCO, Navi Mumbai). The need for a second airport for Mumbai has become inescapable and imperative.

City and Industrial Development Corporation of Maharashtra Limited (CIDCO) proposed to set up a new international airport at Navi Mumbai in Maharashtra. The proposed Navi Mumbai International Airport (NMIA) is located near Panvel, between the existing National Highway-4B (NH4B) and Aamra Marg in Panvel Tehsil of Raigad district. The total area demarcated for the airport zone is 2,054 hectare; this includes the area for development; approximately 1,615 hectare as an Airport Zone and the remaining for off-site infrastructure such as diversion, training of rivers, approach roads, etc. Environmental Impact Assessment (EIA) carried out for NMIA by the Centre of Environment Science & Engineering at Indian Institute of Technology Bombay (IIT Bombay), reported 58 species of birds from 21 locations in the 10 kilometre radius-area of the proposed NMIA site. The area comprised creeks, rivers and the mangroves, which, serve as a good habitat for a variety of congregating bird species. Karnala Bird Sanctuary is located in close proximity of the proposed NMIA site.

The Ministry of Environment and Forests (MoEF), Government of India has granted a conditional clearance to this project. One of the conditions (condition no. xxxi provided under specific conditions) is that an avifaunal study should be carried out in consultation with the Bombay Natural History Society (BNHS). The BNHS survey was designed to document the bird diversity and species-composition at various survey-sites in the 10 kilometre radius-area of NMIA. A total of 260 bird species belonging to 56 families were observed in the study area since December 2011.



Curlew Sandpiper and Sand Plover form major part of wader population in Navi Mumbai

Chapter II

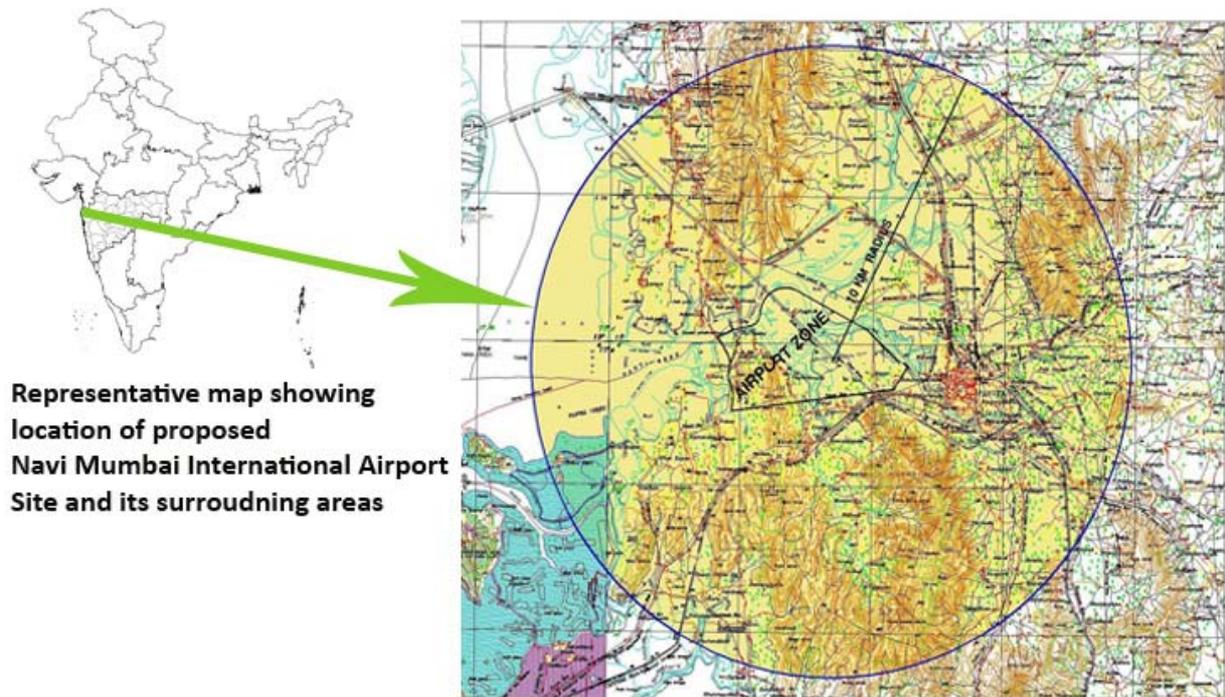
Study Area

Survey sites in the 10 kilometre radius area of the proposed site of NMIA were divided by us into five blocks as mentioned below, however, excluding the industrial areas and the areas with dense human habitations.

- 1. The proposed site of NMIA:** Data was collected from wetlands, creeks, paddy fields, mangrove covered areas, mudflats, open scrub-land and shrub-land. The study area included Kombadbhuja, Ulve, Dungi, Pargaon, Chinchpada and Kopar; the villages adjacent to the proposed NMIA site, and the creeks at Gadhi, Ulve, Kalamboli and Panvel.
- 2. North-west:** This block includes the land primarily covered with grass and shrubs, the seashore parallel to Palm Beach Road and a part of Airoli Creek, and the water bodies around NRI Complex, DPS School on Palm Beach Road, Belapur Pond and a portion of Parsik Hills.
- 3. North-east:** This block includes Taloja, Panvel, Tembhode, Kewale, Nere and Pali villages, which is a hilly area interspersed with paddy fields, human habitations and grasslands.
- 4. South-west or Uran-Jawaharlal Nehru Port Trust (JNPT) area:** This block includes small wetlands, and the mangrove areas near the villages such as Jasai, Sonari, Belpada, Karal, Gawhan, Uran, Jaskhar and Funde.
- 5. South-east:** This block primarily consists of reserve-forest patches adjoining villages such as Mosare, Patnoli and Ransai. The southern-moist, mixed-deciduous forest patch was recently added to Karnala Bird Sanctuary. The NH17 (National Highway number 17) cuts through this sanctuary.

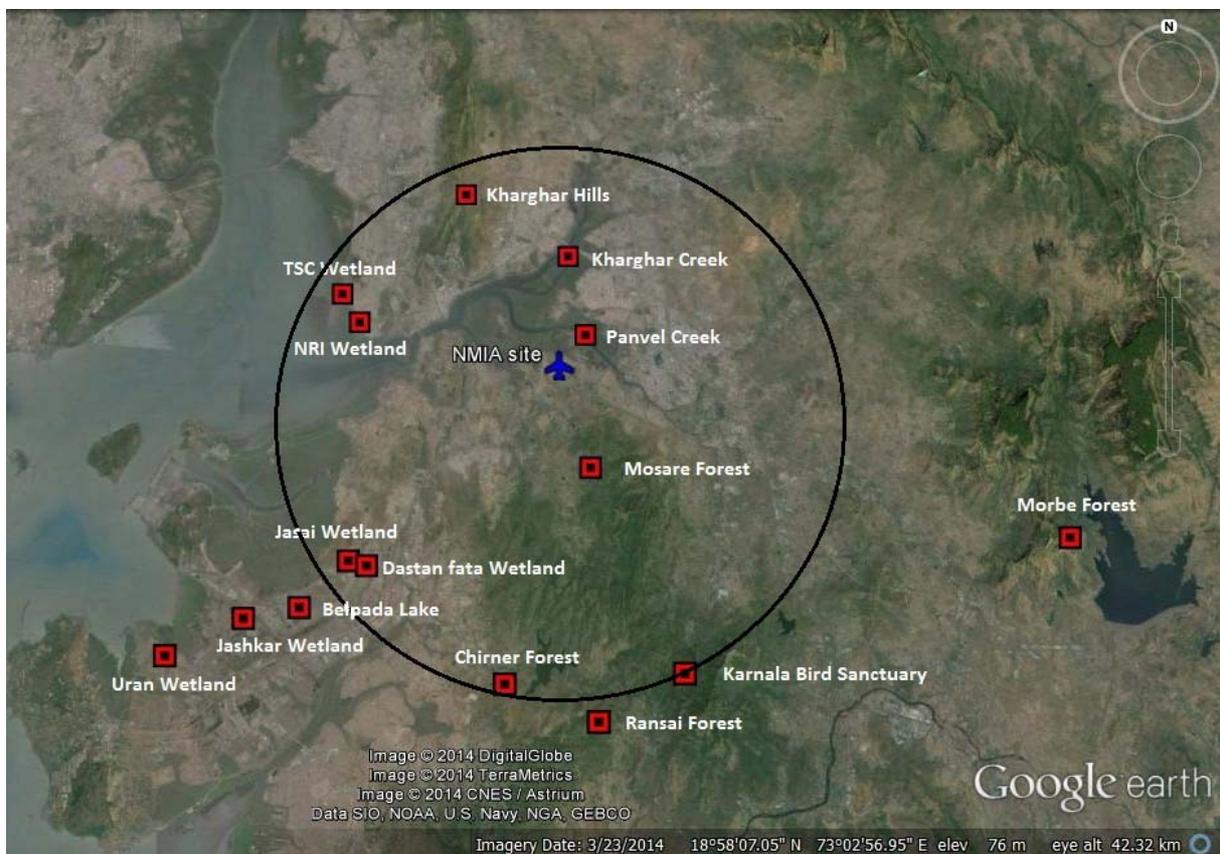
For the study of seasonal variations in bird population, the BNHS survey team focussed on the following areas to collect data about temporal and special variation in the population of some congregating bird species.

- 1. Belpada Lake:** It is located in the southwest direction of the proposed NMIA site near Sonari-Belpada village. This lake near the campus of Speedy Services was observed being used by the birds for roosting. It is surrounded by grass/shrub land from three sides and the boundary wall of Speedy Services on the fourth side. This wetland, once connected to the sea by water channels, is isolated and its water level is not dependent on the tidal cycle, therefore, it dries up in the summer. This lake is reachable from Panvel-JNPT road, and is about 2-3 km from Jasai village and about 500 metres from the toll plaza towards Speedy Container Yard.
- 2. Panvel Creek and NMIA site:** Waders are usually seen on a rock-bed, exposed during a low tide, in Panvel Creek at the proposed site of NMIA near Kopar and Pargaon villages. This site is of mixed habitat and includes mangroves, open scrubland/shrub land, complex of smaller wetlands created by backwater, paddy fields as well as creeks of Gadhi, Ulve, Kalamboli and Panvel. Roosting of birds was mainly seen in area of about 40 hectares as shown in the map.



Representative map showing location of proposed Navi Mumbai International Airport Site and its surrounding areas

Representative map showing the location of the proposed NMIA Site, and the 10 kilometre-radius study area



Map 1: A Google Earth map showing selected study sites in 10 kilometre-radius of proposed NMIA site

3. **Kharghar Creek:** Located between the harbour-line railway stations Kharghar and Mansarovar, the creek can be reached by road via Sion-Panvel Highway. The mangroves adjoining the creek were surveyed for the study of population of small birds. As this study area comprised a large portion covered by the mangroves it was important to know the status of smaller birds that may pose a threat to flight safety in future.

4. **NRI Wetland:** This site lies in the northwest direction of the proposed site of NMIA. It includes wetland spread across 19 hectares, surrounded by grass, shrubs and mangroves. Water level in this wetland is controlled mainly by the tide level and the activities of the local fisherman. During a high tide, the water enters the wetland and is retained by small check dams created by the fishermen. Mangroves cover the wetland from three sides and the fencing wall of NRI complex on one side with a thin stretch of grass and vegetation in between. The vegetation on the borders of the wetland makes it undisturbed and an enclosed habitat for birds to roost. This wetland lies behind NRI Complex, followed by a stretch of mangroves, and finally reaches the seashore. We observed a majority of water birds preferred to congregate in this area during early-winter and summer. This wetland is also used as a stopover site by a number of migratory birds during the early-winter season.

