

Preface: The global environmental change — messages from birds

The current environmental changes affect both natural ecosystems and civil societies. Anthropogenic activities and the degradation of natural habitats change the population structures of various species but also threaten essential ecosystem services.

Birds often occupy large areas and diverse habitats. Changes in bird populations can indicate changes in the environment even thousands kilometers away in their winter grounds. Bird monitoring studies can detect the changes in population sizes and ranges. Therefore, many environmental changes can be examined with the help of birds.

Maj and Tor Nessling Foundation promotes scientific research on environmental protection, while BirdLife Finland concentrates on birds. These organisations combined their expertise and arranged the symposium *The Global Environmental Change — Messages From Birds* in Espoo, Finland, in November 2010. The symposium showed that birds can deliver many messages, of which some are presented in this special issue.

Virkkala and Rajasärkkä address the impact of climate change on the densities of breeding birds in protected areas. The densities of northern birds have decreased in southern Finland, while the densities of southern species have increased in the north. These changes are likely related to climate warming. Protecting local habitats is not enough to safeguard northern species but a reduction in greenhouse gas emissions is essential to control the climatic warming. Greenhouse gas emissions may be reduced by using wind power. This does not come without cost as wind turbines can affect birds in many ways as reviewed by Fox.

One of the global environmental changes is urbanization (Fox). An increasing number of people move from rural areas to cities. So do some birds. Barnacle geese have found an open niche from the Helsinki metropolitan area, where the population of geese has increased much faster than that of human inhabitants (Väänänen *et al.*).

Global warming influences the arrival of spring migrants, because the progress of migration depends on temperature (Halkka *et al.*). Lindén points out that the commonly used first arrival dates are dependent of the size of bird population and the observation activity. Halkka *et al.* show that the arrival dates of long-distance migrants do not depend on the temperatures at the site of arrival alone, but also on temperatures during migration.

The growing population of cormorants may indicate that the state of Finnish coastal waters is changing and also raises concerns about the competition for fish between humans and birds (Lehikoinen *et al.*). Cormorants eat mainly fish, which are not targeted by fishermen. Thereby, direct competition for the same prey between humans and cormorants is unlikely.

Suhonen *et al.* address changes in lakes and their duck-populations over a 20 year time. Although the changes at a landscape level are low, individual lakes have changed their quality as breeding habitats of ducks depending on natural succession or the disturbances by humans and beavers.

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