

Zoos in the 21st Century: Catalysts for Conservation?

Edited by Alexandra Zimmerman, Matthew Hatchwell, Lesley Dickie and Chris West (2007), xii + 373 pp., Cambridge University Press, Cambridge, UK. ISBN 9780521618588 (pbk), GBP 35.00/USD 65.00; 9780521853330 (hbk), GBP 75.00/USD 145.00.

Article 9 of the Convention on Biological diversity calls for Parties to support *ex situ* conservation, i.e. conservation of genes, species, and ecosystems outside their natural limits. This is difficult with ecosystems but gene banks are well established in many parts of the world and species are often conserved in zoos, aquaria and botanic gardens. *Zoos in the 21st Century* is an excellent review of how zoos and aquaria may be able to contribute to conservation in the coming century. With over 10% of the world's population visiting zoos every year, they certainly provide an outstanding opportunity for educating the general public about species. Indeed, for many people, their only chance to see many of these species is in captivity.

Over the past several decades many zoos have become more like conservation parks, where the animals are displayed in as natural a setting as possible, even to the extent that the vegetation within their enclosure is appropriate to their natural habitat. This gives the visitors the feeling that they are sharing the experience of the natural lives of the species they are observing and, one hopes, gives the captive species a more satisfying life. And of course captive individuals receive professional medical care and a regular supply of food, making their captivity superior to life in the wild in at least some ways.

But what are zoos doing to help conserve species in the wild? This book provides many answers, ranging from supporting field research to financial support, training, and education of the public. While the authors are overwhelmingly from the USA and the UK, the book has global relevance and provides examples from many parts of the world.

The book is divided into three main sections: the challenge of changing human behaviour, dealing primarily with the role of zoos in contributing to a conservation ethic; establishing connections between zoos and the wild, covering topics such as reintroduction into the wild, research, and conservation medicine; and direct involvement of zoos in *in situ* conservation, with several chapters discussing how zoos are contributing to protected areas and other kinds of conservation, especially in the tropical countries where so many of the charismatic zoo species originate.

Several chapters indicate that zoos are themselves becoming conservation organizations, for example bringing the California condor, the Mauritius kestrel, the black-footed ferret, and the Guam rail back from extinction. Numerous zoos are also supporting conservation activities in various parts of the world, both with financial support and providing staff for training and other activities. The work that the Wildlife Conservation Society, based at the Bronx Zoo in New York, is doing is exemplary in this regard, especially in the field of zoonotic diseases (diseases that can be transmitted between humans and other animals). Given the progress that is reported from various parts of the world in this book, we can be confident that the zoos of the 21st century will continue to be popular with the public and will continue to expand their contributions to conservation in the wild. The detailed discussion of the current contribution of zoos, by Georgina Mace *et al.*, indicates the directions in which zoos will need to move. The participation of so many of the world's zoos in the *World Zoo Conservation Strategy*, reported in the chapter by Matthew Hatchwell *et al.*, indicates a coordinated effort by zoos in the field of conservation. But it also implies that a new version of this strategy is timely, as the previous version is now nearly 15 years old. Both zoos and field biologists have learned important lessons over the past decade or so on how to build stronger public support for field conservation. Let us hope that this book, and the activities it reports, will further accelerate conservation efforts throughout the world.

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Ecology and Ecosystem Conservation by Oswald J. Schmitz (2007), x + 166 pp., Island Press, Washington, DC, USA. ISBN 9781597260497 (pbk), USD 19.95; 9781597260480 (hbk), USD 40.00.

In our world where pressing problems such as habitat conversion, biodiversity loss and climate change are inextricably linked to our current socio-economic path, the role of ecology in the policy realm cannot be understated. From Rachel Carson, through acid rain, and into climate change, ecological science has played a key role in illuminating the costs of human impacts on natural systems. With this as a stage Oswald Schmitz' *Ecology and Ecosystem Conservation* serves as a fine introduction to ecology as science for a range of readers

including natural science undergraduates, interdisciplinary graduate students and conservation professionals.