5. **TSC Wetland:** Spread over 15 hectares, this wetland lies behind Training Ship Chanakya Maritime Institute and followed by a stretch of paddy fields, shrub land and the mangroves, and finally it reaches the seashore. The water level in the wetland is primarily controlled by the local fisherman, as by the tidal cycles. A majority of water birds preferred to congregate in this area during the summer months. Birds use this site for resting during the high tide. We observed that the migratory birds used this area as a stopover site during winter migration cycles.

6. **Uran-JNPT Area:** There are many small wetlands scattered across the Uran-JNPT area, flocked by waders during low tides. The wetlands near village Dongri and Funde were used by birds for resting and foraging. During late-winters, a majority of these wetlands were observed to have dried completely. Tide dependent movement of birds was observed. Many birds were seen resting during low tide also foraging in shallow water.

7. **Wetland at Jaskhar and Nhava Sheva Police Station:** The Jashkar wetland is adjacent to human habitation and the grassland on west of Nhava Sheva Police station was a temporary wetland during monsoon and overwintering population of few migratory birds was seen here. Birds were often observed resting at this site during high tide.

8. **Forest areas:** We surveyed the forest areas in Chirner, Mosare, Ransai, Patnoli and Karnala Bird Sanctuary. The forest in these areas is of the mixed-deciduous type, dominated by Jamun *Syzygium cumuni*, Goose Berry *Zizipus mauritiana*, Banyan *Ficus bengalensis*, Teak *Tectona grandis*, Red Silk Cotton *Bombax ceiba* and Anjan *Hardwickia binata*. The land-use pattern includes forest, grassland, agriculture and plantation in Chirner, Mosare, Ransai and Patnoli. Chirner forest was seen interspersed by the patches of Mango orchards, and Teak and Cashew plantations. Karnala Bird Sanctuary a protected area and a mixed deciduous forest provides the most suitable habitat for the forest dwelling birds.

Chapter III

Methodology

Multiple site-surveys were conducted between April 2014 to June 2014. We used binoculars (Nikon Monarch 10x X 40x) for correct bird identification and a digital SLR-camera (Cannon 550D, Cannon with 400 mm fixed-focus lens) for documentation of bird-species and observations at each survey site. Photographs of the unidentified birds were maintained for further studies. The bird species were recorded (sighting or call) on the field, and direct observations were made by walking along roads, hills, forest-paths, wetlands, mangroves and creek areas.

The birds were identified by referring to, Ali & Ripley (1983), Grimmett *et. al* (1998) and Rasmussen & Anderton (2012). The list of birds was arranged family-wise following Manakadan & Pittie (2001), and Rasmussen & Anderton (2012) was followed for the nomenclature. A GPS device was used to collect accurate geographical coordinates. The birds were counted using the Estimated-block Method (Bibby, *et al.* 2000) for different species, according to the congregation size during roosting time. Transects were laid in habitats such as forests, open lands, grassland, mangrove patches and agricultural lands. The Total Count Method was used to estimate the count of congregating water-birds and waders during High Tide Wetland Surveys (Koffijberg *et al.* 2003, Donal and Clark, 1991). The observations were recorded continuously for two hours before and after high tide for each wetland. Every site was visited at least once in a month.

In the study area, we found that site specific avifaunal diversity is dynamic and it depends on various factors like water level, seasonal variations and daily changes in tide level. These sites were seen used by migratory birds for foraging and resting during high tide resulting in to fluctuations in species composition temporally and spatially. For tree roosting species we counted birds arriving in evening and seen till dark at particular site. Repetitive counts were taken for collecting data to estimate the roosting population with maximum accuracy.

Chapter IV

Site-wise observations of birds during April-June 2014

Species count at all the selected sites was taken along with other natural history observations. We observed fluctuation in population of birds at all the wetland sites in the study area dependent on tide and water level. The detailed site-wise observations are as follows:

4.1 Wetland areas

All the study sites were visited at least once in every month. Wetlands and other roosting sites were visited more often to record the observations of population fluctuations in the migratory birds.

4.1.1 NRI Wetland

This study area was often visited during high tides, and the waterbirds and waders were observed resting here in large mixed flocks. The wetland was found fenced from all the side with a single entrance, which leads to a trail adjacent to the lake.

On April 2, 2014 we visited NRI wetland at 1:48 PM IST during the high tide (4.63 m) and observed a mass congregation of 5,000 to 7,000 individuals of Lesser Flamingo *Phoeniconaias minor* and about 50 individuals of Greater Flamingo *Phoenicopterus roseus*. About 90 per cent population of Lesser Flamingo *Phoeniconaias minor* was identified as immature by their grey plumage. Some birds were observed resting and few of them were foraging in the wetland. There was a mixed flock of waders comprised of approximately 2,000 individuals of Little Stint *Calidris minuta*, 1,500 individuals of Lesser Sand Plover *Charadrius mongolus*, and 2,000 individuals of Curlew Sandpiper *Calidris ferruginea* resting on the edges of the water body. The flock of waders was observed flying from one end of the wetland to the other, in search of open space for resting, because of the high water level in the wetland. We also recorded a congregation of 100 Eurasian Curlews *Numenius arquata*, 13 Caspian Terns *Sterna caspia*, 50 Grey Plovers *Pluvialis squatarola*, 35 Whiskered Terns *Chlidonias hybridus*, 50 Brown-headed Gulls *Larus brunnicephalus*, and 50 Gull-billed Terns *Gelochelidon nilotica* resting in the wetland. A few individuals of Common Redshank *Tringa totanus* and Common Greenshank *Tringa nebularia* were seen foraging along with a flock of Black-winged Stilt *Himantopus himantopus*.

On April 9, 2014 during our visit to the wetland, we observed about 30 to 50 birds as the tide receded and the birds were seen moving towards the seashore for foraging. About 30 to 40 Lesser Flamingos *Phoeniconaias minor* were seen resting in the wetland. We also encountered Indian Reed-warbler *Acrocephalus [stentoreus] bruniscens*, White-eared Bulbul *Pycnonotus leucotis* and Common Myna *Acridotheres tristis* couple of times in the adjacent mangroves. Common Kingfisher *Alcedo atthis* and White-throated Kingfisher *Halcyon smyrnensis* were seen fishing in the lake.

During our next survey on June 25, 2014 we saw about 150 birds in the wetland, though it was the high tide. We observed only 100 individuals of Lesser Flamingo *Phoeniconaias minor* resting in the wetland along with 25 to 30 Gull-billed Terns *Gelochelidon nilotica* and Caspian Terns *Sterna caspia*.



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Lesser Flamingo roosting at NRI Wetland, Palm Beach Road



SUJIT NARWADE

A large number of waders in-flight at roosting area of TSC wetland, Palm Beach road, Navi Mumbai

4.1.2 Belpada Lake

This Lake was found completely dry during April and May 2014; with very little water left in the marshes in one corner of the lake. About 40 individuals of Black Kite *Milvus migrans/govinda* were seen resting in the dried lake along with a few individuals of Eastern Cattle Egret *Bubulcus coromandus*, Painted Stork *Mycteria leucocephala*, Little Egret *Egretta garzetta*, Intermediate Egret *Egretta intermedia*, and Great Egret *Egretta alba*. We observed Purple Swamphen *Porphyrio porphyrio*, Common Moorhen *Gallinula chloropus*, Indian Spot-billed Duck *Anas poecilorhyncha*, Pheasant-tailed Jacana *Hydrophasianus chirurgus*, and Bronze-winged Jacana *Metopidius indicus* foraging in the marshes.

On June 3, 2014 about 80 adults and five sub-adults of Lesser Whistling Duck were seen along with Purple Swamphen *Porphyrio porphyrio*, Pheasant-tailed Jacana *Hydrophasianus chirurgus* and Black-winged Stilt *Himantopus himantopus*.

After the first shower of the monsoon we visited the lake on June 25, 2014. In the little puddles of water created by rain in the lake, we saw about 500 Lesser Whistling-ducks *Dendrocygna javanica* and 150 Indian Spot-billed Ducks *Anas poecilorhyncha*. We assume that the birds gathered here for pre-breeding pairing. We also saw a pair of Red-wattled Lapwing *Vanellus Indicus* with two chicks. About 16 individuals of Pheasant-tailed Jacana *Hydrophasianus chirurgus* were also observed at one corner. It was possibly the gathering for mate selection; a typical behavioural pattern among polyandrous species in which, one female mates with more than one male member of the group. Among the migratory species, we saw two Marsh Sandpipers *Tringa stagnatilis* and eight Common Redshanks *Tringa totanus* continuously foraging at the site. Other birds sighted during the survey were Black-winged Stilt *Himantopus himantopus*, Purple Swamphen *Porphyrio porphyrio*, Little Grebe *Tachybaptus ruficollis*, Bronze-winged Jacana *Metopidius indicus*, and Indian Pond-heron *Ardeola grayii*.

4.1.3 TSC Wetland

Adjacent to Palm Beach Road, this wetland is visible from the roadside. The water level here was found to be controlled by the local fisher-folks and during low water level migratory birds were seen congregating here in great numbers; primarily for resting. We visited this wetland at least once a month for the survey.

In April 2014, we visited this wetland on the 11th and the 24th, and saw that the wetland was occupied by more than 5,000 Lesser Flamingos *Phoeniconaias minor*. About 80 per cent of the population was identified with sub-adult plumage; suggesting their young age. A number of bird-watchers and photographers were seen flocking towards this large congregation of Lesser Flamingo *Phoeniconaias minor*. Along with Flamingos small flocks of Grey Plover *Pluvialis squatarola*, Pacific Golden Plover *Pluvialis fulva*, Lesser Sand Plover *Charadrius mongolus*, Curlew Sandpiper *Calidris ferruginea*, and Little Stint *Calidris minuta* were seen in their breeding plumage, foraging ferociously.

On June 3, 2014 approximately 4,000 Lesser Flamingo *Phoeniconaias minor* were counted at TSC Wetland. Chestnut-tailed Starlings *Sturnia malabarica* were seen foraging on the fruits of Indan Ash Tree *Lannea coromandalica* planted around the lake. We visited this wetland again on the June 24, 2014 and counted about 9,000 to 10,000 Lesser Flamingo *Phoeniconaias minor* which

were seen foraging in the wetland, and later when the tide receded the birds started flying towards the seashore. Along with the Flamingos, 20-25 Slender-billed Gull *Larus genei* were observed. The population of Lesser Flamingo *Phoeniconaias minor* was observed to be 9000-10000 in 2014 as compared to 1,500-2,000 individuals in year 2013 and 2000-3000 in 2012.

4.1.4 Uran Wetland (Panje)

This wetland become completely dry by March-end and during our visit in April 2014 we saw very few waders including Lesser Sand Plover *Charadrius mongolus* and Curlew Sandpiper *Calidris ferruginea*. These birds were scattered all over the wetland.

After the first shower of rains, we visited the wetland on June 25, 2014. There was some water in the wetland and we observed a small flock of 200 individuals of Lesser Flamingos *Phoeniconaias minor*. We also saw 20 Caspian Terns *Sterna caspia*, 17 Eurasian Curlew *Numenius arquata*, 25 Gull-billed Tern *Gelochelidon nilotica*, and one Black-headed Ibis *Threskiornis melanocephalus* resting in the wetland.

4.1.5 The proposed NMIA site

This area comprises of 2000 ha area including Panvel creek, smaller wetlands, grasslands and mangroves. We conducted a transect of three kilometres, starting from below the Panvel-Uran bridge, running parallel to the creek with mangroves and associated plants on one side and a cluster of wetlands on other side of the transect.

In May 2014, we visited the site during the high tide period, due to which we couldn't see many water birds, except a small flock of 5 to 7 Indian Shag *Phalacrocorax fuscicollis* and 10 to 12 Little Cormorant *Phalacrocorax niger* resting in the mangroves. Two Black Kite *Milvus migrans/govinda* were hovering above the wetland, along with one Black-winged Kite *Elanus caeruleus*. We observed 10 to 12 scattered individuals of Little Egret *Egretta garzetta* and Intermediate Egret *Egretta intermedia* among the cluster of wetlands. We also recorded five Indian Pond-herons *Ardeola grayii* on the edges of the wetland. There was a lot of movement of Indian Reed-warblers *Acrocephalus [stentoreus] bruniscens* in the mangroves and we could hear their call along the transect. We also observed Ashy Prinia *Prinia socialis* and Plain Prinia *Prinia inornata* on the edges of mangroves and grassland, moving from one perch to the other, across the transect. In the grassland patches along the transect we encountered couple of Malabar Lark *Galerida malabarica* and Rufous-tailed Lark *Ammomanes phoenicura*.

