BIRD POPULATIONS

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REPORTS OF AVIAN MONITORING PROGRAMS

INTRODUCTION TO THE REPORTS

After what, to many of us, seems an inexcusably long time, the reality of climate change appears finally to have penetrated the consciousness of most organizations and governments worldwide. The physical effects of climate change that have come to light recently, including widespread recession of ice in the Arctic Ocean, accelerated melting of the Greenland and Antarctic icecaps, disappearing glaciers worldwide, and the submergence of previously inhabited islands in the Pacific Ocean and Bay of Bengal, have simply been too dramatic to ignore. And while the urgency of the situation may not yet be fully grasped by public leaders, at least a vague notion has taken hold that fundamental changes in energy policies and practices are required to avert sociopolitical upheaval.

Despite this welcome awakening from apathy and denial, the reality is that major changes in climate, and in populations of plants and animals worldwide, are inevitable, no matter how quickly energy-use practices are redesigned. The more slowly we implement changes in energy use, the greater will be the extent of the ecological damage to the Earth's biodiversity. The more dire but scientifically sound predictions suggest that, if climate change continues unabated, nearly a quarter of all species on Earth could be threatened with extinction by 2050 and half could be extinct or threatened with extinction by the end of the century. Thus, we also face the dual challenges of determining the ways that plant and animal populations will likely be affected by climate change and of formulating management strategies to maintain their populations under those circumstances, that is, as the "baseline" conservation targets shift.

The science of predicting effects of climate change on bird populations is in its infancy. One line of investigation attempts to predict the range changes and local extinctions of bird species that will result from geographic displacement of the climatic conditions that exist in their current ranges. This approach assumes that species are mobile enough to track rapidly changing environments, an assumption widely thought to be true for birds, but not for less mobile species, such as many plants and sessile animals. However, because bird populations depend on habitat conditions, including plant and animal species compositions, as well as weather conditions, such assumptions may not be true for birds either.

Moreover, most bird species in the temperate portions of North America and Eurasia are migratory and occupy two — often very different — breeding and wintering habitats that can be separated by thousands of miles, as well as a number of other habitat types along their migration routes. These different habitats play critical roles in the overall life history of these species, and are each likely to be affected differently by climate change. Thus, the ways in which each of these habitats is likely to change, and the ecological responses of each bird species to such changes, must be factored into avian conservation plans if they are to succeed.

Because changes in avian vital rates (i.e., productivity, recruitment, and survival) drive changes in bird populations, one important way

of addressing these issues is by modeling vital rates as functions of both habitat and weather conditions, and then examining the results of these models as climate and habitats are allowed to change according to predictions of climate models. Such an approach necessitates the existence and integration of long-term, large-scale monitoring data on avian demographic rates, data that have only recently begun to be collected over substantial areas of temperate North America and Europe.

The British Trust for Ornithology spearheaded the integration of avian population and vital rate data in the early 1990s. Annual reports for 2001 and 2002 for key program components of their integrated avian population and demographic monitoring scheme are reprinted on pages 136-215 of this volume of *Bird Populations*. Examples presented throughout these reports illustrate the value of integrating population and demographic data: proximate demographic causes of population change can be determined, management and conservation strategies for declining species can be formulated, and the effectiveness of such strategies can be evaluated through continued monitoring.

Avian monitoring efforts in North America benefited from the establishment of major conservation initiatives that also began in the early 1990s. These include the Neotropical Migratory Bird Conservation Initiative – Partners In Flight (PIF) and the North American Bird Conservation Initiative (NABCI), which have aided the growth of the North American Breeding Bird Survey (BBS) and the establishment and growth of the Monitoring Avian Productivity and Survivorship (MAPS) Program. Reports of the BBS have been published in past volumes (and will be published in future volumes) of *Bird Populations*, while the 1999 - 2001 report of the MAPS Program is published on pages 23-89 of this volume. Efforts are currently underway in North America to coordinate the establishment of demographic monitoring (MAPS) efforts based to some extent on trend information from population monitoring programs (BBS), and to integrate data from each of these two continent-wide programs to provide spatially explicit information on the demographic causes of population changes.

Evidence for the expansion of avian demographic monitoring in Europe is provided by the rapid growth of the European Constant Effort Sites (CES) Network. Patterned after the British CES Program, which was created in 1981, and stimulated by the success of the North American MAPS program (which was also patterned on the British CES program), the European effort now includes stations in at least 14 countries.

It is our hope that, beginning with this volume of *Bird Populations*, the onset of entirely electronic publication will increase the ease, timeliness, and cost-efficiency of reporting results of avian monitoring programs. Indeed, publication of the longest-running landbird monitoring program in North America, the Breeding Bird Census – which was initiated in 1937 and utilizes a spot-mapping protocol – was revived, after a 9-year hiatus, with publication of the 2001 and 2002 censuses on pages 90-135 of this volume. We hope that the benefits accruing electronic publication will provide encouragement for other programs, such as the North American Breeding Bird Research and Monitoring Database (BBIRD), the Landbird Migration Monitoring Network of the Americas (LaMMNA), and many of the participants in the European CES Network, to also publish their reports in this journal.

The ability of meteorologists and climatologists to model and understand recent changes in weather and climate has depended upon the existence of monitoring data extending back into the mid 1800s. We take the existence of such weather monitoring data completely for granted today, but it was not always so. Early proponents of weather monitoring had to fight for funding and rely on volunteers, much the same as do today's proponents of avian population and demographic monitoring. We can only dream that, likewise, 150 years from now, the avian population ecologists charged with maintaining the health of bird populations will take for granted the high-quality global avian population and demographic monitoring data they will have at their disposal. It is our hope that the reports of avian monitoring programs published in *Bird Populations* will contribute to the realization of that dream. – David F. DeSante.