Waterbirds around the world

A global overview of the conservation, management and research of the world's waterbird flyways

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Shorebird populations worldwide are in a perilous state, with 48% of the 200 populations with known trends in decline (International Wader Study Group 2003). Only 16% of the world’s shorebird populations with known trends are increasing. These declines are troubling because shorebirds are likely to be important indicators of wetland health on a global scale.

Of North America’s 51 breeding species of shorebirds, 22 are in population decline and only three are increasing. To address why these declines are occurring, this study investigated the biological factors (migratory behaviour, biogeography, life-history, sexual selection) that may make some shorebirds more prone to decline than others. Preliminary examination suggests that both the migratory route of a species and their mating system relate to population trends. These initial findings require corroboration using formal statistical analyses to account for the phylogenetic relationships amongst shorebirds.

Typically, extrinsic threats such as habitat loss, predation, climate change, and hunting are cited as the major probable causes of population decline or elevated extinction risk across many taxa. Recent studies indicate that this is only part of the story, and the intrinsic biology of a species influences whether a population is predisposed to decline and extinction (Fisher & Owens 2004). Shorebirds exhibit an unusual diversity in various ecological and behavioural traits among birds, so they are an excellent group to investigate biological correlates of population trends (Székely & Reynolds 1995, Thomas 2004). The focus of this study was to investigate the factors that predispose certain shorebird species to decline, using North American shorebirds as a model group.

Data on population trends of 51 North American breeding shorebirds were taken from the United States, Canadian, and Alaskan shorebird conservation plans (Brown et al. 2001, Donaldson et al. 2000, Alaska Shorebird Group 2004). In addition, data was collated from the literature on a suite of characters, including: migratory behaviour (distance and route), biogeography (population size, breeding and non-breeding range), life-history (body size, clutch size, adult mortality), and sexual selection (social mating system, testis size).

There are more species with declining populations than stable, or increasing, populations amongst socially polygamous shorebirds, but the reverse is true of socially monogamous shorebirds (Fig. 1a). In addition, shorebirds that migrate across continental North America tend to be declining, rather than stable or increasing, whereas the majority of coastal and oceanic migrants have stable populations (Fig. 1b).

This preliminary examination indicates important biological traits that may predispose some shorebird taxa to decline more than others. However, since closely related species tend to share similar life-histories, ecology, and behaviours (Harvey & Pagel 1991), statistical analyses that incorporate shorebird phylogeny would need to be conducted to separate the effects of common ancestry from biological predisposition (Fisher & Owens 2004).

Fig. 1. Population trends of North American shorebirds depending on: a) social mating system (open bars indicate social monogamy, filled bars indicate social polygamy); and b) migration route (open bars indicate coastal or oceanic migration route, filled bars indicate continental migration route).
Furthermore, there is an urgent need to examine the interactions between intrinsic biological traits and extrinsic threats in driving population trends (Fisher & Owens 2004). For instance, Eskimo Curlew *Numenius borealis*, a continental migrant highly dependent on upland grasslands (Gill et al. 1998), has declined to near extinction, partially due to the conversion of upland areas into agriculture. Thus, the species dependence on uplands and the concurrent demise of their upland natural habitat interacted to drive the species decline. Since many migratory shorebirds are reliant on small, ephemeral wetlands that are rarely protected adequately (Brown et al. 2001), the links between migration routes and habitat change appears to be particularly important in shorebird conservation.

Effective conservation management to halt and reverse recent population declines therefore requires detailed studies of both intrinsic and extrinsic factors that predispose some species to decline more than others on both a regional and global scale.  

REFERENCES


The *rufa* population of Red Knot *Calidris canutus* is in rapid decline, and is being intensively studied to determine reasons. Use of leg flags and colour-marking allows detailed demographic information to be collected on individual birds. Photo: Rob Robinson.