On June 3, 2014 at 10-11 am during low tide we recorded movement of four individuals of Indian Reedwarbler *Acrocephalus stentoreus* in the bushes of *Avicennia marina*: a mangroves species commonly known as Grey Mangrove. White-cheeked Bulbul *Pycnonotus leucogenys* were heard calling and a pair of Spot-billed Duck *Anas poecilorhyncha* and Little Cormorant *Microcarbo niger* were seen resting on the edges of mangroves. A single individual of Purple heron *Ardea Purpurea*, Grey heron *Ardea cinerea*, Black-shouldered Kite *Elanus axillaris* and Slaty-breasted Rail *Gallirallus straitus* were recorded.

On June 30, 2014 during 09.30 – 10.30 am we observed a Brahminy Kite *Haliastur indus* soaring in the sky. The mangrove-habitat was seen in flowering of *Avicennia marina* and *Acanthus iliciformis* species. Along the transect we encountered 15 to 20 Ashy Prinia *Prinia socialis*, two



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A Purple Heron in the mangroves, NMIA area



SUJIT NARWADE

A Black-headed Bunting in the mangroves

Malabar Lark *Galerida malabarica* and our Rufous-tailed Lark *Ammomanes phoenicura*, foraging on the ground. A couple of Tri-coloured Munias *Lonchura malacca* were perching on the mangroves. We saw a cup-shaped nest of Indian Reed-warbler *Acrocephalus [stentoreus] bruniscens*. On the edges of the creek a Slaty-breasted Rail *Gallirallus striatu*, small flock of 10 individuals of Indian Shag *Phalacrocorax fuscicollis*, 8 Little Cormorant *Phalacrocorax niger*, five Little Egret *Egretta garzetta*, three Intermediate Egret *Egretta intermedia* and three Great Egret *Egretta alba*, two Indian Spot-billed Duck *Anas poecilorhyncha* were also observed.

4.2 The forest areas

During May and June 2014, we observed nesting activities of Thick-billed Flowerpecker *Dicaeum agile*, White-rumped Shama *Copsychus saularis* and Purple Sunbird *Cinnyris asiatica* in the forest areas. In June 2014 we recorded presence of Jacobin Cuckoo *Clamator jacobinus*, Common Hawk-cuckoo *Hierococyx varius* and Indian Cuckoo *Cuculus micropterus* by their prominent calls in all the forest areas in the study area. We also observed few passage migrant and breeding visitors such as Black-backed Dwarf Kingfisher *Ceyx erithaca*, Jacobin Cuckoo *Clamator jacobinus*, Indian Pitta *Pitta brachyura* and Common Hawk-cuckoo *Hierococyx varius* at Karnala Bird Sanctuary and the forest areas at Mosare.

4.2.1 Karnala Bird Sanctuary

On April 7, 2014 we walked on a transect from 10-11 am from the forest department check-post at Karnala Bird Sanctuary to 1.5 km distance towards Karnala Fort. The weather was sunny, and deciduous forest of Karnala had started shading its foliage. We encountered a Common lora *Agithina tiphia*, Five Red-vented Bulbuls *Pycnonotus cafer*, Seven Red-whiskered Bulbuls *Pycnonotus jocosus*, two Puff-throated babblers *Pellorneum ruficeps* and three Black-naped Blue Monarchs *Hypothymis azurea* foraging in the thickets of *Carissa sp.*; commonly known in Marathi as Karvanda and *Liana*; the woody climbers. The birds like Plum-headed Parakeet *Psittacula cyanocephala* (a male and a female), Brown-headed Barbet *Megalaima zeylonica*, Coppersmith Barbet *Megalaima haemacephala*, Thick-billed Flowerpecker *Dicaeum agile* and four Black-headed Oriol *Oriolus xanthornus* (all male) were observed feeding on *Ficus* fruits. Three individuals of Black Drongo *Dicrurus macrocercus*, two Purple-rumped Sunbirds *Leptocoma zeylonica*, two Rufous Treepie *Dendrocitta vagabunda* were sighted foraging in the canopies of large trees including Mango *Mangifera indica*, Red Silk Cotton Tree *Bombax ceiba*, etc. We also saw Yellow Throated Sparrow *Petronia xanthocollis*, Oriental Magpie Robin *Copsychus saularis* in the open patches of land amidst forests.

On May 6, 2014 we laid a transect at 7.30-9.30 am and encountered three males and two females of White-rumped Shama *Copsychus saularis* in the *Liana* thickets; and males were singing continuously. Seven individuals of Red-whiskered Bulbul *Pycnonotus jocosus* and six Red-vented Bulbuls *Pycnonotus cafer* were observed feeding on fruits of *Carissa Sp.* Three individuals of Black-naped Blue Monarch *Hypothymis azurea*, four females and one male of Common lora *Agithina tiphia*, Eight individuals of Gold-fronted Leafbird *Chloropsis aurifrons* were also observed in the shrubs of *Carissa sp.* A Yellow-eyed Babbler *Chrysomma sinense*, two Puff-throated Babblers *Pellorneum ruficeps* and two Purple Sunbirds *Cinnyris asiatica* were observed foraging in the dry leaf litter on the forest ground. A Yellow-fronted Pied Woodpecker *Dendrocopos mahrattensis* was observed flying in the canopies along the transect line. A Yellow-



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A Black-naped Monarch at Morbe dam



SUJIT NARWADE

A Common Iora at Ransai Forest

footed Green-pigeon *Treron phoenicoptera*, Greater Racket-tailed Drongo *Dicrurus paradiseus* and Plum-headed Parakeet *Psittacula cyanocephala* were observed foraging in the canopies of the big trees.

On June 26, 2014, between 8.30 am and 9.30 am, the weather was humid and cloudy, but it did not rain. The first showers of rain had made the surroundings green, however, the water-streams in the forest were still dry. We observed an Indian Pitta *Pitta brachyura*, summer visitor to Northern India. We saw three males of White-rumped Shama *Copsychus saularis*, six Common loras *Agithina tiphia*, two Gold-fronted Leafbirds *Chloropsis aurifrons*, three Black-headed Orioles *Oriolus xanthornus*, and one each of Common Cuckoo *Cuculus micropterus*, Hawk Cuckoo *Hierococcyx varius* and Common Woodshrike *Tephrodornis pondicerianus*.

4.2.2 Chirner

Chirner site mostly consists of plantation and agriculture, interspersed with degraded patches of reserved forests. On April 8, 2014 we walked here from 10 am to 12.30 pm and anthropogenic activities like quarrying, farming, firewood collection and cattle grazing were seen during the survey. Fruits of *Carissum sp.*, *Ficus sp.*, *Syzygium jambolanum* were not ripened yet. We observed common birds; including two Black Drongos *Dicrurus macrocercus*, three House crows *Corvus splendens*, two Indian Black Robins *Saxicoloides fulicatus*, four Little-green Bee-eaters *Merops orientalis*, three Red-whiskered Bulbuls *Pycnonotus jocosus* and a Common lora *Aegithina tiphia* during the survey. We also observed birds of prey such as Crested Serpent Eagle *Spilornis cheela* and Common Kestrel *Falco tinnunculus* hovering in the sky.

On May 7, 2014 at around 7.30 am we observed 24 individuals of Red-vented Bulbul *Pycnonotus cafer* and 17 individuals of Red-whiskered Bulbul *Pycnonotus jocosus*, eight individuals of Coppersmith Barbet *Megalaima haemacephala*, four Brown-headed Barbet *Megalaima zeylonica* and male Common lora *Aegithina tiphia* feeding on the fruits of *Carissum sp.* and *Syzygium jambolanum*. Four individuals of Tawny-bellied Babbler *Turdoides hyperythra* were also observed feeding on the fruits of *Ficus sp.* In an open field within the forest area we encountered birds such as Red-wattled Lapwing *Vanellus indicus*, Pied Bushchat *Saxicola caprata*, 10 individuals of Spotted Dove *Streptopelia chinensis*, Ashy Prinia *Prinia socialis*, five Black Drongos *Dicrurus macrocercus*, and a male and a female of Indian Robin *Saxicoloides fulicatus* and 8 individuals of Little Green Bee-eater were observed feeding on butterflies and other insects. Not much activity was recorded at Chirner on the June 28, 2014 due to the continuously drizzling rain.

4.2.3 Mosare Forest

This site has a good patch of deciduous reserved forest on top of a hillock. Agricultural lands cultivated by the people from nearby villages surround the base of this hillock. The forest is a source of firewood for the locals.

On April 9, 2014 we surveyed 5 km distance in the forests near Mosare village from 10.00 am to 2.30 pm and observed two Indian Jungle Crows *Corvus culminatus*, three Black Drongos *Dicrurus macrocercus*, four Indian Robins *Saxicoloides fulicatus*, two Common Loras *Aegithina tiphia*, Thick-billed Flowerpecker *Dicaeum agile*, and four Little Green Bee-eaters *Merops orientalis* during the survey. Shikra *Accipiter badius*, Common Kestrel *Falco tinnunculus* and Crested Serpent Eagle *Spilornis cheela* hovering in the sky.



SUJIT NARWADE

A Common Woodshrike at Morbe dam



SUJIT NARWADE

A Jungle Babbler at Mosare Forest

On June 27, 2014, when we surveyed the Mosare Forest site, the weather was humid. The first shower of rains had made the surroundings green but the streams were dry. We observed three males of Vigors' sunbird *Aethopyga vigorsii*, nine Red-vented Bulbuls *Pycnonotus cafer*, six Red-whiskered Bulbuls *Pycnonotus jocosus*, four Common Tailorbirds *Orthotomus sutorius*, and three Grey-breasted Prinia *Prinia hodgsonii* in the thickets of Carissum sp. We observed and heard Jacobin Cuckoo *Clamator jacobinus*, Common Hawk Cuckoo *Hierococyx varius* and Indian Cuckoo *Cuculus micropterus* during the survey on the transect. We observed five individuals of Black-naped Blue Monarch *Hypothymis azurea*, four Brown-headed Barbets *Megalaima zeylonica*, three Coppersmith Barbets *Megalaima haemacephala* on *Syzygium jambolanum* (Jambhul) tree. Five individuals of Pale-billed Flowerpecker *Dicaeum erythrorhynchos* was observed feeding on fruits of *Ficus* sp. We heard call of Malabar Whistling Thrush *Myophonus horsfieldi* during the survey.

4.2.4 Morbe dam area

On March 28, 2014 we walked on a transect of 2 km distance between 8.30-10.30 am and we observed four individuals of Spotted Dove *Streptopelia chinensis*, three Oriental Turtle Dove *Streptopelia orientalis* and an Emerald Dove *Chalcophaps indica* feeding on the grains spilt by goods carrier going to the Kondhe village. A Yellow-footed Green Pigeon *Treron phoenicoptera*, two Plum-headed Parakeets *Psittacula cyanocephala*, three Brown-headed Barbet *Megalaima zeylonica* were observed flying during the transect. Tickell's Blue Flycatcher *Cyornis tickelliae*, Paradise Flycatcher and a White-rumped Shama *Copsychus saularis* were observed in the thickets of Liana or woody climbers. Three Orange-headed Thrushes *Zoothera citrina* and four Puff-throated Babblers *Pellorneum ruficeps* were also observed feeding on the grubs from leaf litter on the forest floor. Seven individuals (three male and four females) of Black-headed Oriole *Oriolus xantornus* and four Greater Racket-tailed Drongoes *Dicrurus paradiseus* were observed foraging in the canopies of large trees. Seven individuals of Little Green Bee-eater *Merops orientalis*, a male and a female of Pied Bushchat *Saxicola caprata* and four Rufous-tailed Lark *Ammomanes phoenicura* were sighted on the open grass patches interspersed in the forest.



