

## THE ADÉLIE PENGUIN: BELLWETHER OF CLIMATE CHANGE

Ainley, D.G. 2002. New York: Columbia University Press. 310 pp. with 23 illustrations, 51 figures, 48 tables, 16 plates. Hard cover. ISBN 0-231-12306-X, US \$66.

When we think of penguins, the Adélie Penguin comes to mind as the classic black-and-white flightless bird living in the cold wilderness of the Antarctic. The species is named after the wife of French explorer Jules-Sébastien-César Dumont d'Urville, who reached the Antarctic mainland in 1840. Since the discovery of Adélie Penguins, many scientific studies on the biology and conservation of this species have been conducted.

One of the most renowned experts is David Ainley. He has been studying Adélie Penguins for more than 30 years. His long-term monitoring data from breeding colonies form the basis for an understanding marine ecosystem functions and demographic changes in the Antarctic, which are of increasing importance to ecologists, environmentalists, and political decision-makers.

The book introduces the reader to the far south through descriptions of the heroic discovery of the Antarctic continent, including anecdotes of first encounters between penguins and humans. General information on sea ice, marine ecosystems, and the foraging ecology of Adélie Penguins are then given, providing background for a detailed presentation of the species' life history.

The large data pool collected by the author and his colleagues at Cape Crozier provides an impressive example of what long-term monitoring studies can achieve. Analysis of several demographic variables leads into a discussion of the importance of various natural and anthropogenic factors not only for local population dynamics, but also as compared with other Antarctic study sites. This latter aspect could have been enlarged in the book, but the detailed presentation of field results gives a strong scientific background.

## THE BERING SEA AND ALEUTIAN ISLANDS: REGION OF WONDERS

Johnson, T. 2003. Fairbanks, Alaska: Alaska Sea Grant College Program, SG-ED-42, University of Alaska. 191 pp. with a CD containing nine radio programs on marine research projects in the region. Soft cover. ISBN 1-56612-081-0, US \$25.

*The Bering Sea and Aleutian Islands: Region of Wonders* uses more than 200 spectacular modern and historical photographs, maps, and other illustrations to introduce readers to the Bering Sea region (the Alaskan and the Russian sides), its natural resources, its people, and its conservation issues. In eight chapters, Terry Johnson places the area in a global context and describes the physical environment and biota, plus the minerals and energy, history, culture, and commerce, and lastly the challenges of managing the resources.

The book was commissioned by the North Pacific Marine Research Program as part of their goal to "extend information about what is going on in the Bering Sea and North Pacific to non-scientists—commercial fishermen, subsistence users, and the public at large." A compact disc included with the book contains copies of radio programs broadcast on Alaska Public Radio as part of the Alaska Sea Grant's *Arctic Science Journal* series, with titles such as "Why Care About the Bering Sea?" and "Kittiwakes Go Up and Down." Most of these stories highlight research funded by the North Pacific Marine Research Program. To further highlight research, "Sea Science" sidebars are interspersed throughout the book. For example, the sidebar "Birds, Stress, Behavior, and Survival" highlights Alexander Kitaysky's work on stress hormones in kittiwakes.

From a systemic view, Ainley presents the major ecological knowledge about, and effects of, global climate change. Ainley combines data from fossil records, population trends, and ice extent to show the links between environmental change and species distribution, taking into account all the major influencing factors.

Although temperature trends vary across the Antarctic, surface-air temperatures in the coastal areas—especially west of the Antarctic Peninsula—have increased over the last decades. This increase has caused glaciers and shelf and sea ice to retreat. For the Adélie penguins, areas without sea ice are unsuitable for feeding and breeding. Consequently, the northern limits of the species' distribution are determined by the winter sea-ice extent. With global warming, this limit could shift further south in future. However, a retreat of ice on the continent itself could open up new breeding space, leading to increased populations in areas with sufficient sea-ice cover. Adélie Penguin population changes can, therefore, be used as indicators for environmental change.

This excellent book uses a sophisticated approach to reach a wide readership. It provides profound knowledge to other scientists, while also summarising research facts in a lightly-written manner so that interested non-scientists can understand complex views on population dynamics and environmental processes in a global context. The appealing layout of the book also balances scientific illustrations, drawings, and photographs.

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The first two chapters of the book, "Global Context" and "Physical Environment," include several useful maps and illustrations that describe ocean-bottom topography, currents, and ice extent. Brief narratives describe the major physiographic features, such as volcanoes and the Bering Sea shelf and basin. Also discussed are forcing functions such as currents and climate.

Chapter 3, "Life in the Sea," is the largest chapter in the book by far. It contains basic information on oceanography (subheadings include "Vertical Mixing," "The Green Belt," "The Microbial Loop"), fish (with paragraphs on forage fish and species of commercial importance), and marine mammals. This chapter provides a reasonably good overview for readers not familiar with the region.

Seabirds are treated primarily in Chapter 4, "Life Above the Sea," in which about four pages of text and some 22 photographs provide general descriptions of various components of the seabird fauna (e.g. "Oceanic Birds," "Gulls and Terns," "Diving Seabirds"). The author provides basic examples of life-history information (e.g. "Seabirds are long-lived and generally produce only a single egg per year") and tells the reader how many species of certain taxonomic groups have been

recorded in the region. Chapter 4 also includes similar information on waterfowl, shorebirds, raptors, and songbirds.

