

**Quantitative Conservation Biology: Theory and Practice of Population Viability Analysis** by William F. Morris & Daniel F. Doak (2002), xvi + 480 pp., Sinauer Associates Inc., Sunderland, USA. ISBN 0 87893 546 0 (pbk), £24.99.

**Population Viability Analysis** edited by Stephen R. Beissinger & Dale R. McCullough (2002), 496 pp., University of Chicago Press, Chicago, USA. ISBN 0-226-04177-8 (hbk), \$95.00, 0-226-04178-6 (pbk), \$35.00.

Population viability analysis (PVA) is a ubiquitous component of modern conservation biology. The premise of PVA is that population dynamics are unpredictable because of demographic stochasticity (random fluctuations in population size caused by discrete numbers of births and deaths and chance fluctuations in sex ratio) and environmental variability (changes in environmental factors that cause fluctuations in population vital rates) and that these stochastic features of population growth lead to decline and extinction. It follows that if these random fluctuations can be modelled accurately, then it will be possible to assign meaningful values to the chance of extinction for particular populations, and to develop management strategies that focus on especially elastic features of a population's demography.

These are controversial premises. A 1997 review of the prospects for PVA (Ralls & Taylor, 1997, How viable is Population Viability Analysis? In *The Ecological Basis of Conservation*, pp. 228–235, Chapman & Hall, New York, USA) concluded that its future was bleak. PVA typically focuses on one species at a time, and therefore applies only to rather narrow conservation problems. Analyses typically omit risk from sources that are difficult to estimate and are therefore likely to be optimistic, are often used inappropriately, and typically assume that current conditions will persist for unreasonably long times. A final objection is implicit: PVA focuses on stochasticity, not on model structure, which may be the dominant source of error in most population models. In 1997, PVA did not seem to be an especially promising tool.

These two new books reassess the state-of-the-art of PVA, and advance the field in important ways, although an unspoken question remains: is PVA a viable tool for conservation planning and management, or will it

ultimately be relegated to the dustbin of fashionable science, along with overfit models and trivial conclusions? The general answer to this question is encouraging. Useful estimates of extinction risk can be derived from stochastic models of population growth. Moreover, some general principles are emerging, concerning the relative importance of migration corridors in metapopulations, the effects of fragmentation and diminished carrying capacities, and how extinction risks are different for species with different life histories. But, the specific answer is that a good PVA requires hard work.

The audience of *Quantitative Conservation Biology* is field biologists and graduate students. This book is data-heavy and theory-light. It is a book about methods rather than methodology and is for scientists interested in analysing data and developing management plans and recommendations. This will be a good book for advanced undergraduate courses in conservation biology or for a graduate seminar. Very little in the way of mathematical or computer programming skills is assumed. Additionally, the authors remind us that the first rule of modeling is to never build a model more complicated than the data warrant. This is good advice, but it is disarmingly simplistic: it begs the question of how much data, and of what kind, is required. In the end, model selection and fitting really are difficult topics, and are still under development by specialists, so the finer points will come only at great expense to most of us.

Despite the apparent simplicity of this book there are models for structured and unstructured populations, metapopulations, demographic stochasticity, and population growth in variable environments, including environments subject to catastrophes and bonanzas. More advanced topics include model selection, accounting for observation error, and sensitivity analysis. Attentiveness to these details is crucial for conducting good analyses and the present book removes many of the obstacles formerly preventing their application. Notwithstanding these advanced topics, *Quantitative Conservation Biology* is an extremely readable introduction and is worthy of considerable study.

*Quantitative Conservation Biology* does not represent the cutting edge of theory or data analysis, however. For that one turns to *Population Viability Analysis*, which is a sophisticated, if unsystematic, volume. In this book, 53 authors contribute to developments in theory and

methodology. Not all of these authors succeed and many chapters are simply extended discussions of previous work. Thus, this book is valuable mostly as a compilation of methods, a benchmark against which to measure the success of future developments, and as an indication of open problems, of which there are many. Contributions are arranged in four sections in each of which are some gems, despite a lacklustre tone overall. The interested reader should consult Lande's review of PVA for an introduction to the field (chapter 2), Hanski on the relevant extensions to metapopulation theory (chapter 5), White *et al.* concerning parameter estimation (chapter 9), Sæther & Engen on population prediction intervals, which are used for measuring and communicating uncertainty (chapter 10), Doak *et al.* on seed banks and complicated life histories (chapter 15), and Possingham *et al.* on decision-theory (chapter 22).

As highlighted by these two books and in other recent publications about PVA, future developments need to focus on two unresolved problems. Firstly, methods must be developed for incorporating additional sources of information besides times series of population sizes. Secondly, because model mis-specification is an important source of error, model averaging techniques or other methods to account for uncertainty in model structure must be developed. Not all of the issues raised by Ralls & Taylor in 1997 have been adequately addressed, although PVA methodology is an area of active research and developments are rapid. For this reason, the authors of these volumes think that PVA is in fact a viable method in conservation ecology.