SUJIT NARWADE

Viger's Sunbird is usually seen at Mosare and Chirner Forest areas



SUJIT NARWADE

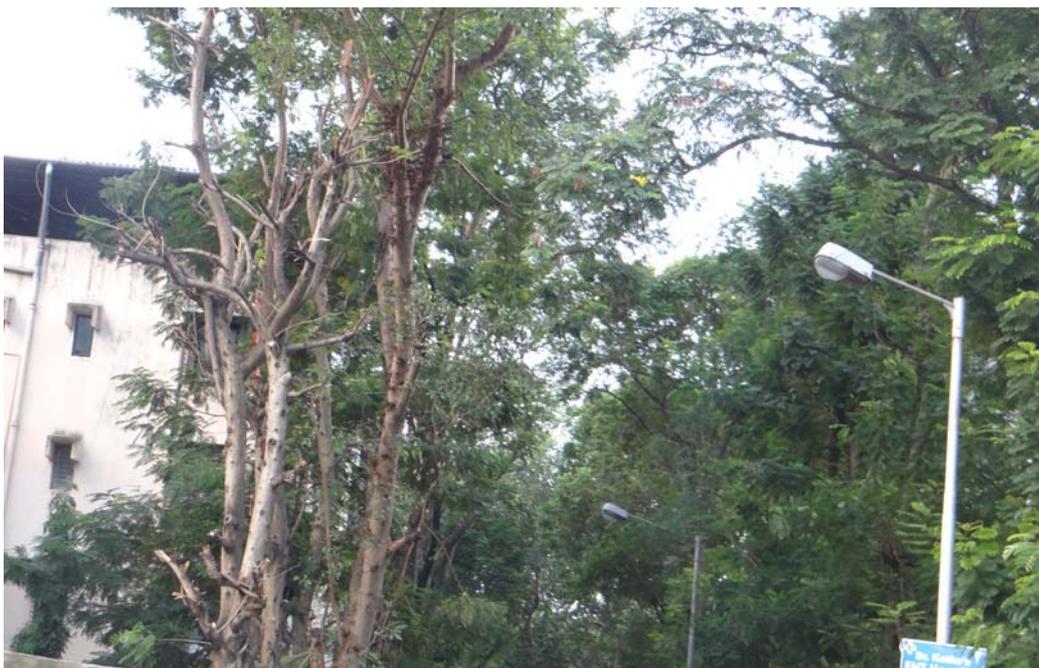
A Yellow-eyed Babbler at NMIA site

Chapter V

A note on communal roosting of birds in the study area

A number of bird species of diverse orders and families, and with a diversity of habits and habitats roost together for at least a part of the year. In a few cases, such social gathering or roosting may be a simple consequence of the paucity of a suitable roosting site forcing the birds to crowd together. However, in a majority of cases of communal roosting, the birds associate through some social attraction and do not disperse even if alternative roosting sites are available. Some of these social groups merely comprise feeding or migratory flocks, which, remain together outside the roosting time as well. There are number of bird species which voluntarily form new social groups specifically at the time of roosting (Gadgil and Ali, 1975). Aggregation of the roosting individuals are common in primates (Anderson, 1998), bats (Lewis, 1995; Wilkinson, 1995), and birds (Eiserer, 1984). In birds, and in other animals as well, the adaptive value of communal roosting is not clearly understood. Avian communal roosting is thought to confer benefits in terms of reduced thermoregulation costs, decreased predation risk, and increased foraging efficiency (Eiserer, 1984; Ydenberg and Prins, 1984) but the results are still controversial (Richner and Hebb, 1996).

Zahavi (1971) has reviewed the problem of the functional significance of communal roosting in birds. He is inclined to the view that efficiency in food location promoted by the communal roosts acting as information centres (Ward, 1965) is the primary function of communal roosts, while the adaptations against predation are a response to increased predation pressure consequent on the assemblage of birds (Gadgil, 1972). However, mixed roosting need not be mutually beneficial to all the species involved. Thus the Common Myna *Acridotheres tristis* may benefit from the association of the more aggressive crows, but from the viewpoint of the crows the advantage conferred by the mynas in warning of the approach of predators may not compensate for the disadvantage of making the roost more attractive to predators (Gadgil, 1972). The majority of birds come together for different reasons. One of the purposes of bird aggregation is roosting, to spend the night in relative security. We reported two types of communal roosting in bird at different places in our study area. One is tree roosts of perching birds and other is high tide roost of waders.



Pruning of trees near Panvel railway station area has disturbed the roosting sites of Egrets and Shags

5.1 Tree roosting birds in the study area

We found communal roosting of birds at Mosare village, CIDCO Garden at sector 9 of Khanda Colony, Panchshil Rest House of Belapur, near Panvel Railway Station area, etc. Detail account of tree roosting species and sites has been given in figure 1 and 2.

5.1.1 Mosare Forest

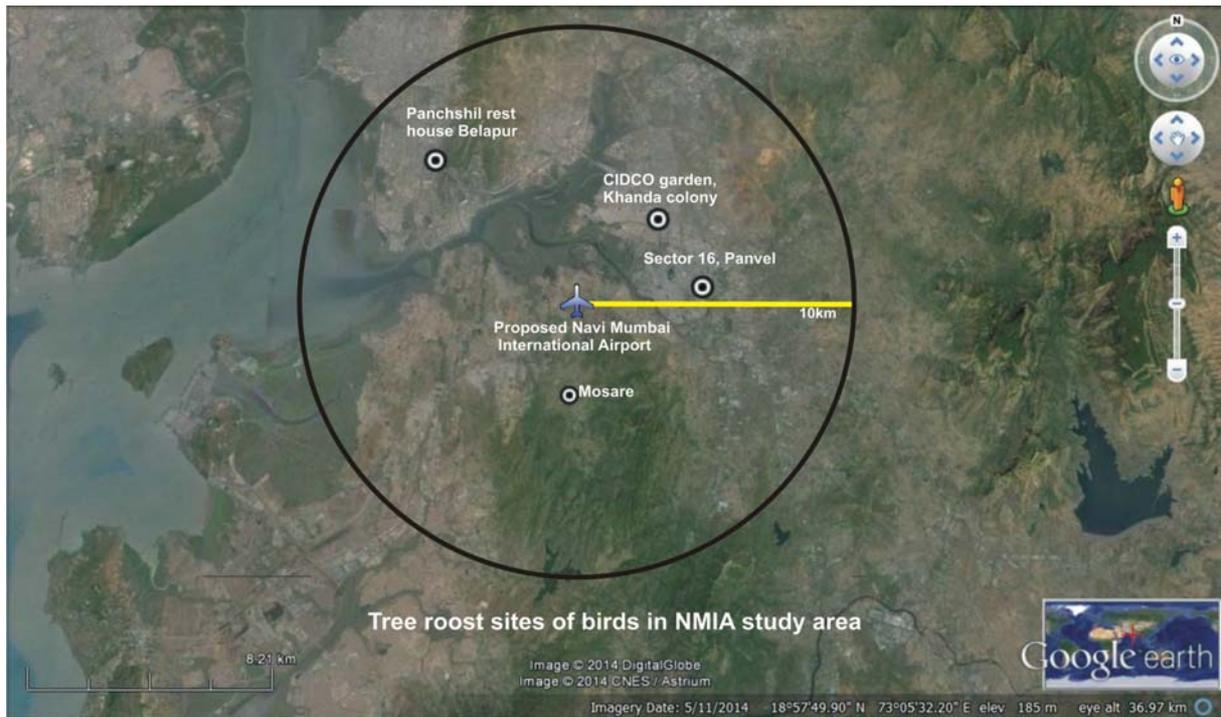
On June 9, 2014 we took a count of birds roosting at this site. Weather was cloudy, and drizzling rains continued throughout the day. The Indian Jungle Crows *Corvus culminatus* were the first one to enter the roost at about 6:00 pm followed by the Rose-ringed Parakeets *Psittacula krameri* and the Egrets were seen coming even after 7:00 p.m. The birds were seen flying from the west to east while entering the roost. Rose-ringed Parakeet *Psittacula krameri*, Indian Jungle Crow *Corvus [macrorhynchos] culminatus*, House Crow *Corvus splendens*, Black-crown Night Heron *Nycticorax nycticorax*, Little Brown Dove *Spilopelia senegalensis* and a mixed group of Egrets were seen roosting in large numbers here. About 500 Eastern Cattle Egrets *Bubulcus coromandus*, Intermediate Egret *Egretta intermedia*, about 50 Great Egrets *Egretta alba* and over 50 Black-crowned Night-herons *Nycticorax nycticorax* were seen in a communal roost. About 20 individuals of Laughing Dove *Streptopelia senegalensis* were seen in low height bushes next to the ground level. House Crows *Corvus splendens* typically gather on the power transmission wires and then entered the roost on top. Egrets were seen coming in from approximately 6.15 p.m. until 7:45 p.m. and later. The birds were seen approaching from west to east while entering the roost. For the population details of the roosting bird species please refer to *Garph 1* and *2* on page 21. In morning these birds were seen flying in all directions, especially mangrove areas.

5.1.2 CIDCO Garden

About 1,000 House Crows *Corvus splendens*, 45 Indian Jungle Crows *Corvus [macrorhynchos] culminatus*, approximately 1,000 Common Mynas *Acridotheres tristis*, 30 Indian Pond-herons *Ardeola grayii*, 100 Indian Shags *Phalacrocorax fuscicollis* and 100 Eastern Cattle Egrets *Bubulcus coromandus* were seen roosting on the trees in CIDCO Garden at Sector 9, Khanda Colony, Navi Mumbai. Indian Shag *Phalacrocorax fuscicollis* was seen arriving between 5.00 p.m. and 6.00 pm followed by Common Myna. Eastern Cattle Egret *Bubulcus coromandus* and Indian Pond-heron *Ardeola grayii* were seen arriving 6.00 pm onwards until dark. Crows were seen moving in all directions for foraging on food wastes, garbage dumps, seashore, forest areas at morning.

5.1.3 Panchshil Rest House, Belapur

We saw about 1,000 to 1,200 House Crows *Corvus splendens* roosting all over the Parsik Hill area of Belapur. Crows were seen roosting on trees as well as on rooftops of buildings. The flocks of 30-40 individuals were seen travelling from west to east. About 700 Indian Shags *Phalacrocorax fuscicollis*, 50 Indian Pond-herons *Ardeola grayii*, 30 Eastern Cattle Egrets *Bubulcus coromandus* were seen on a Gulmohar tree *Delonix regia* at Panchshil Rest House (residence of Commissioner of Navi Mumbai). Indian Shags were seen in the groups of 10-50 individuals, flying from the mangroves at the proposed site of NMIA and moving towards Kamothe, Kharghar and the Panchshil Rest House site. In the morning, the Shags were seen flying back to the mangroves towards the seashore on the west of the proposed site of NMIA.



