

great 20-year research career and gave the world a gift by putting in the effort to make this self-published book available for all who want to learn about wolves living in one of the most remote regions of the world. Well done!

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OTHER

Rise of the Necrofauna: The Science, Ethics and Risks of De-Extinction

By Britt Wray. 2017. Greystone Books/David Suzuki Foundation. 288 pages, 26.95 CAD, Cloth.

This book is about the recreation of extinct species through genetic engineering. It addresses how it might be done, what species might be targetted, and the various practical problems entailed. It also reviews at some length why we would want to do it, and the various pros and cons of such resurrections. The book grew out of a couple of radio broadcasts the author had created on the same topic and I realised, after starting to read it, that I had heard one of them, on the CBC "Ideas" programme, a year or so back and had been very impressed with the open, but quizzical, way in which the host (the author) had addressed the topic.

In the introduction, the author quotes the biologist, Stan Temple, as saying de-extinction is "...a game-changer for the conservation biology movement", because it overturns one of the main driving forces behind species conservation, "extinction is forever" (p. 6). The author suggests that there is a danger we might reduce our concerns about species extinction if we feel we can resurrect them when conditions improve. She quotes Stuart Pimm as calling it a "moral hazard" (p. 72). Unsurprisingly, scientists working on projects related to de-extinction do not feel that way.

The field of de-extinction studies is not a huge one right now. This is because (a) the technical problems in species resurrection are formidable, (b) many species have disappeared because we destroyed the ecosystems they were part of, and there seems little point in resurrecting them unless we can simultaneously restore their native habitat, and (c) large fierce animals, which are charismatic enough to attract the necessary funding, often threaten other interests (farmers, foresters, the public at large) and their resurrection may not be greeted with universal enthusiasm.

Wray devotes much text to two cases where de-extinction has been mooted: the Passenger Pigeon (*Ectopistes migratorius*) and the Woolly Mammoth (*Mammuthus primigenius*). Passenger Pigeons were the most abundant birds in North America in the pre-European period. They fed principally on tree seeds and must have had a huge impact on forest ecology at the time. Woolly Mammoths trampled and cropped the tundra ecosystems of the Pleistocene and it has been argued that their efforts were crucial in maintaining grasslands. Hence, both species were probably essential to their ecosystems, and their resurrection and spread might help to restore many aspects of early ecosystems that have been lost. Certainly, the idea of restoring either or both has a huge emotional appeal.

As in her radio programme, Wray is skeptical about the true value of de-extinction in this book. She feels that the techniques developed may be more useful in preventing extinction of still extant species than in creating "necrofauna". Is this a topic that we, naturalists and conservationists, should be deeply concerned about? That is not the message of the book. Rather, the author uses the concept of restoring extinct species as a basis for discussing a variety of conservation choices. Should you read it? All seven reviews currently on Amazon give it five stars. The writing is engaging and there is lots of interesting information, but I did not get the feeling that this is something the thinking conservationist must know about. No doubt at some stage in the future some species will be resurrected, if only because of the fame that will attach to their re-creator, but right now there are probably much more important problems out there to be wrestled with.

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The Magnificent Nahanni: The Struggle to Protect a Wild Place

By Gordon Nelson. 2017. University of Regina Press. 304 pages, 34.95 CAD, Paper.

Most of us have seen images of the Nahanni River region, of the Rabbitkettle tufa mounds, Virginia Falls, canyon walls towering over rafts and canoes, or the jagged peaks of the Cirque of the Unclimbables. While Gordon Nelson's *The Magnificent Nahanni* includes

a few excellent photos (30) of these icons, this is neither a coffee table photo book nor a guidebook. But if you are looking for a comprehensive history of the four-decade struggle to protect this biologically and culturally rich area, then this is the right book.



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