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**The Beaver: Natural History of a Wetlands Engineer** by Dietland Müller-Schwarze & Lixing Sun (2003), x + 190 pp., Cornell University Press, New York, USA. ISBN 0-8014-4098-X (hbk), \$35.00.

This handsome book reviews the natural history and ecology of the North American and the Eurasian beaver, with the focus on the North American species. Beavers are model species for conservation and wildlife management. They were extirpated over large areas in the past for their pelts, meat and the damage they cause, but following a recent change in attitudes towards these mammals, reintroductions and nurturing of remnant populations have sometimes even led to a regional overabundance. Many lessons in wildlife conservation can therefore be learned from the history of coexistence between people and beavers.

Authors Dietland Müller-Schwarze and Lixing Sun have studied the behaviour and ecology of beaver for many years and are thus well acquainted with the subject. In part their book is based on their own research and in part on research results of other authors published between 1960 and 2001. The main text is organised into five parts (The Organism, Behavior, Populations, Ecology, Beaver and People: Conservation, Use and Management), with a total of 21 chapters. Numerous black-and-white photographs and diagrams illustrate the main text. In addition, there are 16 unnumbered pages of glossy paper in the centre of the book with 50 colour plates.

Starting from the beaver as a single organism, the text progresses to the behaviour of family units and populations, describes the ecology, particularly the creation of habitat for plants, animals, and people, and then turns to the relationship between humans and beavers. The last part is of particular interest. It describes the long period of exploitation of beavers, based on historical data of the fur trade, and also discusses the problems of reintroductions, the handling of damage, and the use of beavers as ecosystems engineers for habitat restoration. These pages are full of information that may enhance wise management of beavers in the future.

*The Beaver: Natural History of a Wetlands Engineer* is a welcome addition to the wildlife literature. It is of interest for readers in mammalogy, wildlife management, conservation and education, and is nicely and carefully produced.

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**History of the Russian Zapovedniks 1895–1995** by Feliks Shtilmark [translated from Russian by G.H. Harper] (2003), xii + 308 pp., Russian Nature Press, Edinburgh, UK. ISBN 0 9532990 2 3 (pbk), £27.50.

The history of protected areas tends to be considered mostly in terms of the American national parks and the first game parks of southern Africa. The parallel story of protected area development within Russia, and later in the Soviet Union, is less well reported. The first *zapovednik* (a strictly protected area put aside for scientific enquiry) was developed in 1895 within the steppe lands of southern Russia. After that time the concept grew, and *zapovedniks* eventually represented the backbone of the Soviet protected areas system.

This recent work by Feliks Shtilmark, at one point an insider to the *zapovednik* establishment, chronicles

the philosophy of *zapovednost*, the idea of complete withdrawal of management from these sites to enable natural ecosystem processes to be observed. In the original concept, these are sites where man's influence was to be minimized, if not removed. The initial aim was to provide scientific understanding of natural processes (including those of natural succession and extinction) and to provide a baseline against which environmental change could be assessed, rather than as a means for conservation (parallel systems of *zakazniks* focused on protection of specific species and habitats). The conservation role of *zapovedniks* has only been recognized since the 1950s. These areas – which were often of a massive scale, aiming at the protection of intact ecosystems – are true Category I sites (*sensu* IUCN), but yet as early as the 1920s the landscape value of these sites was being recognized and exploited (with early nature tourism in buffer zones, in protected areas in places such as Georgia).

The book describes in detail the development of the *zapovednik* network and the political wrangles over the purpose of these sites. Under the political dictates of the Stalinist era and beyond, for the productivity of land and its contribution to the Soviet economy (with its reliance on natural resources), pressure was put on the *zapovednik* system to focus on the protection and 'enhancement' of economically important species. At the peak of these policies a range of species introductions were undertaken to test the adaptability of potentially commercial species to new environments, and to increase the productivity of these 'pristine' areas. Despite the ideal of non-intervention, a range of allied management techniques were also applied in some areas, including predator control.

The book is important to those interested in the history of protected areas, and in the different models of protection applied in the world today. It will also put into context many of the issues raised today working in post-Soviet countries, where there is a clear disparity between the aims of *zapovedniks* and the management models for protected areas that have evolved in the West, particularly with regard to the role of local communities in protected areas.

This is a detailed monograph, forging a line between history and science. This book is not always an easy read: it frequently gets bogged down in detailed descriptions of the individuals involved in *zapovednik* administration, and the shift in institutional structures over time, and whilst the author's position on the philosophy of *zapovednost* is overwhelmingly clear at all times, the level of detail provided often mars the underlying argument.