Rosy Satrling were observed roosting at all the mangrove areas in the study area

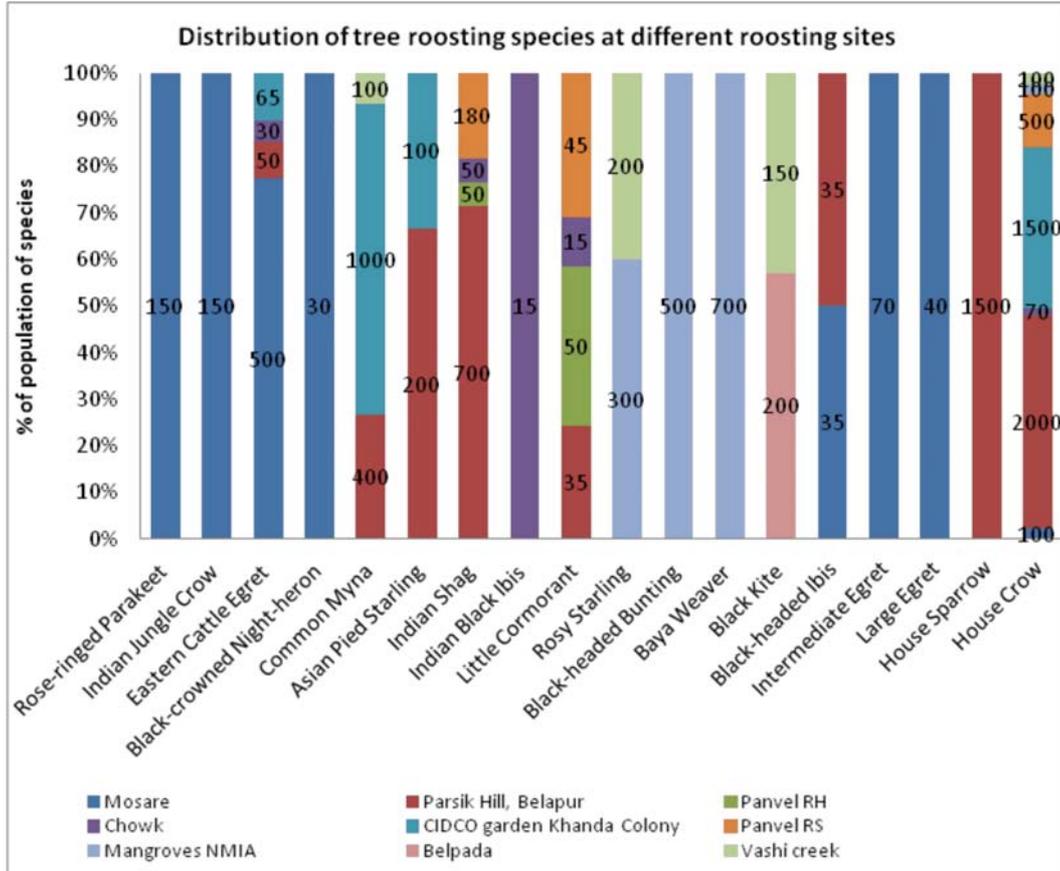


Figure 1: Species roosting at different sites in study area (percentage)

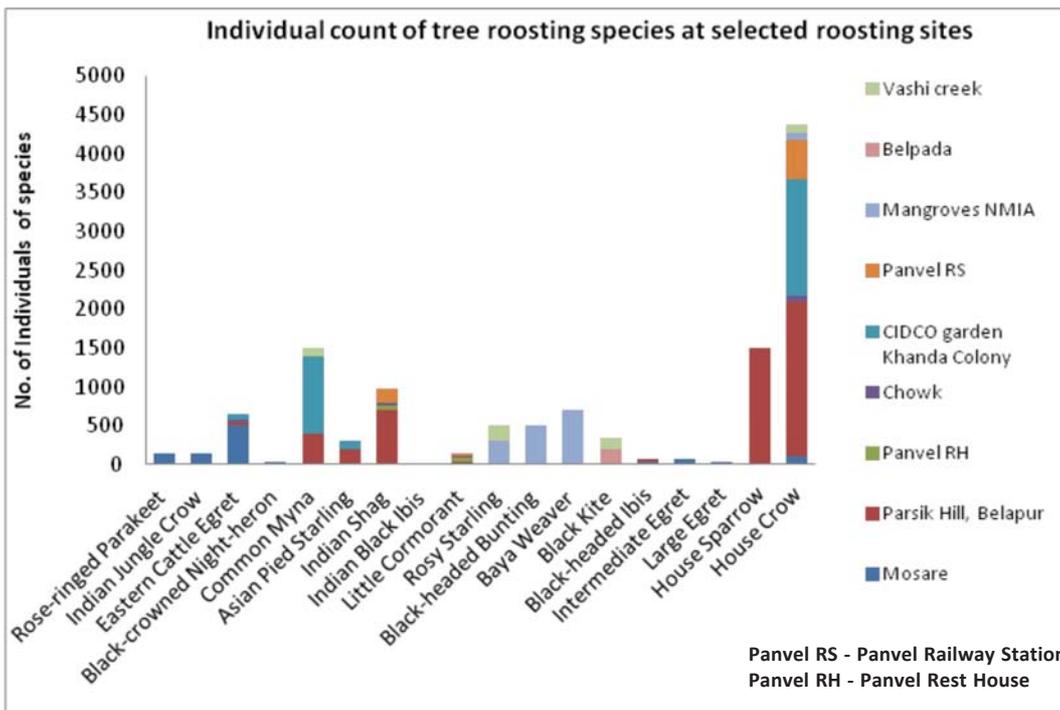


Figure 2: A graph showing population of birds roosting at different sites in the study area

5.1.4 Panvel Railway Station area

We saw Indian Shag *Phalacrocorax fuscicollis*, and Eastern Cattle Egret *Bubulcus coromandus* roosting and nesting, scattered over a large area in Ssector 16, New Panvel near Panvel Railway Station.

5.1.5 Panvel Rest House

We saw Indian Shag *Phalacrocorax fuscicollis*, Eastern Cattle Egret *Bubulcus coromandus* roosting and nesting on large trees opposite to Panvel Rest house.

5.1.6 Vashi Creek area

We observed Birds like Asian Pied Starling, Common Myna, House Crow roosting in mangroves spread between Vashi station to vashi creek. About 150 Black Kites were seen roosting in vening on power line running parallel to vashi bridge.

5.1.7 Kamothe area

About 1500 House Sparrow were seen roosting in groups of 300-400 individuals in various areas in Kamothe node during winter season. During years 2013-14 sparrows were seen shifting their roosting trees within Kamothe area.

5.1.8 Chowk village near Morbe dam

Though this site is outside 10 km radius area Eastern Cattle Egret *Bubulcus coromandus*, Indian Shag *Phalacrocorax fuscicollis*, Little Cormorant *Phalacrocorax niger*, Indian Black Ibis *Pseudibis papillosa* and House Crow *Corvus splendens* were seen roosting here in evening and moving in 10 km radius area of proposed NMIA in morning.

5.1.9 NMIA site

We observed birds like Black-headed Bunting *Emberiza melanocephala* and Baya Weaver *Ploceus philippinus* were roosting in mangrove at this site in winter season. Rosy Starling *Sturnus roseus* was seen roosting occasionally during October (early winter) and late winter (February) period. Sometimes House Crow *Corvus splendens* were also seen roosting along with other species. Thirty to forty Grey Heron *Ardea cinerea* were seen roosting on powerline tower near Khandehwar railway station.



SUJIT NARWADE

One of the most commonly seen birds, House Crow was observed roosting at a site in Mosare Forest

5.2 High tide roosts of ground roosting birds

During the study period from April to June 2014, we observed, that the birds used different sites in different seasons. Tidal cycles in sea and water levels in the wetlands are found to be influential factors on seasonal variations in the species abundance at the roosting and foraging sites. Roosting sites such as wetlands near NRI, the proposed NMIA site, Sonari-Belpada and TSC wetland and adjoining mangroves hold considerable populations of birds in the study area. These roosting sites are located near the major foraging sites such as seashores and creeks (maps showing movement of birds).

Thousands of waders and water birds were seen moving in flocks across the sites, and to open creeks and mudflats on the seashore for foraging (Narwade et al 2012). The detail account of high tide bird roost-count is given in the figure 3 page 24. Birds like Lesser Flamingo *Phoeniconaias minor*, Lesser Sand Plover *Charadrius mongolus* Greater Sand Plover *Charadrius leschenaultia*, Grey Plover *Pluvialis squatarola*, Eurasian Curlew *Numenius arquata*, Common Redshank *Tringa tetanus*, Little stint *Calidris minuta* were seen roosting during high tide and waiting till the mudflat at seashore get exposed.

It was observed that bird congregation occurs usually in shallow water, and the population of the congregating birds in different roosting areas changes annually. For example in 2012 due to low rainfall during summer season of 2013 wader population was seen very less as compared to 2012 and 2014. In 2014 we have seen sudden increase in population of Lesser Flamingo *Phoenicopterus minor*, especially juveniles indicates good season at its breeding sites.

In April we usually see high congregation of waders It has been studied that the day roost choice was affected by its distance from the feeding area and other microclimate (Rogers et. al. 2006). Birds select day roosts closer to the feeding areas, while during night, birds select safer but more distant roosts (Rogers *et al.* 2006) at Roebuck Bay of Australia. Similarly there was an assessment of the effects of the development on roosting behaviour of water birds in Cardiff Bay and Cardiff Bay Development Corporation (CBDC) which has produced alternative roost sites within the bay to mitigate against the loss of salt marsh (Donald & Clark, 1991a). It was observed that by communal roosting, birds are benefited by increased ability to spot approaching predators, opportunity to explore new feeding areas (Donald & Clark, 1991b). Secure roosts are essential for wading birds and wildfowl.

It would be interesting to study the long-term impact of rapidly changing environment on the birds in the study area and correlate it with the status of birds in their breeding grounds. It will give idea about how particular species is doing at local as well as global level. Movement of birds within the airport influence zone would be a concern considering air safety in the future.