Chapters 5 and 6 discuss the importance of minerals, furs, and fish in the past and current economy of the region, setting the stage for a discussion of management challenges (Chapters 7 and 8).

Seabird scientists likely would be interested in this book only for background perspective on the region. The book is not meant to be a serious contribution to literature on seabirds, but it is useful as a familiarization tool for students or resource managers new to the area or for general readers interested in an overview.

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## TRACKING OCEAN WANDERERS: THE GLOBAL DISTRIBUTION OF ALBATROSSES AND PETRELS

BirdLife International. 2004. Cambridge, UK: BirdLife International. 100 pp. Soft cover. ISBN 0-946888-55-8. Available free of charge from BirdLife Global Seabird Programme, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK ([birdlife@birdlife.org](mailto:birdlife@birdlife.org) or Cleo.Small@rspb.org.uk). On-line version available at <http://www.birdlife.org/action/science/species/seabirds/tracking.html>.

In September 2003, an international group of seabird biologists and geographic information system (GIS) experts held a workshop in South Africa to pool data on the at-sea distributions of albatrosses and three other procellariiform species. The result is this book, an impressive example of modern tracking and mapping technology applied to a global conservation issue. Equally impressive is the data-sharing by 24 research teams from ten countries, which shows what can be achieved with goodwill and collaboration among researchers.

The project had ambitious goals: to assemble all available data from remote-sensing tracking devices, producing a database and distribution maps for the larger procellariiforms; to identify core foraging and migration areas around the globe; to use this information to combat the disastrous effects of longline fisheries on these birds; and ultimately to improve conservation strategies for the high seas.

Data were obtained from two types of devices carried by the birds: platform terminal transmitters (PTTs—i.e. satellite-tracked transmitters) and geolocators (GLSs—devices that use day-length and timing of noon and midnight to locate birds). The PTTs provided the bulk of the data, mostly from breeding adults, but the GLSs were useful for tracking non-breeding birds over many months. More than 160 high-quality colour maps show the marine distributions of 16 species of albatrosses, including Giant Petrels (*Macronectes* spp.) and White-chinned Petrels (*Procellaria aequinoctialis*). One chapter is devoted to the distributions of selected species, focusing on variations attributable to phases of the breeding cycle, sex differences, annual variation, and comparisons among colonies.

The heart of the analysis is the regional summaries, which contain maps synthesizing the combined distributions and core areas of all species within four major regions: the southwest Atlantic and southern South America; the Indian Ocean; Australasia; and the North Pacific. Kernel GIS analysis was used to map utilization distributions, showing the areas in which the birds are likely to spend 50%, 75%, 95%, and 100% of their time while at sea. (No shipboard survey data were included in this analysis, but comparing the graded distributions derived from the remote-sensing data with the shipboard density data would be a valuable—and time-consuming—exercise.)

The book next applies the utilization maps to a discussion of methods for improving the conservation of the birds while at sea. Key areas that support large numbers of birds, that have high species diversity, or that include significant numbers of threatened species are identified. Criteria for designating marine Important Bird Areas are considered, and the problems of obtaining approval and enforcement in such areas

are discussed. Interestingly, increased protection extending 200 nautical miles (the equivalent of Exclusive Economic Zones) would benefit the breeding populations of about two thirds of albatross species.

The strongest emphasis is placed on comparing the bird distributions with areas of longline fisheries and fisheries management zones. The authors emphasize their problems in acquiring adequate data on fisheries activities, which limited the risk analysis. Five key regional fisheries management organizations (RFMOs) cover most of the ranges of the albatrosses and large petrels, and all have longline fisheries, mostly for tuna. With this information in hand, conservationists now have a powerful tool to apply pressure on these five RFMOs, the countries responsible for most of the longline fishery (Taiwan, Japan, Korea), and countries fishing in particularly sensitive areas (the US, Australia, New Zealand, South Africa, and several South American nations).

Under the auspices of BirdLife International, the GIS database established at this workshop has become more permanent, with a long-term goal of providing online interactive data access. Since 2004, data have been added for the Waved Albatross (*Phoebastria irrorata*), the Westland Petrel (*Procellaria westlandica*), and the Short-tailed Shearwater (*Puffinus tenuirostris*). Additional data has also been added for several albatross species already in the database (C. Small pers. comm.).

Albatrosses are the most threatened avian family, with 19 of 21 species now globally threatened. Bycatch in longline fisheries is the single greatest cause of decline in these magnificent birds. Backed by colony-based population data, this excellent book provides an impressive arsenal of data with which to work at the highest international levels to stop the needless slaughter. A major step has been taken with the *Agreement on the Conservation of Albatrosses and Petrels* (ACAP). This international agreement, now signed by 11 countries (8 of which have ratified the agreement), works to reduce fisheries bycatch and other threats in the birds' ranges. ACAP entered into force on 1 February 2004 and is now at the forefront of the growing international effort to protect albatrosses and petrels (details at [www.acap.aq](http://www.acap.aq)). Identifying and publicizing the bycatch problem is critical to achieve meaningful change, but the spotlight has to remain firmly on the fisheries organizations and the fishing nations to ensure that fishery practices change.

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