

this book as providing valuable perspectives for government decision- and policy-makers struggling to find effective responses to climate change. There would also be broad appeal to the interested public. Many important lessons in Leduc's integrated analysis could help us to follow Primavesi's emphasis on our increasing need to see the earth through recognizing "our place within it" (p. 50) and to learn from Inuit to use "head and heart together" (p. 213). This book serves as an important reminder and encouragement for climate research and politics to come together in order to address complex environmental challenges, drawing from interdisciplinary knowledge and intercultural inspiration to develop a heartfelt global conscience.

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**POLAR BEARS: THE NATURAL HISTORY OF A THREATENED SPECIES.** By IAN STIRLING. Markham, Ontario: Fitzhenry & Whiteside, 2011. ISBN 978-1-55455-155-2. 300 p., colour illus., glossary, bib., index. Softbound. Cdn\$40.00.

Almost everyone knows Ian Stirling. He has written many articles for *Arctic* and has written extensively on Arctic ecology, particularly on polar bears. So this review is not necessary for most readers, as they already know that Stirling's book will provide a wonderful assessment of knowledge on polar bears, including much of the exciting research he has been personally involved with over the last few decades. The book describes the natural history of polar bears. We don't have many "natural historians" anymore and Ian Stirling fits more within the mould of a contemporary scientist, using all of the latest technologies to study polar bears. But Ian summarizes his scientific findings in this book to provide a remarkably complete view of polar bear natural history. To be a great contemporary scientist and a natural historian at the same time requires considerable time conducting fieldwork, talking to Northerners, watching bears, and pondering how the various bits of anecdotal information piece together. Few people could accomplish this feat, but Stirling does it admirably. The book is highly recommended for readers of all backgrounds from laypeople to experts, and the quality of the reproduction, editing, pictures, and printing are excellent.

The book covers polar bear population ecology, behaviour, physiology, genetics, interspecific relationships with seals, sea ice, polynyas, denning habitat, environmental degradation, human development, and models of future Arctic change. It is largely non-technical, providing a broad understanding of the ecology and natural history of polar

bears that is accessible to most people. Yet it does not "talk down" to readers; they can expect to be challenged with complex ideas and difficult topics, from the effects of contaminants on polar bears (e.g., hermaphroditism) to models of predicted climate change. Some of the best writing is found in Ian's descriptions of how polar bears travel, hunt, eat, den, and interact. His many hours in the field have provided him with a unique perspective that can give readers a sense of what it is like to be a polar bear.

Most of the book is scientific in presentation, but the stories of unique observations made by Stirling and his colleagues are equally interesting and valuable. Science does not often report on individual occurrences, but Ian describes a unified attack by walrus on a polar bear, a dying matriarch, and polar bears diving underwater to retrieve mouthfuls of tissue from a submerged whale carcass after a group of eight polar bears captured five belugas and four narwhals from a High Arctic estuary in summer. He also observed polar bears' mating behavior and reports that average copulation duration is 71 minutes, a number that can inform research into comparative mating behaviour. He reviews the harvest of polar bears from the Svalbard area (> 20 000), which varied from 150–200 per year taken by Russian hunters in the 1700s, to 150–400 per year taken by Norwegians in the 1800s, to more than 300 per year in the 1900s. He tells of a pack of wolves in the Churchill denning area that had learned to kill polar bear cubs traveling from their maternity dens to the sea ice. Anyone who has had the pleasure of listening to a great storyteller, such as an Inuk elder, knows how fascinating these one-off accounts can be.

Yet I have some quibbles. The Churchill chapter is longer than necessary, with too many pictures of bear dens. Unfortunately, there is no mention of disease, although climate warming could provide the vector for new diseases to enter the Arctic by hitching a ride on temperate invaders, resulting in significant mortality of unprotected polar bears. A few observations (e.g., of a polar bear dying of kidney failure after ingesting oil) are repeated.

The chapter on evolutionary origin of the polar bear is particularly relevant given the possibility that we may lose this unique creature. Reviewing the literature, Stirling describes how Bering Sea brown bears using the sea ice about 150 000 years ago evolved into seal-eating specialists that subsequently expanded their range into the circum-polar ice areas. Since the publication of this book, genetic findings have suggested an Irish polar bear origin occurring about 14 000 years ago. Of interest in all of the described scenarios is the accelerated rate of evolution evident from these studies. As a follower of human evolutionary discoveries and theories, I am fascinated by the similarity of how the science of bear evolution has paralleled that of human evolution. I predict that we will come to appreciate the complexity of bear evolution, understanding that an ice-adapted bear has evolved a number of times, and branches have also gone extinct during the waxing and waning of past ice ages. Hybridization between polar bears and brown bears indicates the considerable similarity between the two

bear species. One message is that, if polar bears become extinct but brown bears continue to inhabit northern coastal regions, in the future another ice bear may evolve to use the Northern Hemisphere—though this may take another 10 000 years!

Some of the best chapters include “The Origin of the Polar Bear,” “Behaviour,” “Hunters of the Northern Ice,” and “Reproduction.” Stirling even gives advice on how to prevent polar bears from eating you. It is a sad message to realize how many people Stirling refers to as “the late.” I hope there is a good crop of new scientists in the wings, awaiting their turn to become the next great Arctic natural history recorder. I heartily agree with Stirling that just going on a hunting trip with an Inuk hunter is a rare first-hand experience and far more rewarding than shooting a

polar bear and bringing a hide home for a trophy. Perhaps this form of ecotourism will provide an economic opportunity for Northerners in the future. Stirling provides us with a wonderful book—he is a science elder. Reading this book will provide the same wonder as listening to an elder Inuk’s stories. However, the final message is clear: polar bears need sea ice, and their habitat is disappearing.

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