Southeast Asian birds in peril

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Source: The Auk, 123(1) : 275-277

Published By: American Ornithological Society

URL: https://doi.org/10.1642/0004-8038(2006)123[0275:SABIP]2.0.CO;2

Letters

The Auk 123(1):275–277, 2006

Southeast Asian birds in peril.—Given their richness of endemic species and unprecedented rates of habitat destruction, the tropics remain an obvious focus for conservation biologists (Myers et al. 2000). Among the world's tropical regions, Southeast Asia (i.e. Brunei, Cambodia, East Timor, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam) is of particular conservation concern, because it has the highest rate of habitat loss (Sodhi et al. 2004, Sodhi and Brook 2006). Here, we highlight the dire future faced by Southeast Asian birds and urge ornithologists to focus more research and conservation attention on the avifauna of this region.

Southeast Asia contains not only the highest mean proportion of endemic (national level) bird species but also the highest mean proportion of threatened bird species of all tropical regions (Fig. 1A). However, the avifauna of Southeast Asia remains one of the least studied in the tropics (Fig. 1B). Deforestation is likely to be the major cause of avian losses in Southeast Asia (Brooks et al. 1997, Brook et al. 2003), a region that has suffered the second-highest magnitude of habitat loss in the tropics (Fig. 2A). On the basis of the current rate of deforestation reported by the World Resources Institute (see Acknowledgments), we predict that only 10% of natural forests (i.e. composed primarily of native trees; *sensu* FAO 2001) in Southeast Asia will remain by 2100. Furthermore, most of these remaining forests will be found only in protected areas (Fig. 2B). Actually, our prediction is likely an optimistic one, because deforestation and forest degradation in Southeast Asia is accelerating at the highest rate among tropical regions (Matthews 2001). It is likely that other native habitats, such as freshwater lakes, have also suffered higher losses in Southeast Asia than in other tropical regions (Adeel and Pomeroy 2002).

On the basis of a species-area model calibrated for the avifauna of Southeast Asia (Brook et al. 2003) and information on current known species richness and original and projected forest areas for each country in Southeast Asia, we predict that by 2100 Southeast Asia could lose up to 2,761 of its national bird populations (Fig. 3). Indonesia, the country with the highest number of resident and endemic bird species in

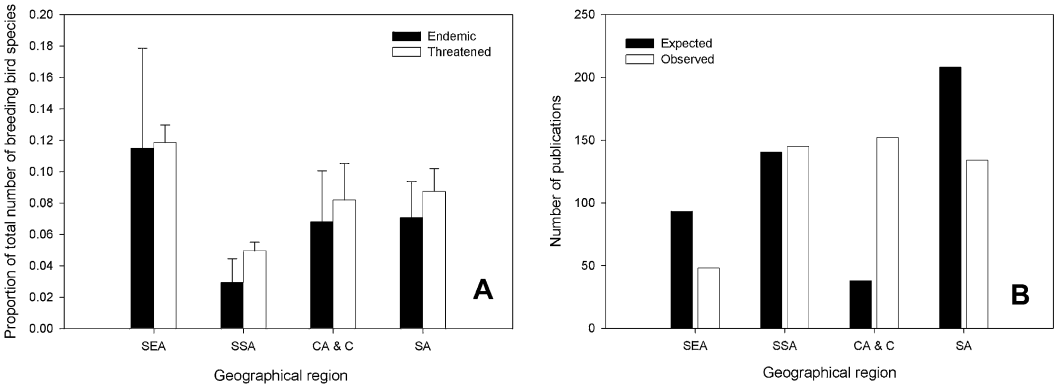

FIG. 1. (A) Comparison of proportion of total number of breeding bird species that are endemic and threatened among tropical regions. Data on number of breeding, endemic and threatened bird species were obtained from World Resources Institute (see Acknowledgments); threatened status was obtained using IUCN Red Listing criteria. Error bars represent standard errors of mean proportion of total number of breeding bird species that are endemic or threatened. (B) Comparison of number of scientific publications derived from biodiversity- or conservation-related research on birds among tropical regions. Number of scientific publications from each region was collated from a web-based search of the Web of Science from the year 1945 to 2005. Expected number of publications for each region was calculated by multiplying the total number of publications in all tropical regions by the proportional geographic area of that region. Abbreviations: SEA = Southeast Asia, SSA = Sub-Saharan Africa, CA & C = Central America and Caribbean, and SA = South America.

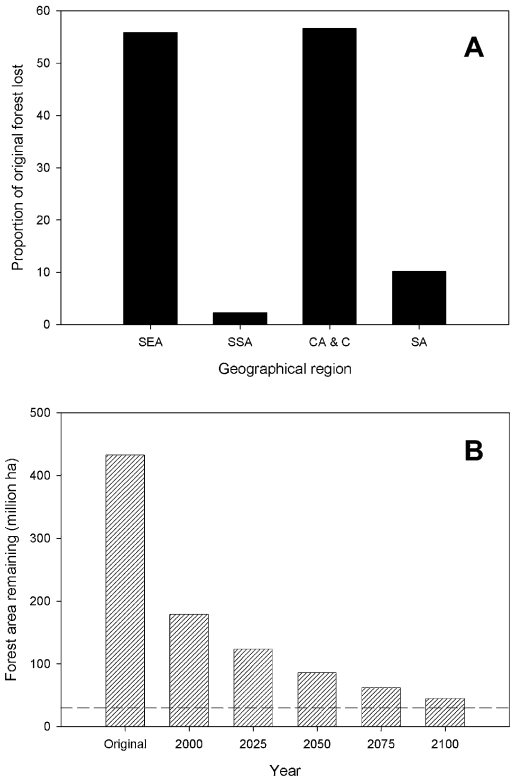

FIG. 2. (A) Comparison of proportion of original forest lost by the year 2000 across tropical regions. Abbreviations: SEA = Southeast Asia, SSA = Sub-Saharan Africa, CA & C = Central America and Caribbean, and SA = South America. (B) Estimated original forest cover, forest cover in 2000, and projected forest cover for Southeast Asia in 2025, 2050, 2075, and 2100 (based on natural forest losses reported by World Resources Institute for 1990–2000). Dashed line represents forest area protected. Data for protected forested areas are from World Resources Institute (see Acknowledgments).

