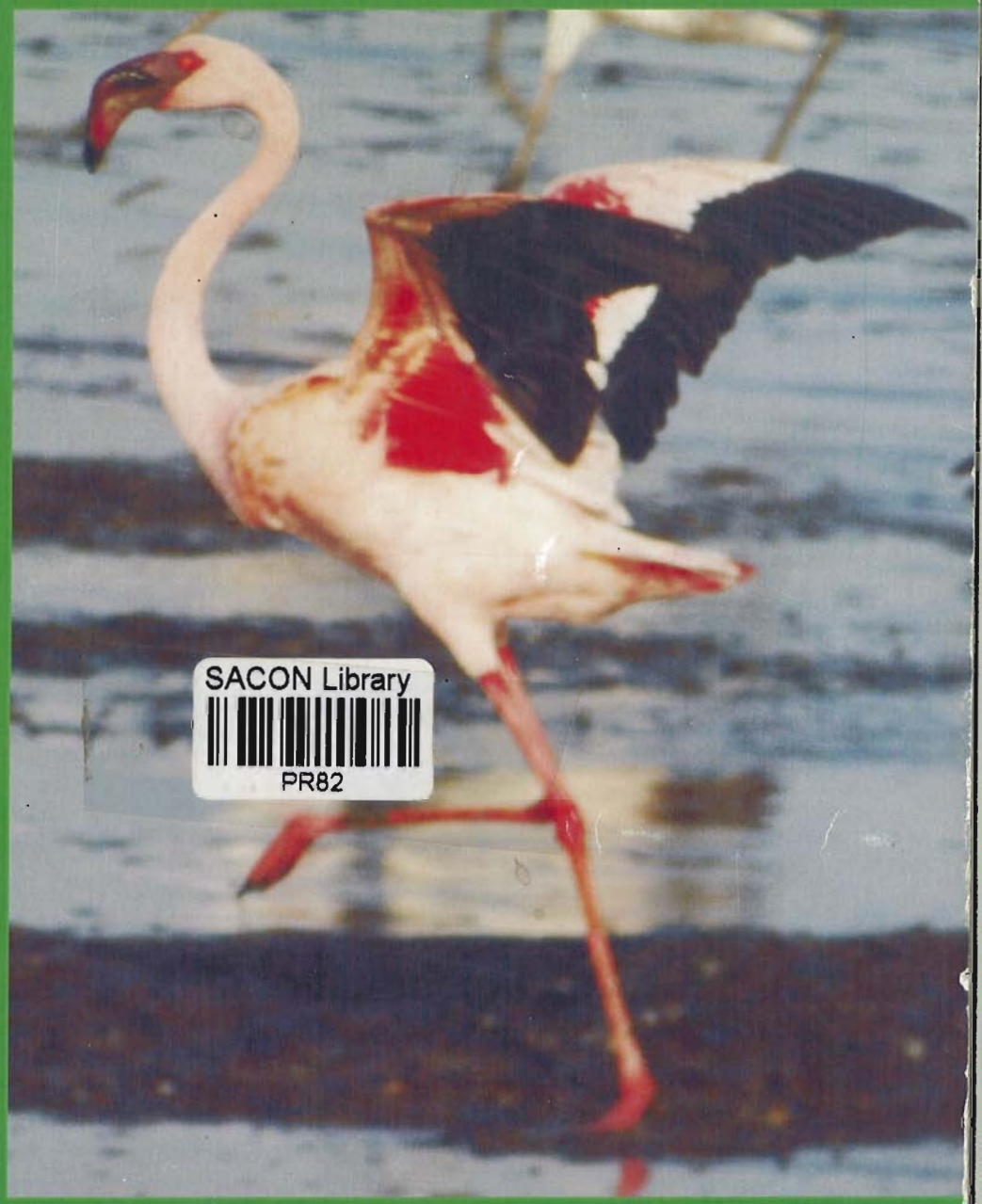
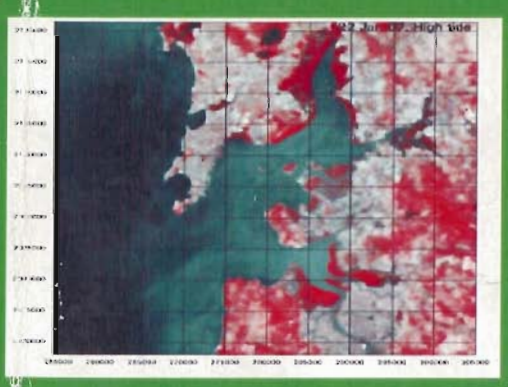
MUMBAI TRANS HARBOUR LINK (MTHL) PROJECT: STUDY OF FLAMINGOS AND MIGRATORY BIRDS