However, it is worth persevering: there is a wealth of information on a system of protection that is poorly

known and little understood, and there are many fascinating anecdotes about the courage and ingenuity of the pioneer *zapovednik* staff who made their home in some of the most isolated and inhospitable areas of the Soviet Union. The book is illustrated with a series of small but appealing hand drawn scenes of different habitats types and protected areas. These if nothing else inspire one as to the vast wildernesses included within the *zapovednik* system, and underlines the risk that sites of such beauty may be lost without ongoing reinvestment in a system that has been fractured by the break up of the Soviet Union and subsequent economic declines. One is left pondering the future of such an idealistic system, and how it will fare as it meets the problems facing protected areas the world over: the need for economic justification and sustainability.

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**Figs of Southern and South-Central Africa** by John and Sandra Burrows (2003), viii + 379 pp., Umdaus Press, Hatfield, South Africa. ISBN 1-919766-24-3 (hbk), €116.

The authors of *Figs of Southern and South-Central Africa* say in their Introduction that this book is born out of their frustration with the largely inaccessible taxonomic literature on figs! In other words, don't expect a turgid recycling of the regional floras: this book is a labour of love that is designed to reach out to as many interested people as possible. The knowledge and experience that forms the basis of this publication is gleaned from field trips covering some 70,000 km of the African subcontinent over the past 10 years.

With cover dimensions of 32 × 24 cm and weighing over 2 kg this is not a field guide, but then it's not a coffee table book either. This is more an encyclopaedia for fig lovers, reflected in supplementary chapters on the family Moraceae; fig wasps and pollination; figs, birds and other wildlife; cultivation of figs; a history of fig exploration in Africa; and a fascinating account of the authors' own fig hunting expeditions. There are also descriptions of related genera, and naturalized/introduced fig species. The main bulk of the book, however, is made up of detailed descriptions of the naturally occurring fig species in the region.

Descriptions include scientific names, synonymy and derivation of scientific names, vernacular names, a detailed description, a useful section on similar species, distribution maps, ecology, pollinators, economic uses, and notes on cultivation. The descriptions are particularly refreshing because they are not recycled

from the systematic literature and, although thorough, avoid the excessive jargon that infests taxonomic treatments. I was also delighted to see comprehensive lists of vernacular names; these can save the reader a great deal of trouble when it comes to identification. The text is supplemented by excellent line drawings, almost all by Sandie Burrows, and superb photographs, mainly taken by John Burrows.

As a field botanist, this is the kind of book I like to carry in the car, and refer to back in camp after a day's collecting. At the same time it is likely to appeal to people who just love plants, and trees in particular, because of the wonderful illustrations. South Africa is fortunate to have such an active botanical community, and publishers like Struik and Umdaus, who publish such beautiful books. The only drawback with a book that looks as good as this is the cost of production, which of course is reflected in the price. At €116 the book is worth every cent, but I hope it carries a lower price tag in Africa. If not, it will be out of reach for many African readers and libraries, particularly in the countries north of the Limpopo.

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

**Lion Conservation in West and Central Africa: Integrating Social and Natural Science for Wildlife Conflict Resolution around Waza National Park, Cameroon** by Hans Bauer (2003), viii + 160 pp., Leiden

University, Leiden, The Netherlands. ISBN 90 9017184 3 (pbk), unpriced.

**Drafting a Conservation Blueprint: a Practitioner's Guide to Planning for Biodiversity** by Craig R. Groves (2003), xxi + 457 pp., Island Press, Washington, DC, USA. ISBN 1 55963 938 5 (hbk), \$70.00, 1 55963 939 3 (pbk), \$35.00.

**Mammal Community Dynamics: Management and Conservation in the Coniferous Forests of Western North America** edited by Cynthia J. Zable and Robert G. Anthony (2003), xxi + 709 pp., Cambridge University Press, Cambridge, UK. ISBN 0 521 81043 4 (hbk), £110.00 (\$160.00), 0 521 00865 4 (pbk), £38.95 (\$60.00).

**Measuring Biological Diversity** by Anne E. Magurran (2004), viii + 256 pp., Blackwell Publishing Ltd., Oxford, UK. ISBN 0 63205 633 9 (pbk), £32.50.

**Eco-Economy: Building an Economy for the Earth** by Lester R. Brown (2003), xviii + 333 pp., Earthscan Publication Ltd., London, UK. ISBN 1 85383 904 3 (pbk), £14.99, 1 85383 826 8 (hbk), £17.99.

**Saving Asia's Threatened Birds: a Guide for Government and Civil Society** a project by the BirdLife Asia Partnership (2003), x + 246 pp., BirdLife International, Cambridge, UK. ISBN 0-946888-47-7 (pbk), £19.00.

**The Ivory Markets of East Asia** by Esmond Martin and Daniel Stiles (2003), 112 pp., Save the Elephants, Nairobi, Kenya and London, UK. ISBN 9966-9683-3-4 (pbk), unpriced.