Journal of Asia-Pacific Biodiversity 8 (2015) 72–82

Contents lists available at ScienceDirect

Journal of Asia-Pacific Biodiversity

journal homepage: http://www.elsevier.com/locate/japb

Original article

Variation of avifaunal diversity in relation to land-use modifications around a tropical estuary, the Negombo estuary in Sri Lanka

Manjari Bhagya Jayathilake, [redacted]

Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Kelaniya 11600, Sri Lanka

ARTICLE INFO

Article history:
Received 21 November 2014
Received in revised form
30 January 2015
Accepted 3 February 2015
Available online 11 February 2015

Keywords:
Anthropogenic disturbances
Avifauna
Estuary
House crow
Land-use modifications

ABSTRACT

We assessed variation in avifaunal diversity at some selected habitats around the Negombo estuary in Sri Lanka in relation to land-use modifications. During the study period, we observed 48 bird species of which 47 species are residents to Sri Lanka. The avian species richness, evenness, and heterogeneity were found to be the highest at undisturbed habitats. Further, these diversity measures were negatively correlated with the intensity of anthropogenic land-use activities. Total abundance of birds increased at highly disturbed habitats due to the presence of the house crow, as it is the most abundant of all birds observed at these habitats. This study highlights the need for habitat management around estuaries, giving due consideration to existing ecological theories to conserve avifaunal diversity. It also highlights the negative impacts of the house crow on diversity of other resident avian fauna in these habitats.

Introduction

Coastal ecosystems, including estuaries and associated habitats, have been increasingly altered and developed for human settlement (DeLuca et al 2008) and for commercial and recreational use. These anthropogenic disturbances have severely affected the long-term viability, health (Kennish 2002), and the biota including birds inhabiting these sensitive habitats.

Due to the high productivity, estuaries and coastal regions around the world have been the focal points of human settlement and marine resource use, and such use has strong negative impacts on plant and animal communities (Hilbert 2006; Lotze et al 2006). In many parts of the world human activities around estuaries significantly affect bird communities, their behavior, and existence. For example, DeLuca et al (2008) found that coastal urbanization, even at low levels, significantly affects the integrity of aquatic bird communities in the Chesapeake Bay, USA. Similarly, the abundance and richness of shorebirds and other aquatic birds were low in Southern California, where human activities were high (Lafferty et al 2013). It has also been found that human influences at intertidal mud flats of Queule River estuary in Chile have affected the distribution of both migratory and resident birds there (Suazo et al 2012). However, prominent features or characteristics of urbanization and human habitations around estuarine land-use patterns that govern the avifaunal distributions are yet to be assessed.

Sri Lanka is a small island in the Indian Ocean and together with Western Ghats of India, is recognized as one of the 34 biodiversity hotspots of the world (Gunatilleke et al 2008). In spite of the small size, Sri Lanka is known to harbor 426 avian species including residents and winter migrants (Harrison 2011). The island has its unique specialties as well, with more than 20 species and over 70 subspecies being endemic to Sri Lanka (Harrison 2011). A few studies that assess estuarine avian communities have already been carried out in Sri Lanka. For example, Bellio and Kingsford (2013) studied the alteration of wetland hydrology and its implications on shorebird conservation in Bundala National Park (a Ramsar site), and Embilikele lagoons and found that human activities such as pollution had detrimental effects on bird communities. Kaluthota et al (2008) also conducted studies in Bundala on migratory wading bird communities. Chandana et al (2008) studied the factors affecting avifaunal distribution in three lagoons, namely, Malala, Embillikele, and Bundala and showed that salinity, water depth, and abundance of aquatic macrophytes were the key determinants of bird diversity there. However, the direct impacts of urbanization on estuarine avian diversity in Sri Lanka have not yet been addressed. This gap has been identified throughout the world too, as the conservation biologists focus predominantly on the protection of natural ecosystems and have placed little importance on

* Corresponding author. Tel.: +94 (0)11 2914479; fax: +94 (0) 11 2914479.
E-mail address: upali@kln.ac.lk (W.U. Chandrasekara).

Peer review under responsibility of National Science Museum of Korea (NSMK) and Korea National Arboretum (KNA).

http://dx.doi.org/10.1016/j.japb.2015.02.001