Final Report





Sálim Ali Centre for Ornithology and Natural History

Mumbai Trans Harbour Sea Link (MTHL) Project: Study of Flamingos and Migratory Birds

Final Report - Phase I

August 2006 – August 2007

Submitted to

Maharashtra State Road Development Corporation Ltd., (MSRDC), MUMBAI

Investigators

Dr. Lalitha Vijayan

Dr. S. Narendra Prasad

Dr. S. Muralidharan

Dr. S. Bhupathy

Research Scholars

Mr. A. P. Zaibin

Mr. V. Dhananjayan

Mr. R. Jayakumar

Mr. Chiranjibi Pattanaik

Ms. P. Jayanthi

Sálim Ali Centre for Ornithology and Natural History

Coimbatore

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SUMMARY AND RECOMMENDATIONS

The Maharashtra State Road Development Corporation (MSRDC) has proposed the Mumbai Trans Harbour Sea Link (MTHL) project, mainly passing over the Thane Creek and a stretch of about 5 km over the land between Sewri and Nhava in Mumbai. The Sewri-Mahul mudflats (1000 ha) have been identified as an Important Bird Area (IBA) since this area harbours 12-15% of the entire South Asian population of the Lesser Flamingo *Pheonicopterus minor* (>15000), a globally Near Threatened species and thousands of smaller waders. Hence, a project has been commissioned by MSRDC to study the population of birds with emphasis on the Flamingos, their behavior and the quality of the habitat, which will help take necessary mitigatory steps for the protection of the birds and the area. A mandatory EIA has already been obtained by MSRDC from the Ministry of Environment and Forests, GOI. This study is a follow up measure and a proactive approach on the part of MSRDC to internalize environmental concerns into the project.

The study encompassed three major subcomponents, namely 1) Bird studies (population, distribution, habitat use and behaviour of flamingos), 2) Habitat evaluation including mapping (classification and quantification) using modern spatial technology tools such as Remote sensing and GIS and 3) Water quality and level of contaminants in water, sediment and fishes. Studies were conducted in the mudflats of Sewri- Mahul region and Nhava between August 2006 and August 2007 following standard methods. Summary of the findings and recommendations are given below.

Studies on Flamingos and other birds

- Lesser Flamingos arrived in small numbers at the Sewri - Mahul region at the end of November 2006, their number increased slowly till March and then rather abruptly to 10,520 (± 3471) individuals, remained steady till May, plummeted in July to mere 25 and eventually to 5 immature birds and no flamingos since 28th July 2007. Probable reasons for the late arrival are extended breeding and more water at Kutchh or favourable conditions in other breeding areas. No Greater Flamingo was recorded during this year.

- The proportion of adults and juveniles showed less variation during December 2006 - February 2007 (60.5- 64% and 36- 39.5% respectively). A surge in number of flamingos in March resulted in greater proportion of adults (84%) than juveniles (16%) which continued up to June. As their numbers plummeted in July, the adult-juvenile proportion became skewed and juveniles were relatively abundant in small flocks, 98%.

- Lesser Flamingo was distributed all along the mudflats in the Sewri-Mahul region from Reti Bhandar to Tata Power mainly using the edge of the advancing/ receding water. In the early and later stages of the season they used only Mahul to Tata Power area. At the time of high tide they were loafing in deeper water between Tata Power and the embankments. The juveniles were found more towards the muddy shores. The major concentrations of the flamingos in the Sewri – Mahul region may be because of the nutrient flow from the rivulet joining at Mahul.

- There was no significant variation between the feeding and non-feeding areas in the quality of water and abundance of benthic macro-invertebrates which decreased during monsoon.

- They spent more time feeding in the mudflats with low water depth up to about 30cm; 64.5 % time for foraging followed by preening (6.32 %) and walking (5.63 %); adults spent 77 % for feeding while juveniles spent only 53 %, feeding increased from winter to summer to monsoon.

- Finally, as the famous ornithologist Leslie Brown has put it "no one ever will fully rationalise flamingos, and that they will remain the supremely beautiful, elusive, opportunistic, unpredictable beings".