In 10 short chapters the reader learns about such cornerstones of ecology as basic species interactions, fragmentation effects and the various roles of biodiversity in ecosystem functioning. We also learn that through careful experiment, data collection and modelling, ecological science can guide effective, yet sometimes counter-intuitive, management decisions.

As ecologists, or academics writ large, we like to think about the importance of theory and data, however in many cases it is the story that sells, and throughout this text Schmitz tells very good stories. For example, he takes us into the conservation conundrum of how protecting subadult pandas and mature loggerhead turtles is a more effective way of maintaining threatened populations than popular interventions concentrated on cub and hatchling protection, respectively.

The text particularly comes alive when Schmitz tells stories about North American forest systems, where he himself has done much research. We get tales of moose suppressing aspen growth and restoring mixed spruce-aspen forests, and how climate is likely to drive changes in elk habitat. A particular example that stands out is the effect that the North Atlantic Oscillation has on snowfall on Isle Royale, Michigan. Here a cyclic climate phenomenon drives periods of high snowfall. This in turn limits moose mobility, giving wolves the proverbial free lunch (or at least greatly discounted). The corresponding decline in moose has positive effect on Balsam Fir trees and hence changes the island landscape. This story encompasses just the kind of ecological complexities that Schmitz is trying to impress on the reader, and he extends this line of thought to how human action interacts with such complex natural systems.

If I have to take issue with the text at all it is the few times that the author proclaims the objectivity of the science of ecology. While I agree that the role of the ecologist is to provide scientific insight, reveal tradeoffs, and illuminate the consequences of human action on the environment, it does not always happen to be that neat. Conservation science is fundamentally value-based, i.e. the natural world should be conserved. So the objectivity is not so clear-cut. Despite this, ecologists still have a role to play at the decision making table. I do not think that Schmitz would disagree here but early on (p. 25) when he says 'No experimental control = no conclusion' he does not stress sufficiently to the reader that in many of the most pressing problems in conservation, experimental control is not possible. Sometimes we have to settle for modelling, regression and at times even anecdote. Another opportunity passed up in the text was deep discussion linking ecology and human welfare through ecosystem services. It seems a shame that

the Millennium Ecosystem Assessment is not referred to at all. I think that not only would this text be improved by such a discussion, but also that the reader would probably have benefited from Schmitz's treatment of it.

Throughout the text Schmitz reveals why it is so important to take a systems view of conservation founded on the science of ecology. He aptly demonstrates how human action, even well intentioned conservation strategies, may reverberate through natural and human systems in complex ways over long time periods. Because of this, in the end, Schmitz calls for a precautionary approach to decisions affecting natural systems.

The book itself has a long list of references, additional readings, focus questions and a great cover. I found myself learning, and enjoying this text throughout, and would certainly recommend it for use in university courses. It is concise enough to pair with one of the many social science texts on conservation. *Ecology and Ecosystem Conservation* is a credit to Schmitz and, based on it, I look forward to reading more of the offerings from the *Foundations of Contemporary Environmental Studies* series of which it is a part.

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The following titles have been received at the Editorial Office and may of interest to readers:

The Ecology and Evolution of Ant-Plant Interactions by Victor Rico-Gray & Paulo S. Oliveira (2007), xiii + 331 pp., The University of Chicago Press, Chicago, USA. ISBN 0226713482 (pbk), USD 28.00/GBP 18.00; 0226713474 (hbk), USD 70.00/GBP 44.50.

Plants and Vegetation: Origins, Processes, Consequences by Paul A. Keddy (2007), xxi + 683 pp., Cambridge University Press, Cambridge, UK. ISBN 9780521864800 (hbk), GBP 38.00/USD 75.00.

The Silent Deep: The Discovery, Ecology and Conservation of the Deep Sea by Tony Koslow (2007), 292 pp., The University of Chicago Press, Chicago, USA. ISBN 9780226451251 (hbk), USD 35.00/GBP 22.50.

The Biology of African Savannas by Bryan Shorrocks (2007), x + 268 pp., Oxford University Press, Oxford, UK. ISBN 9780198570660 (pbk) GBP 27.50.