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Special Issue Article: Advancing Environmental Conservation: Essays In Honor Of Navjot Sodhi

Promoting community-based bird monitoring in the tropics: Conservation, research, environmental education, capacity-building, and local incomes

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ABSTRACT

Long-term, locally-based biodiversity monitoring programs are essential for understanding and mitigating the effects of global change on tropical biodiversity while providing capacity-building, environmental education, and public outreach. However, these programs are lacking in most tropical countries. Birds are the best-known major group of organism, comprise excellent environmental indicators, are relatively easy to monitor, and are met with enthusiasm and interest by people worldwide. Bird monitoring programs using mist nets and bird banding (ringing) are especially valuable, as these well-established techniques enable the use of capture-mark-recapture (CMR) models to measure population change and other demographic parameters. Equally important for conservation, the ability to capture and release birds makes it possible to provide hands-on ornithological training and educational activities to students, conservationists, villagers, decision-makers, journalists, and other local people. Bird banding programs provide local jobs for research assistants, who often go on to productive careers in conservation, education, research, or ecotourism. Long-term bird banding stations also provide the nuclei, infrastructure, and staff for monitoring, education, and conservation programs focused on other taxa. As successful examples from Costa Rica and Ethiopia show, bird monitoring programs that integrate conservation, ecological research, environmental education, capacity-building, and income generation are cost-effective tools to achieve the goals of community-based biodiversity conservation and poverty reduction in the developing world. Therefore, locally-based and long-term bird monitoring programs should be encouraged, established, and funded throughout the tropics.

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1. Introduction

One of Navjot Sodhi's biggest strengths was his passion to build conservation capacity, to promote environmental education, and to establish locally-based biodiversity research programs in the tropics. He valued tropical conservation education so much that he organized leading conservation scientists to write "*Conservation Biology for All*" (Sodhi and Ehrlich, 2011), the first conservation biology textbook freely available online (http://www.mongabay.com/conservation-biology-for-all.html). Consequently, not only did Navjot have one of the highest-impact publication records in conservation biology, but he also touched the lives of thousands of future conservationists who will keep alive his legacy.

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In 2005, I had the good fortune to spend 2 months at the National University of Singapore as a visiting scholar with Navjot, who became a dear friend and collaborator. We talked at length about how to establish and maintain locally-based, long-term tropical biodiversity monitoring programs that not only collect critical conservation ecology data, but also provide environmental education and public outreach, train local people in biodiversity monitoring, build conservation capacity, and develop into self-sustaining centers for biodiversity conservation, research, education, and ecotourism (Sodhi et al., 2010; Bickford et al., in press; Harris et al., 2011). Navjot himself loved to band (ring) birds in threatened tropical landscapes, and a fitting way for the conservation community to honor Navjot's memory will be by promoting long-term, community-based, and integrated biodiversity monitoring programs in the tropics.

2. Monitoring birds for conservation, education, capacity-building, and outreach

The 21st century will be the make-or-break century for the world's biodiversity. Navjot Sodhi understood the critical importance of local education, grassroots organization, and community involvement in biodiversity conservation, especially in developing tropical countries where good opportunities for environmental education are often nonexistent. The sheer magnitude and scope of environmental problems (Brook and Bradshaw, in press) can lead conservationists in despair to wish for top-down, large-scale, quick fixes that can actually exacerbate the problems (Sterner et al., 2006) because conservation initiatives that lack local grassroots support and understanding are often doomed from the start. During field work in over 70 countries, mostly in the developing world, I have frequently been surprised at the scarcity of effective, well-funded, and long-term initiatives that integrate conservation, education, research, and capacity-building. As a result, even in many locations with large-scale conservation projects, there is often limited knowledge and appreciation by local people of their local biodiversity and why they should protect it. Many conservation projects do not educate most local people about the value of biodiversity and ecosystem services (Şekercioğlu, 2010; Peh and Lewis, in press). This deficiency of communication, education, and outreach (Bickford et al., in press) often generates local resentment and opposition to initiatives that actually aim to benefit local communities. Biodiversity monitoring programs, especially in the developing world, need to be designed accordingly, and should aim to communicate the passion for biodiversity and its conservation (Bickford et al., in press; Fig. 1).