Habitat mapping and classification

- The required satellite data (IRS P6 LISS IV) from NRSA and the corresponding LANDSAT Enhanced Thematic Mapper (ETM^+) datasets downloaded from GLCF site were used and habitat classification was done for the area of interest and a classified map was generated. The habitat appraisal was done in ERDAS IMAGINE software.

- Alignment of the proposed bridge was overlaid on the classified imagery. GPS locations of the flamingo distribution with approximate densities were overlaid on the classified imagery with the alignment of the bridge.

- Detailed analyses of the distribution of the flamingos in relation to the proposed alignment of the bridge showed that the portion of the bridge at the sewri end would pass through the mudflats used by the flamingos for feeding and up to the Tata Power Jetty where they roost during high tide. This makes it very essential to see that extreme care is taken to avoid disturbance to the area at least during the peak period of their stay here.

Habitat quality and contamination

- The quality of the habitat was also assessed in terms of physico-chemical characteristics of water and sediment and, accumulation of heavy metals, persistent organochlorine pesticides, Polychlorinated Biphenyles (PCBs) and Polycyclic Aromatic Hydrocarbons (PAHs) in water, sediment and fishes collected from the study area.

- Dissolved oxygen levels were found to be less indicating, greater input of industrial and domestic wastes. Mahul recorded very high turbidity, while COD was high in Sewri. Nhava had the highest total alkalinity and oil & grease while Sewri had the lowest. The high concentration of phosphate, sulphate and nitrate may be due to storm water bringing in a lot of surface wash off. Total Organic Carbon in the sediments in all three regions was lower than levels reported as contaminated elsewhere.

- The present levels of heavy metals in water and sediment do not seem to constitute a potential threat to the marine environment of this region but the levels reported in the fishes appear high compared to elsewhere and could create an impact in the long run.

- Organochlorine pesticides showed variation in different sites. Level of total HCH was higher in sediment and fishes. The cyclodiene insecticides did not show any variation among the study locations, whereas the total DDT burden was higher in sediment samples of Sewri than other two places. Comparatively higher load of total Polychlorinated Biphenyles (PCBs) was in Mahul followed by Sewri and Nhava. Organochlorine pesticides and PCB concentrations in sediment were higher than the sediment quality guidelines suggested for the protection of aquatic biota. The total PCBs in fishes exceeded the MRL values for edible products.

- The total Polycyclic Aromatic Hydrocarbons (PAHs) concentration in sediments from Mahul and Nhava exceeded the levels reported in similar studies and the sediment guideline values. The high concentration of PAHs could be coming from the inflows of the rivers crossing industrial areas, oil and gasoline spills from petroleum industries and boat or ship operations. These levels are demonstrated to be carcinogenic and mutagenic. The overall concentration of organochlorine pesticides, PCBs and PAHs in Sewri – Mahul region were comparably higher and this may have some impact on resident organisms including man over a period of time.

Recommendations

- Flamingos have moved away from the Sewri Port area as compared to the previous year probably because of the increased activity of ship repair and hence this needs to be shifted.

- Ensure minimum disturbance to the flamingos in the feeding and resting areas. Construction activities in this area may be restricted to the season when flamingos are not here (or not in larger flocks).

- Contamination by PCBs, oil & grease and PAHs is much higher. Necessary action may be taken with the concerned authorities (including Pollution Control Board).

- Mangrove restoration programmes may be undertaken in suitable areas.

- Education and awareness programmes maybe conducted for different target groups including schools and local communities in this area.

- Further studies are needed on the flamingoes & their habitat: seasonal data on arrivals of flamingos, plankton abundance (as food), detailed spatial study with high resolution data of 1 m or less for the Sewri - Mahul region for two times *ie.* at high tide and low tide for bench- marking the flamingo habitats, analyze other toxic metals and toxic congeners of PCBs & PAHs and assess possible impact on birds.

- Examination of flamingo habitats in other areas and possible disturbances to them by similar construction works elsewhere. These are needed for benchmarking disturbances to the bird habitats

- Long-term monitoring and detailed studies are very essential for better understanding of the conditions and disturbance if any during the construction work of MTHL.

- Seasonal variability in habitat availability has major management implications because the maintenance of a stable flamingo population depends on the availability of multiple foraging sites that may not actively be in use at any given time. Hence, monitoring and protection of all the mudflats in the Thane Creek are important.

- To improve our knowledge of flamingos and ensure their protection, monitoring populations at regional scales at the breeding and non-breeding sites and international cooperation are crucial.