Southeast Asia (929 and 408 species, respectively; Sodhi et al. 2004), will likely suffer the highest losses in bird populations because of deforestation. Our predictions of bird losses are optimistic, because we do not consider the likely cumulative effects of other drivers of biodiversity loss, such as fire, over-harvesting, invasive species, and climate change (Kinnaird and O'Brien 1998, Sodhi and Er 2000, Yap and Sodhi 2004, Sodhi and Brook 2006).

From an academic perspective, more research is certainly needed on Southeast Asian birds, particularly on the biology of individual species. Because it is often difficult for foreign scientists to obtain research permits in Southeast Asia (Liow and Sodhi 2000), local ornithologists should actively facilitate the acquisition of such permits for collaborative research projects, which would ultimately increase the knowledge of the biology of the native birds and advance the research agendas of all parties. International academic ornithological societies, such as the American Ornithologists' Union, can also facilitate such research collaborations by integrating more local scientists into their operations.

From a conservation angle, however, changing the predicament of Southeast Asian birds will be extremely difficult, though not impossible, with potential solutions that integrate scientific, social, commercial, and political processes. Social issues, such as poverty alleviation, must be an integral part of conservation policies and goals to achieve tangible and long-lasting results (du Toit et al. 2004). Protected areas, for example, are unlikely to remain protected when neighboring villagers are poverty-stricken and rely solely on forest resources for subsistence (e.g. bush meat). In addition to educating the local populations, bureaucrats, and politicians about the plight of Southeast Asian birds, ornithologists need to work with various stakeholders (e.g. village chiefs) to find mutually acceptable means of enforcing the protection of remaining forests and expanding the existing protected-area network where possible. Funding available for terrestrial conservation in Asia is <5% of what is required (Balmford et al. 2003). Thus, there is an urgent need to raise and channel funds for conservation in Southeast Asia.

The conservation hurdles in Southeast Asia are not insurmountable, as exemplified by initiatives taken by several nongovernmental organizations (e.g. BirdLife International, Conservation International, The Nature Conservancy, Wildlife Conservation Society; see Acknowledgments), and some local ornithologists. In Thailand, Poonswad et al. (2005) attempted to integrate 28 known hornbill poachers into hornbill monitoring programs using mostly locally generated funds (68%; hornbill family adoption for US$120 each). Over three years, their efforts increased the number of nests with fledglings by 39%. It is our hope that such conservation successes become a norm in Southeast Asia.—NAVJOT S. SODHI, *Department of Biological Sciences, National University of Singapore, 14 Science Drive 4, Singapore 117543, Republic of Singapore* (*e-mail: dbsns@nus.edu.sg*); LIAN PIN KOH, *Department of Ecology and Evolutionary Biology, Princeton University, Princeton, New Jersey 08544, USA*; and BARRY W. BROOK, *School for Environmental Research, Charles Darwin University, Darwin, NT 0909, Australia*.

ACKNOWLEDGMENTS

The nongovernmental organizations cited here can be found at the following websites: BirdLife International (www.birdlife.net), Conservation International (www.conservation.org), The Nature Conservancy (www.nature.org), Wildlife Conservation

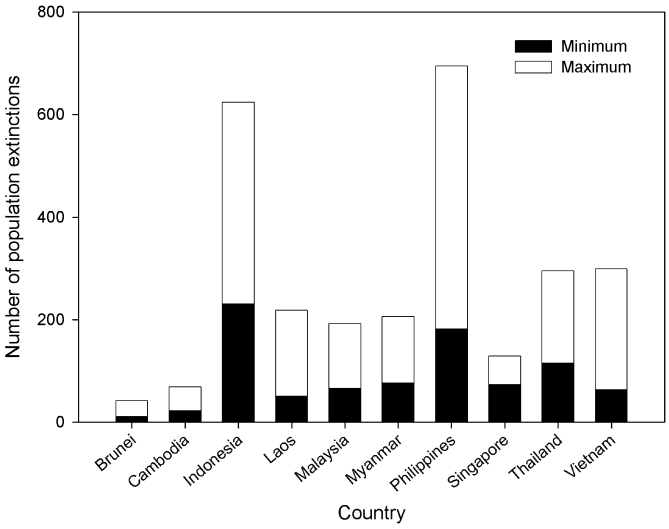

FIG. 3. Projected loss of avian populations by the year 2100 for each country in Southeast Asia on the basis of the known (minimum) and inferred (maximum; based on back extrapolation; see Brook et al. 2003) number of resident species' populations, projected area of remaining forest by the turn of the next century, current rate of habitat destruction, and upper and lower bounds of the scaling (z) parameter of the species-area curve derived for each taxonomic group in Southeast Asia by Brook et al. (2003).

Society (www.wcs.org), and the World Resources Institute (www.wri.org).

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Received 11 April 2005, accepted 8 July 2005