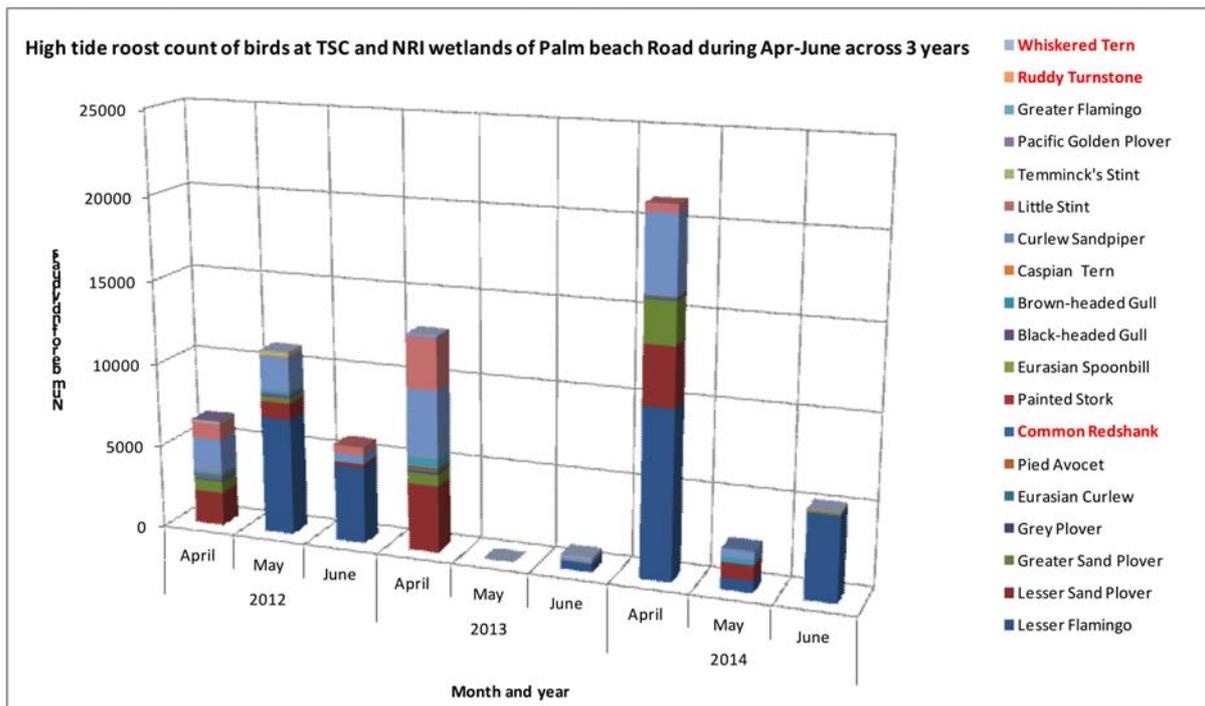
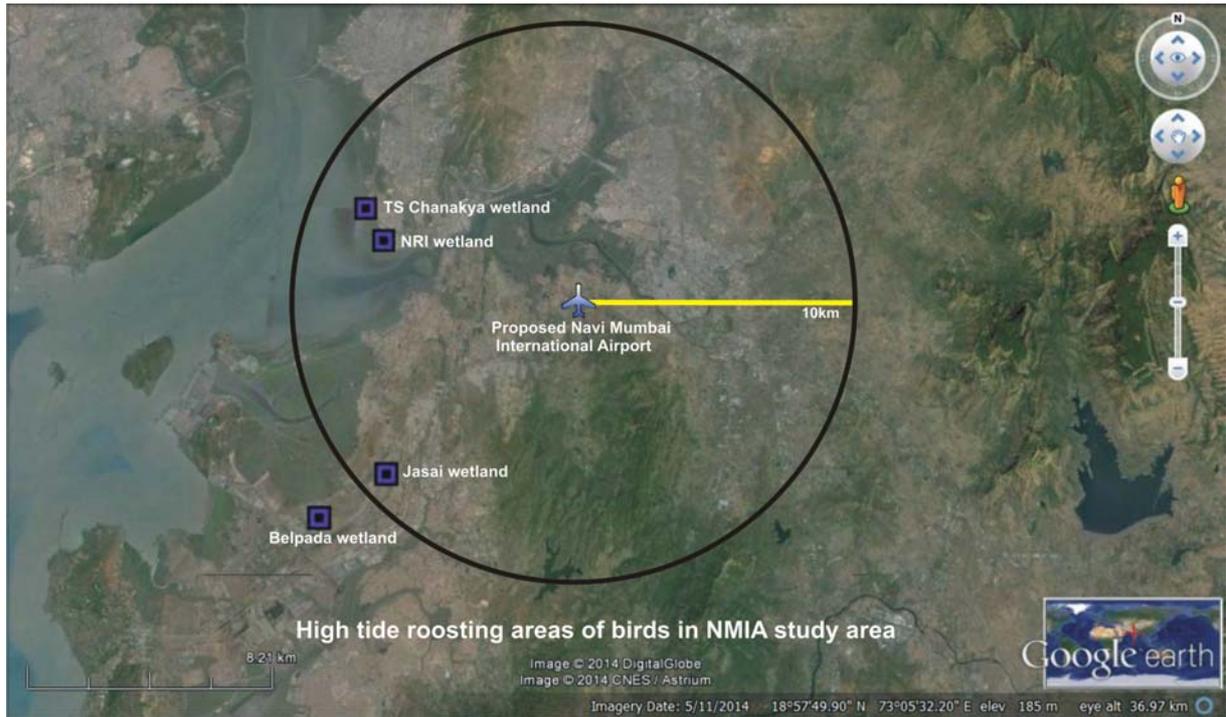


Figure 3: A graph showing annual and monthly variation in the population of roosting birds during high tide at a selected sites in the study area

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SUIT NARWADE

Waders were observed flying in search of a shallower part of the wetland before settling at TSC wetland



SUJIT NARWADE

The number of tourists visiting TSC wetland Palm Beach Road wetland has increased in the past few years; mainly due to easy road connectivity



SUJIT NARWADE

Sometimes, the birds were observed to be disturbed by over enthusiastic tourists getting too close to the birds

Annex I: List of birds observed in study area (see Abbreviations at the end of Annex-I)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
Family Ardeidae						
1.	Little Grebe <i>Tachybaptus ruficollis</i>	W	IV	LC	R	Dastan Phata, DPS Lake, Belapur pond
Family Phalacrocoracidae						
2.	Little Cormorant <i>Phalacrocorax niger</i>	W	IV	LC	R	All wetland areas
3.	Great Cormorant <i>Phalacrocorax carbo</i>	W	IV	LC	R	Ulve
4.	Indian Shag <i>Phalacrocorax fuscicollis</i>	W	IV	LC	R	All wetland areas
Family Ardeidae						
5.	Eastern Cattle Egret <i>Bubulcus coromandus</i>	W/P	IV	LC	R	All wetland areas
6.	Intermediate Egret <i>Egretta intermedia</i>	W/P	IV	LC	R	All wetland areas
7.	Great Egret <i>Egretta alba</i>	W	IV	LC	R	All wetland areas
8.	Little Egret <i>Egretta garzetta</i>	W/P/C	IV	LC	R	All wetland areas
9.	Grey Heron <i>Ardea cinerea</i>	W/C	IV	LC	R	All wetland areas
10.	Indian Pond-heron <i>Ardeola grayii</i>	W	IV	LC	R	All wetland areas
11.	Purple Heron <i>Ardea purpurea</i>	W/C	IV	LC	R	All wetland areas
12.	Western Reef-heron <i>Egretta gularis</i>	W/MD	IV	LC	M	Dastan Phata, Nere, Sonari-Belpada
13.	Black-crowned Night-heron <i>Nycticorax nycticorax</i>	W	IV	LC	R	Kharghar Creek, Panvel Creek
14.	Striated Heron <i>Butorides striata</i>	W	IV	LC	R	Uran
15.	Black Bittern <i>Dupetor flavicollis</i>	W	IV	LC	R	NRI
16.	Chestnut Bittern <i>Ixobrychus cinnamomeus</i>	W	IV	LC	R	Panvel Lake
Family Ciconiidae						
17.	Painted Stork <i>Mycteria leucocephala</i>	W	IV	NT	R	Sonari-Belpada, Kopar, wetlands at Palm Beach Road
18.	Asian Openbill <i>Anastomus oscitans</i>	W	IV	LC	R	Dastan Phata
19.	Woolly-necked Stork <i>Ciconia episcopus</i>	W	IV	LC	R	Dastan Phata, Mosare
20.	Black Stork <i>Ciconia nigra</i>	W	IV	LC	M	Ransai dam
Family Threskiornithidae						
21.	Black-headed Ibis <i>Threskiornis melanocephalus</i>	W/C	IV	NT	R	All wetlands and mangroves
22.	Indian Black Ibis <i>Pseudibis papillosa</i>	W	IV	LC	R	Morbe
23.	Eurasian Spoonbill <i>Platalea leucorodia</i>	W	I	LC	R	Jasai, Sanjivani School, Sonari-Belpada
24.	Glossy Ibis <i>Plegadis falcinellus</i>	W	IV	LC	M	Karal
Family Phoenicopteridae						
25.	Greater Flamingo <i>Phoenicopterus roseus</i>	W	I	LC	M	Sonari-Belpada, NRI
26.	Lesser Flamingo <i>Phoeniconaias minor</i>	W	I	NT	M	Wetlands and Seashore of Palm Beach Road
Family Anatidae						
27.	Greylag Goose <i>Anser anser</i>	W	IV	LC	M	Sonari-Belpada
28.	Ruddy Shelduck <i>Tadorna ferruginea</i>	W	IV	LC	M	Jasai, Sanjivani School, Sonari-Belpada
29.	Northern Pintail <i>Anas acuta</i>	W	IV	LC	M	Sonari-Belpada
30.	Common Teal <i>Anas crecca</i>	W	IV	LC	M	Sonari-Belpada
31.	Indian Spot-billed Duck <i>Anas poecilorhyncha</i>	W/C	IV	LC	R	All
32.	Mallard <i>Anas palatyrhynchos</i>	W	IV	LC	M	NRI
33.	Garganey <i>Anas querquedula</i>	W	IV	LC	M	Sonari-Belpada

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
34.	Northern Shoveller <i>Anas clypeata</i>	W/C	IV	LC	M	Kharghar Creek
35.	Comb Duck <i>Sarkidiornis melanotos</i>	W	IV	LC	R	Dastan Phata
36.	Lesser Whistling-duck <i>Dendrocygna javanica</i>	W	IV	LC	R	Dastan Phata, Belapur pond, Sonari-Belpada, Palm Beach road
37.	Cotton Teal <i>Nettapus coromandelianus</i>	W	IV	LC	R	Dastan Phata, Belapur pond
38.	Gadwall <i>Anas strepera</i>	W	IV	LC	M	Belpada
39.	Eurasian Wigeon <i>Anas penelope</i>	W	IV	LC	M	Belpada
Family Accipitridae						
40.	Black-winged Kite <i>Elanus caeruleus</i>	All	I	LC	R	All areas
41.	Black Kite <i>Milvus migrans migrans/govinda</i>	All	I	LC	R	All areas
42.	Brahminy Kite <i>Haliastur indus</i>	W/P	I	LC	R	Sonari-Belpada, Dastan Phata
43.	Black-eared Kite <i>Milvus [migrans] lineatus</i>	W	I	LC	M	Sonari-Belpada
44.	Shikra <i>Accipiter badius</i>	All	I	LC	R	All areas
45.	White-eyed Buzzard <i>Butastur teesa</i>	F	I	LC	R	Jasai
46.	Oriental Honey-buzzard <i>Pernis ptylorhynchus</i>	F	I	LC	R	Mosare
47.	Common Buzzard <i>Buteo buteo</i>	F	I	LC	R	Ransai, Chirner
48.	Long-legged Buzzard <i>Buteo rufinus</i>	F	I	LC	R	Mosare
49.	Western Marsh Harrier <i>Circus aeruginosus</i>	W	I	LC	M	All areas
50.	Crested Serpent-eagle <i>Spilornis cheela</i>	F	I	LC	R	Ransai, Mosare
51.	Changeable Hawk-eagle <i>Nisaetus cirrhatus</i>	F	I	LC	R	Ransai
52.	Short-toed Eagle <i>Circaetus gallicus</i>	GS	I	LC	R	Chirner road
53.	Booted Eagle <i>Hieraetus pennatus</i>	F	I	LC	M	Mosare
54.	Greater Spotted Eagle <i>Aquila clanga</i>	F	I	LC	M	Sonari-Belpada, Mosare
55.	Indian Spotted Eagle <i>Aquila pomarina</i>	W	I	VU	R	Sonari-Belpada
56.	White-bellied Sea-eagle <i>Haliaeetus leucogaster</i>	W	I		R	Uran
57.	Black Eagle <i>Ictinaetus malayensis</i>	F	I		R	Karnala
Family Falconidae						
58.	Common Kestrel <i>Falco tinnunculus</i>	GS	IV	LC	R	Chirner road
59.	Peregrine Falcon (Shaheen) <i>Falco peregrinus perigrinator</i>	W	IV	LC	R	Uran
Family Pandionidae						
60.	Western Osprey <i>Pandion haliaetus</i>	W/C	I	LC	R	Kharghar Creek, Sonari-Belpada
Family Phasianidae						
61.	Rain Quail <i>Coturnix coromandelica</i>	P	-	LC	R	Chirner
62.	Red Spurfowl <i>Galloperdix spadicea</i>	F	-	LC	R	Kharghar hills
63.	Jungle Bush-quail <i>Perdica asiatica</i>	F	-	LC	R	Ransai, Chirner Road
64.	Indian Peafowl <i>Pavo cristatus</i>	F	I	LC	R	Nere
65.	Painted Francolin <i>Francolinus pictus</i>	GS	-	LC	R	Taloja
66.	Grey Francolin <i>Francolinus pondicerianus</i>	GS	-	LC	R	Taloja
Family Turnicidae						
67.	Barred Buttonquail <i>Turnix suscitator</i>	P	-	LC	R	Chirner
68.	Yellow-legged buttonquail <i>Turnix tanki</i>	P	-	LC	R	Chirner