Fig. 1. Ethiopian primary school students releasing a banded Yellow-fronted Tinkerbird (*Pogoniulus chrysoconus*) in Wondo Genet, Ethiopia. Photo: Cagan H. Şekercioğlu.

Birds are the best-known major group of organism, comprise excellent environmental indicators, are relatively easy to monitor, and as charismatic flagship species, are met with excitement, enthusiasm, and interest by people worldwide. Therefore, long-term bird conservation and monitoring initiatives that integrate community involvement, capacity-building, outreach, environmental education, and local job creation provide some of the best examples of holistic biodiversity-monitoring programs (Latta and Faaborg, 2009). This is particularly the case for programs that involve mist netting and bird banding (ringing), the labor-intensive nature of which actually benefits local communities by providing jobs. Bird research assistantships not only provide local employment and income, but local field technicians can also be valuable sources of traditional ecological knowledge (Berkes, 2004), environmental educators, ecotourism guides (Paaby et al., 1991), and important links between their communities and conservation scientists.

For conservation science, the value of such long-term population studies is irreplaceable. Short-term studies provide variable snapshots in time. The ever-changing dynamics of tropical bird populations (e.g. Newmark, 2006; Kennedy et al., 2011; Stouffer et al., 2011) can only be revealed by systematic, long-term studies that should cover at least 3–5 and ideally 10 consecutive years (Faaborg et al., 2007). Despite some limitations (Remsen and Good, 1996), long-term mark-recapture studies make it possible to estimate survivorship, population change, and other critical variables that not only illuminate tropical bird ecology (e.g. Blake and Loiselle, 2002; Peach et al., 2001; Sodhi et al., 2011), but also provide essential data for conserving tropical birds effectively (Newmark, 2006). This is especially the case with climate change, whose effects on tropical birds and ecosystems are increasingly expected to be severe (Şekercioğlu et al., 2008a; Cox, 2010; Møller et al., 2010; Corlett, in press; Wormworth and Şekercioğlu, 2011; Şekercioğlu et al., 2011), but little research has been done on these long-term effects (Sillett et al., 2000; Harris et al., 2011). Long-term biodiversity monitoring programs are also critical to monitor the environmental sustainability of rapidly-expanding tropical plantations (Edwards and Laurance, in press) and to measure the performance of conservation efforts in human-dominated areas against baseline ecosystems far from human impact (Barlow et al., in press).

Equally important for conservation, bird banding programs are vital for capacity-building, education, public outreach, and raising awareness. The hands-on nature of bird banding makes it possible for children, students, decision-makers, journalists, and other local people to observe birds up close, to learn about the conservation challenges birds and other organisms face, and to make concrete, personal connections to the increasingly-abstract concept of biodiversity (Louv, 2008). This connection is best exemplified by the excitement children experience when releasing banded birds (Fig. 1), the memory of which can last a lifetime. Unfortunately, the remarkable and cost-effective potential of bird banding to combine research, conservation, education, public outreach, and income generation has been mostly neglected by the global conservation community and funding agencies (Latta and Faaborg, 2009).

3. Barriers and challenges

Even conservation projects on tropical-temperate migrants remain mostly focused on the breeding populations in temperate countries where funding and scientists are concentrated (Latta and Faaborg, 2009). There are not enough studies on the wintering grounds (Faaborg et al., 2007), and tropical research, outreach, and capacity-building projects receive limited funding, despite their cost-effectiveness (Castro and Locker 2000 in Latta and Faaborg, 2009). The disproportionate support for migratory bird research also contrasts with the reality that only 18% of the world's bird spe-