

ENVIRONMENT

Sustainability: A Biological Perspective

By Stephen Morse. 2010. Cambridge University Press, 32 Avenue of the Americas, New York, New York 10013. 261 pages. \$45.00 USD Paper.

Sustainability: A biological perspective is an efficient and effective overview of the concept of sustainability. Intended, as the author writes in the first chapter, as an introduction to the topic, as well as a spur to engagement, the book covers not only theories underlying sustainability, but also how those theories are translated into practice.

Morse approaches the topic of sustainability from two main angles: production and consumption. Chapters two to four explore sustainability related to three particular areas of production: agriculture, fisheries, and industry. Chapter five discusses social and economic dimensions of sustainability, while chapter six focuses on consumption. And the final chapter wraps things up with a discussion of sustainability science and the importance of taking an interdisciplinary perspective. Tools such as modelling and sustainability indicators, and approaches such as stakeholder participation and evidence-based policy, are also introduced and discussed.

Despite the biological promise of the title – its main attraction for me – the book did not deliver much in the way of biological interest. It did not even offer a discussion of biodiversity, much less a chapter as I had hoped. This was a major disappointment.

Sustainability: A biological perspective is a dense book, packed full of information, diagrams, equations, graphs, and tables – and not a single photograph that I can remember! The target readership is obviously students in various physical or environmental sciences, and their professors – or natural scientists at large, and other readers with an interest in understanding sustainability from different perspectives, and with the time to read a densely written and organized book. It does offer a long list of detailed reference.

While the book may be suitable to that target readership, I am not certain how much appeal it would hold for the passionate naturalists among us.

RENATE SANDER-REGIER

3, 11th Line, Bristol, Quebec

Wired Wilderness: Technologies of Tracking and the Making of Modern Wildlife

By Etienne Benson. 2010. The Johns Hopkins University Press, 2715 North Charles Street, Baltimore, Maryland 21218. 251 pages. \$55.00 USD Hardcover.

Benson has produced a much needed historical introduction into the world of radio-telemetry technology. In today's biological research, radio-tagging wildlife seems to be common place. These tags can incorporate global positioning system technology, satellite tracking, or traditional radio-telemetry techniques. Little does anyone know that these technological advances had a tumultuous beginning, with plenty of political wrangling, sprinkled with environmental activism and public disapproval.

The book is divided into six parts: an introduction, four chapters, and a conclusion. Supplementary sections are also included: an abbreviations section, notes, essay on sources, and an index. The chapters are the crux of the book; they provide case histories on the use of radio-telemetry on wildlife, detailing the behind-the-scenes political drama that nearly ended much of the radio-telemetry work at the time. Focus animals include the grizzly bear (*Ursus arctos*), tiger (*Panthera tigris*), and orca (*Orcinus orca*). In the beginning, however, such high profile animals were not tagged, more accessible species were used, such as ruffed grouse (*Bonasa umbellus*), raccoons (*Procyon lotor*), and rabbits (*Sylvilagus* spp.). These early trials fine-tuned the

technology where advancements in a durable unit capable of withstanding the natural landscape were made.

The impetus to explore this type of technology was sparked with the launch of Sputnik. In 1957, Russia was the first to launch a satellite into outer space, much to the embarrassment of the United States. Biologists began to think that if Russia can send a dog into space and radio-telemeter back to earth basic physiological data, then certainly animals on earth can be tagged in a similar fashion, feeding data into a laboratory.

However, not all researchers were enthusiastic with the radio-telemetry technology. Olaus Murie, for example, did not want radio-tagged grizzly bears in National Parks and Refuges. He felt that the refuges should be devoted to "basic scientific research, with the least possible equipment. It should be for the kind of scientific study based on thinking, based purely on close observation, trying to understand the relations among various animal forms and the changing environment" (p. 61). Others felt that the radio-tags themselves had significant negative effects on wildlife. Francis L. Kellogg, the outgoing president of the US-controlled portion of the WWF, had this to say about radio-collaring tigers in Nepal and India: "To what degree, I pondered, does the

radio collar affect the shy wild animal that carries it? Or the vehicles and aircraft that can so unerringly home in on its most secret lair? And the darting process, what of that? What lasting effect can shooting and drugging of a wild animal have?" (p. 119). Other radio-telemetry research projects brought public outcry and lawsuits from environmental groups. The final chapter of the book, "The Regulatory Leviathan," focuses entirely on the tagging of cetaceans, especially orcas. These lawsuits and protests made scientific research of marine mammals nearly impossible at times. With radio-telemetry technology being so heavily criticized, other non-invasive techniques were being developed, including camera trapping and the analysis of DNA in faeces and hair. These techniques had the potential to "make life easier for the animal and are often better received by landowners and wildlife departments" (p. 138). Benson explores these trials and tribulations in great detail through the book.

When I studied San Joaquin kit foxes (*Vulpes macrotis*) and non-native red foxes (*V. vulpes*) for my thesis work in Kern County, California, one of the first tools I used was radio-telemetry (see Clark et al. 2005). My thesis work was possible due to the hard work and perseverance of the many radio-telemetry pioneers mentioned in this book. All of the researchers today that use these sorts of technological tools owe a great deal to people like Dwain W. Warner, William H. Marshall, William Cochran, Donald Siniff, John and

Frank Craighead, David L. Mech, William E. Evans, and Katherine Ralls, among many others mentioned in the book. But, the technology is not out of the woods yet. Even today, researchers are discovering that radio-tagging wildlife is having a significant effect on their behavioural patterns (see Wilson 2011 and Saraux et al. 2011). Nonetheless, one of the subtle themes explored in the book is the idea that the radio-tagging of a few animals, even if there are risks, such as death, will benefit the population as a whole. These benefits include the basic ecological understanding of the species; mapping migratory patterns, especially for birds and marine mammals; and collecting home range data, physiological data, and other life-requiring variables necessary for the conservation of wildlife.

Benson chronicles these pioneering studies in a readable and enjoyable fashion. The book is a must read for anyone interested in radio-telemetry technology or is involved in current radio-telemetry research.

Literature Cited

- Clark, H. O., Jr., G. D. Warrick, B. L. Cypher, P. A. Kelly, D. F. Williams, and D. E. Grubbs. 2005. Competitive interactions between endangered kit foxes and non-native red foxes. *Western North American Naturalist* 65:153-163.
- Saraux, C., et al. 2011. Reliability of flipper-banded penguins as indicators of climate change. *Nature* 469:203-206 + methods.
- Wilson, R. P. The price tag. *Nature* 469:164-165.

HOWARD O. CLARK, JR.

7815 North Palm Avenue, Suite 310, Fresno, California.