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
Family Gruidae						
69.	Demoiselle Crane <i>Grus virgo</i>	W		LC	M	Belpada
Family Rallidae						
70.	White-breasted Waterhen <i>Amaurornis phoenicurus</i>	W/C	IV	LC	R	Dastan Phata, Pargaon
71.	Purple Swampphen <i>Porphyrio porphyrio</i>	W	IV	LC	R	Dastan Phata, Pargaon
72.	Common Moorhen <i>Gallinula chloropus</i>	W	IV	LC	R	Belapur pond, Dastan Phata
73.	Eurasian Coot <i>Fulica atra</i>	W	IV	LC	R	Belapur pond, Dastan Phata
74.	Slaty-breasted Rail <i>Gallirallus striatus</i>	W/C	IV	LC	R	Kharghar Creek, Panvel Creek
75.	Ruddy-breasted Crake <i>Porzana fusca</i>	W/C	IV	LC	R	Kharghar Creek, Panvel Creek
76.	Brown Crake <i>Porzana akool</i>	W/C	IV	LC	R	Chirner, Uran
Family Jacanidae						
77.	Bronze-winged Jacana <i>Metopidius indicus</i>	W	IV	LC	R	Belapur pond, Dastan Phata
78.	Pheasant-tailed Jacana <i>Hydrophasianus chirurgus</i>	W	IV	LC	R	Belapur pond, Dastan Phata
Family Rostratulidae						
79.	Greater Painted Snipe <i>Rostratula benghalensis</i>	W	IV	LC	R	Sonari-Belpada, Dastan Phata
Family Charadriidae						
80.	Red-wattled Lapwing <i>Vanellus Indicus</i>	ALL	IV	LC	R	All areas
81.	Lesser Sand Plover <i>Charadrius mongolus</i>	W/MD	IV	LC	M	All mudflats in study area
82.	Greater Sand Plover <i>Charadrius leschenaulti</i>	W/MD	IV	LC	M	Behind NRI Complex
83.	Little Ringed Plover <i>Charadrius dubius</i>	W/MD	IV	LC	R	All wetlands
84.	Pacific Golden Plover <i>Pluvialis fulva</i>	W/MD	IV	LC	M	Behind TS Chanakya, Panvel Creek
85.	Kentish Plover <i>Charadrius alexandrinus</i>	W/MD	IV	LC	M	All wetlands
86.	Grey Plover <i>Pluvialis squatarola</i>	W/MD	IV	LC	M	Sonari-Belpada, wetlands of Palm Beach Road area
Family Scolopacidae						
87.	Common Snipe <i>Gallinago gallinago</i>	W	IV	LC	R	Sonari-Belpada, Dastan Phata
88.	Common Redshank <i>Tringa totanus</i>	W/MC	IV	LC	M	All (congregation at Kharghar Creek)
89.	Wood Sandpiper <i>Tringa glareola</i>	W/MC	IV	LC	M	All wetlands
90.	Common Sandpiper <i>Tringa hypoleucos</i>	W/MC	IV	LC	R	All wetlands
91.	Common Greenshank <i>Tringa nebularia</i>	W/RS	IV	LC	M	Seashore of Palm Beach Road, Sonari-Belpada
92.	Terek Sandpiper <i>Xenus cinereus</i>	W/MC	IV	LC	M	Kharghar Creek, Kopar
93.	Green Sandpiper <i>Tringa ochropus</i>	W/MC	IV	LC	M	Sonari-Belpada
94.	Marsh Sandpiper <i>Tringa stagnatilis</i>	W	IV	LC	M	All wetlands (more at Belpada)
95.	'Western' Black-tailed Godwit <i>Limosa limosa</i>	W	IV	LC	M	Sonari-Belpada, Sanjivani School
96.	Eurasian Curlew <i>Numenius arquata</i>	W	IV	LC	M	Behind NRI Complex
97.	Ruddy Turnstone <i>Arenaria interpres</i>	RS	IV	LC	M	Behind TS Chanakya
98.	Temminck's Stint <i>Calidris temminckii</i>	W	IV	LC	M	All (Large congregation behind NRI Complex)
99.	Little Stint <i>Calidris minuta</i>	W	IV	LC	M	All wetland areas
100.	Curlew Sandpiper <i>Calidris ferruginea</i>	W	IV	LC	M	Sonari-Belpada, Dastan Phata, Sanjivani school (congregation of 2,000 birds behind NRI Complex)

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
101.	Broad-billed Sandpiper <i>Limicola falcinellus</i>	W	IV	LC	M	Belpada, NRI Lake, TS Chanakya
102.	Ruff <i>Philomachus pugnax</i>	W	IV	LC	M	Sonari-Belpada, Dastan Phata
103.	Dunlin <i>Calidris alpina</i>	W	IV	LC	M	Seashore of Palm Beach Road
104.	Whimbrel <i>Numenius phaeopus</i>	W	IV	LC		Sonari-Belpada
Family Recurvirostridae						
105.	Black-winged Stilt <i>Himantopus himantopus</i>	W	IV	LC	R	All wetland areas
106.	Pied Avocet <i>Recurvirostra avosetta</i>	W	IV	LC	M	Jasai, NRI area
Family Laridae						
107.	Gull-billed Tern <i>Gelochelidon nilotica</i>	W	IV	LC	M	All wetland areas
108.	Caspian Tern <i>Sterna caspia</i>	W/C	IV	LC	M	Wetlands of Kamothe, Panvel, Palm Beach Road
109.	Saunders' Tern <i>Sterna saundersi</i>	W/C	IV	LC	M	Wetlands of Palm Beach Road
110.	Whiskered Tern <i>Chlidonias hybridus</i>	W/C	IV	LC	M	Wetlands of Palm Beach Road, Panvel Creek
111.	River Tern <i>Sterna aurantia</i>	W/C	IV	LC	M	Wetlands of Sonari-Belpada, Palm Beach Road, Panvel Creek
112.	White-cheeked Tern <i>Sterna repressa</i>	W	IV	LC	M	Jasai
113.	Slender-billed Gull <i>Larus genei</i>	W	IV	LC	M	NRI, TS Chanakya
114.	Brown-headed Gull <i>Larus brunnicephalus</i>	W	IV	LC	M	All wetland areas (more than 200 at DPS lake)
115.	Common Black-headed Gull <i>Larus ridibundus</i>	W	IV	LC	M	All wetland areas
116.	Heuglin's Gull <i>Larus fuscus heuglini</i>	W	IV	LC	M	Airoli
117.	Great Black-headed Gull <i>Ichthyaetus ichthyaetus</i>	W	IV	LC	M	Sea shore
Family Rynchopidae						
118.	Indian Skimmer <i>Rynchops albicollis</i>	W	IV	VU	R	NRI area
Family Columbidae						
119.	Rock Pigeon <i>Columba livia</i>	All/NH		LC	R	All areas
120.	Yellow-footed Green-pigeon <i>Treron phoenicoptera</i>	F	IV	LC	R	Ransai
121.	Grey-fronted Green Pigeon <i>Treron affinis</i>	F	IV	LC	R	Karnala
122.	Laughing Dove <i>Streptopelia senegalensis</i>	All	IV	LC	R	All areas
123.	Eurasian Collared-dove <i>Streptopelia decaocto</i>	GS	IV	LC	R	Uran
124.	Spotted Dove <i>Streptopelia chinensis</i>	All	IV	LC	R	All areas
Family Psittacidae						
125.	Rose-ringed Parakeet <i>Psittacula krameri</i>	All	IV	LC	R	All areas
126.	Plum-headed Parakeet <i>Psittacula cyanocephala</i>	F	IV	LC	R	Ransai
127.	Alexandrine Parakeet <i>Psittacula krameri</i>	F	IV	VU	R	Chirner

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
Family Cuculidae						
128.	Asian Koel <i>Eudynamys scolopaceus</i>	All	IV	LC	R	All areas
129.	Greater Coucal (Southern Coucal) <i>Centropus sinensis</i>	All	IV	LC	R	All areas
130.	Common Hawk-cuckoo <i>Hierococcyx varius</i>	All	IV	LC	R	Mosare, Ransai
131.	Jacobin Cuckoo <i>Clamator jacobinus</i>	F	IV	LC	M	Chirner, Karnala
132.	Indian Cuckoo <i>Cuculus micropterus</i>	F	IV	LC	R	Chirner, Ransai, Mosare
Family Cuculidae						
133.	Blue-faced Malkoha <i>Phaenicophaeus viridirostris</i>	All	IV	LC	R	Mosare
134.	Sirkeer Malkoha <i>Phaenicophaeus leschenaulti</i>	All	IV	LC	R	Mosare
Family Tytonidae						
135.	Common Barn-Owl <i>Tyto alba</i>	NH	IV	LC	R	Kharghar
Family Strigidae						
136.	Spotted Owlet <i>Athene brama</i>	F/NH	IV	LC	R	Mosare, Ransai
137.	Indian Eagle-owl <i>Bubo bengalensis</i>	NH	IV	LC	R	Jasai
Family Caprimulgidae						
138.	Indian Little Nightjar <i>Caprimulgus asiaticus</i>	A/GS	IV	LC	R	Ransai
139.	Indian Jungle Nightjar <i>Caprimulgus indicus</i>	F	IV	LC	R	Ransai
Family Apodidae						
140.	Little Swift <i>Apus affinis</i>	NH		LC	R	All areas
141.	Asian Palm-swift <i>Cypsiurus balasiensis</i>	F/NH		LC	R	All areas
Family Alcedinidae						
142.	Lesser Pied Kingfisher <i>Ceryle rudis</i>	W	IV	LC	R	Kopar
143.	White-throated Kingfisher <i>Halcyon smyrnensis</i>	All	IV	LC	R	All areas
144.	Common Kingfisher <i>Alcedo atthis</i>	W	IV	LC	R	All areas
145.	Black-capped Kingfisher <i>Halcyon pileata</i>	W/F	IV	LC	R	Ransai
146.	Black-backed Dwarf Kingfisher <i>Ceyx erithaca</i>	F	IV	LC	M	Ransai
Family Meropidae						
147.	Little Green Bee-eater <i>Merops orientalis</i>	All		LC	R	All areas
148.	Blue-tailed Bee-eater <i>Merops philippinus</i>	F/MC		LC	R	Kharghar Creek, Mosare
149.	Blue-cheeked Bee-eater <i>Merops persicus</i>	GS/W		LC	R	Belpada & Uran
Family Coraciidae						
150.	Indian Roller <i>Coracias benghalensis</i>	All	IV	LC	R	All areas
151.	European Roller <i>Coracias garrulus</i>	All	IV	LC	M	Uran

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
Family Upupidae						
152.	Common Hoopoe <i>Upupa epops</i>	MC/GS		LC	M	All areas
Family Bucerotidae						
153.	Indian Grey Hornbill <i>Ocyrceros birostris</i>	F	I	LC	R	Mosare, Ransai
Family Capitonidae						
154.	Coppersmith Barbet <i>Megalaima haemacephala</i>	F	IV	LC	R	Mosare, Ransai
155.	Brown-headed Barbet <i>Megalaima zeylonica</i>	F	IV	LC	R	Mosare, Ransai
156.	White-cheeked Barbet <i>Megalaima viridis</i>	F	IV	LC	R	Patnoli, Chirner
Family Pittidae						
157.	Indian Pitta <i>Pitta brachyura</i>	F	IV	LC	R	Mosare
Family Picidae						
158.	Eurasian Wryneck <i>Jynx torquilla</i>	F	IV	LC	R	Mosare
159.	Rufous Woodpecker <i>Celeus brachyurus</i>	F	IV	LC	R	Patnoli, Chirner
160.	Black-rumped Flameback <i>Dinopium benghalense</i>	F	IV	LC	R	Ransai
161.	Common Flameback <i>Dinopium javanense</i>	F	IV	LC	R	Ransai
162.	Yellow-fronted Pied Woodpecker <i>Dendrocopos mahrattensis</i>	F	IV	LC	R	Mosare, Nere
163.	Heart-spotted Woodpecker <i>Hemicircus canente</i>	F	IV	LC	R	Karnala
164.	Indian Pygmy Woodpecker <i>Dendrocopos nanus</i>	F	IV	LC	R	Karnala
Family Alaudidae						
165.	Ashy-crowned Finch-lark <i>Eremopterix griseus</i>	GS	IV	LC	R	Uran
166.	Rufous-tailed Lark <i>Ammomanes phoenicura</i>	All	IV	LC	R	All areas
167.	Malabar Lark <i>Galerida malabarica</i>	ALL	IV	LC	R	All areas
Family Motacillidae						
168.	Citrine Wagtail <i>Motacilla citreola</i>	W/M	IV	LC	M	All areas
169.	Yellow Wagtail <i>Motacilla flava</i>	W/M	IV	LC	M	All areas
170.	Grey Wagtail <i>Motacilla cinerea</i>	W	IV	LC	M	All areas
171.	White Wagtail <i>Motacilla alba</i>	W	IV	LC	M	All areas
172.	White-browed Wagtail <i>Motacilla maderaspatensis</i>	W	IV	LC	R	All areas
173.	Tree Pipit <i>Anthus trivialis</i>	P/GS	IV	LC	M	All areas
174.	Paddyfield Pipit <i>Anthus rufulus</i>	ALL	IV	LC	R	All areas
Family Hirundinidae						
175.	Wire-tailed Swallow <i>Hirundo smithii</i>	All	IV	LC	R	All areas
176.	Barn Swallow <i>Hirundo rustica</i>	W	IV	LC	R	All areas
Family Campephagidae						
177.	Common Woodshrike <i>Tephrodornis pondicerianus</i>	F	IV	LC	R	Mosare

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
178.	Large Cuckoo-shrike <i>Coracina macei</i>	F	IV	LC	R	Patnoli
179.	Black-headed Cuckoo-shrike <i>Coracina melanoptera</i>	F	IV	LC	R	Ransai
180.	Small Minivet <i>Pericrocotus cinnamomeus</i>	F	IV	LC	R	Mosare
181.	Orange Minivet <i>Pericrocotus flammeus</i>	F	IV	LC	R	Ransai
Family Irenidae						
182.	Common Iora <i>Aegithina tiphia</i>	F	IV	LC	R	Ransai
183.	Gold-fronted Leafbird <i>Chloropsis aurifrons</i>	F	IV	LC	R	Ransai, Mosare
Family Pycnonotidae						
184.	Red-vented Bulbul <i>Pycnonotus cafer</i>	All	IV	LC	R	All areas
185.	Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	F/MC	IV	LC	R	All areas
186.	White-eared Bulbul <i>Pycnonotus leucotis</i>	MC	IV	LC	R	All areas
187.	White-browed Bulbul <i>Pycnonotus luteolus</i>	F	IV	LC	R	Chirner
Family Laniidae						
188.	Bay-backed Shrike <i>Lanius vittatus</i>	All	IV	LC	R	All areas
189.	'Rufous-backed' Long-tailed Shrike <i>Lanius schach erythronotus group</i>	All	IV	LC	R	All areas
190.	Southern Grey Shrike <i>Lanius meridionalis</i>	GS	IV	LC	R	Chirner road
Family Muscipidae						
191.	Orange-headed Thrush <i>Zoothera citrina</i>	F	IV	LC	R	Ransai
192.	Jungle Babbler <i>Turdoides striatus</i>	F	IV	LC	R	Ransai, Mosare, Patnoli
193.	Tawny-bellied Babbler <i>Turdoides hyperythra</i>	F	IV	LC	R	Mosare, Patnoli
194.	Yellow-eyed Babbler <i>Chrysomma sinense</i>	F	IV	LC	R	Chirner
195.	Indian Scimitar-babbler <i>Pomatorhinus [schisticeps] horsfieldii</i>	F	IV	LC	R	Chirner, Mosare
196.	Puff-throated Babbler <i>Pellorneum ruficeps</i>	F	IV	LC	R	Mosare, Patnoli
197.	Brown-cheeked Fulvetta <i>Alcippe poioicephala</i>	F	IV	LC	R	Ransai
198.	Black Redstart <i>Phoenicurus ochruros</i>	GS	IV	LC	M	Mosare
199.	Malabar Whistling-thrush <i>Myophonus horsfieldi</i>	F	IV	LC	M	Ransai
200.	Oriental Magpie-robin <i>Copsychus saularis</i>	All	IV	LC	R	All areas
201.	Common Stonechat <i>Saxicola torquatus</i>	All	IV	LC	M	All areas
202.	Pied Bushchat <i>Saxicola caprata</i>	All	IV	LC	R	Uran
203.	Isabelline Wheatear <i>Oenanthe isabellina</i>	GS	IV	LC	M	TS Chanakya
204.	Indian Black Robin <i>Saxicoloides fulicatus</i>	All	IV	LC	R	All areas

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
205.	White-rumped Shama <i>Copsychus saularis</i>	F	IV	LC	R	Ransai
206.	Bluethroat <i>Luscinia svecica</i>	MC	IV	LC	M	Sonari-Belpada, Kharghar Creek, Pargaon
207.	Blue Rock-thrush <i>Monticola solitaries</i>	GS	IV	LC	M	Uran
208.	Blue-headed Rock-thrush <i>Monticola cinclorhynchus</i>	F	IV	LC	R	Karnala
209.	Zitting Cisticola <i>Cisticola juncidis</i>	MC	IV	LC	R	Kopar
210.	Plain Prinia <i>Prinia inornata</i>	All	IV	LC	R	All areas
211.	Ashy Prinia <i>Prinia socialis</i>	All	IV	LC	R	All areas
212.	Grey-breasted Prinia <i>Prinia hodgsonii</i>	All	IV	LC	R	Mosare
213.	Indian Reed-warbler <i>Acrocephalus [stentoreus] bruniscens</i>	MS	IV	LC	M	All creeks and mangrove areas
214.	Common Tailorbird <i>Orthotomus sutorius</i>	All	IV	LC	R	All areas
215.	Lesser Whitethroat <i>Sylvia curruca</i>	GS	IV	LC	M	Uran
216.	Red-breasted Flycatcher <i>Ficedula parva</i>	GS/F	IV	LC	M	Nere
217.	Asian Brown Flycatcher <i>Muscicapa dauurica</i>	MC	IV	LC	M	Kopar
218.	White-browed Fantail <i>Rhipidura albicollis</i>	MC	IV	LC	M	Khargahr Creek
219.	Grey-headed Canary-flycatcher <i>Culicicapa ceylonensis</i>	F	IV	LC		Ransai
220.	Asian Paradise Flycatcher <i>Terpsiphone paradise</i>	F	IV	LC		Ransai, Karnala, Morbe, Chirner
221.	Tickell's Blue Flycatcher <i>Cyornis tickelliae</i>	F	IV	LC		Ransai, Karnala, Morbe
222.	Black-naped Blue Monarch <i>Hypothymis azurea</i>	F	IV	LC		Karnala, Morbe
Family Paridae						
223.	Great Tit <i>Parus major</i>	NH	IV	LC	R	Uran
Family Dicaeidae						
224.	Thick-billed Flowerpecker <i>Dicaeum agile</i>	F	IV	LC	R	Ransai, Karnala, Chirner, Morbe.
225.	Pale-billed Flowerpecker <i>Dicaeum erythrorhynchos</i>	F	IV	LC	R	Ransai, Karnala, Chirner, Morbe.
Family Nectariniidae						
226.	Purple Sunbird <i>Cinnyris asiatica</i>	All	IV	LC	R	Ransai, Karnala, Chirner, Morbe.
227.	Purple-rumped Sunbird <i>Leptocoma zeylonica</i>	GS	IV	LC	R	Ransai, Karnala, Chirner, Morbe.
228.	Small Sunbird <i>Leptocoma minima</i>	F	IV	LC	R	Ransai
229.	Vigors' Sunbird <i>Aethopyga vigorsii</i>	F	IV	LC	R	Ransai
230.	Loten's Sunbird <i>Cinnyris lotenius</i>	F	IV	LC	R	Karnala
Family Emberizidae						
231.	Red-headed Bunting <i>Emberiza bruniceps</i>	GS	IV	LC	M	Pargaon
232.	Black-headed Bunting <i>Emberiza melanocephala</i>	GS	IV	LC	M	Pargaon, Kharghar Creek

Annex I: List of birds observed in study area (contd.)

Sr. no.	Common/scientific names	Habitat	WPA schedule	IUCN status	R/M	Sites
Family Fringillidae						
233.	Common Rosefinch <i>Carpodacus erythrinus</i>	GS	IV	LC	M	Mosare
Family Estrildidae						
234.	Indian Silverbill <i>Euodice malabarica</i>	P	IV	LC	R	All areas
235.	Red Avadavat <i>Amandava amandava</i>	W/MC	IV	LC	R	Sonari-Belpada, TS Chanakya
236.	Tricoloured Munia <i>Lonchura malacca</i>	MC	IV	LC	R	Kharghar Creek, TS Chanakya
237.	Scaly-breasted Munia <i>Lonchura punctulata</i>	MC/F	IV	LC	R	Kharghar Creek, TS Chanakya, Mosare
238.	White-rumped Munia <i>Lonchura striata</i>	F	IV	LC	R	Mosare
Family Passeridae						
239.	House Sparrow <i>Passer domesticus</i>	All	IV	LC	R	All areas
240.	Baya Weaver <i>Ploceus philippinus</i>	All	IV	LC	R	All areas
241.	Black-breasted Weaver <i>Ploceus benghalensis</i>	All	IV	LC	R	All areas
242.	Yellow-throated Sparrow <i>Petronia xanthocollis</i>	F/GS	IV	LC	R	Uran, Mosare
Family Sturnidae						
243.	Rosy Starling <i>Sturnus roseus</i>	All	IV	LC	M	Sonari-Belpada, Nhava, Kharghar Creek, Pargaon, Kopar
244.	Brahminy Starling <i>Temenuchus pagodarum</i>	GS	IV	LC	R	Uran
245.	Grey-headed Starling <i>Sturnia malabarica</i>	GS	IV	LC	R	Behind TS Chanakya
246.	Malabar White-headed Starling <i>Sturnia blythii</i>	GS	IV	LC	R	Behind TS Chanakya
247.	Asian Pied Starling <i>Gracupica contra</i>	GS	IV	LC	R	All areas
248.	Common Myna <i>Acridotheres tristis</i>	All	IV	LC	R	All areas
249.	Jungle Myna <i>Acridotheres fuscus</i>	All	IV	LC	R	Mosare
Family Oriolidae						
250.	Indian Golden Oriole <i>Oriolus kundoo</i>	All	IV	LC	R	All areas
251.	Black-hooded Oriole <i>Oriolus xanthornus</i>	F	IV	LC	R	Ransai
252.	Black-naped Oriole <i>Oriolus chinensis diffuses</i>	F	IV	LC	M	Ransai
Family Dicruridae						
253.	Black Drongo <i>Dicrurus macrocercus</i>	All	IV	LC	R	All areas
254.	Ashy Drongo <i>Dicrurus leucophaeus</i>	F	IV	LC	R	Ransai
255.	Bronzed Drongo <i>Dicrurus aeneus</i>	F	IV	LC	M	Karnala
256.	White-bellied Drongo <i>Dicrurus caerulescens</i>	F	IV	LC	R	Ransai, Patnoli
257.	Greater Racket-tailed Drongo <i>Dicrurus paradiseus</i>	F	IV	LC	R	Ransai, Patnoli, Karnala
Family Corvidae						
258.	House Crow <i>Corvus splendens</i>	NH	V	LC	R	All areas
259.	Jungle Crow <i>Corvus macrorhynchos</i>	All	IV	LC	R	All areas
260.	Rufous Treepie <i>Dendrocitta vagabunda</i>	F	IV	LC	R	Mosare

WPA – Wildlife Protection Act, 1972.

Habitats: P – Paddy field, GS – Mixed habitat of Grassland and Shrub land, RS – Rocky Seashore, W – Wetland, MD – Mudflats, MC – Mangrove and Creeks, NH – Near Human habitation, F – Forest.

IUCN Status: EN – Endangered, VU – Vulnerable, NT – Near threatened, LC – Least Concern.

R – Resident, M – Migratory.