

Review: The Last Refuge of the Mt. Graham Red Squirrel: Ecology of Endangerment

H. Reed Sanderson and John Koprowski (Eds.)

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Sanderson, H. Reed, and Koprowski, John (Eds.). *The Last Refuge of the Mt. Graham Red Squirrel: Ecology of Endangerment*. Tucson, AZ: The University of Arizona Press, 2009. 427pp. ISBN 9780816527687. US \$85.00, hardbound.

Two major events in the late 1980's—the listing of the Mount Graham Red Squirrel (MGRS) on the federal endangered species list and the passing of the Arizona-Idaho Conservation Act with its provision for the construction of an international observatory in MGRS territory—spurred the collection of studies presented in this book. Biologists, geographers, professors, and other experts share their research that together present a thorough account of the MGRS and its habitat. They stress the importance of further studies, management techniques that include forest fuel reduction, and the consideration of the “short- and long-term consequences of actions on the genetic and demographic composition of the isolated Mt. Graham population in order to conserve this highly endangered subspecies” (p. 147).

Part I differs from the rest of the book by outlining three viewpoints on the value of the Pinaleños Mountains in Arizona, raising questions about priorities and the possibility of collaborations. The Western Apache people connect to the mountain's natural resources and ancient spirits, giving a cultural worth to the area. Meanwhile, astronomers view the location as a competitive site for studying evolutionary history of the universe and for solving the mystery of planet formation. Finally, ecologists recognize the need to protect the mountain's forests, and thus its inhabitants, especially as fire suppression, logging, livestock grazing, and other activities have reduced the spruce-fir and mixed-conifer forests. The remaining five parts of the book continue the ecological theme with a close examination of MGRS population trends, ecology, behavior, habitat, and extinction risks.

Contributors provide background information and often refer to other works within the volume to explain results. For example, Dianne Angell in chapter 16 describes the foraging behavior of the MGRS and finds that it prefers Douglas fir cones over other cone species. Citing the authors in chapter 17 who found these cones had similar crude protein content and less gross energy than Engelmann spruce cones, Angell suggests the preference is due to its larger seeds and thus faster handling time. Chapters continue to build on each other so that in the end, the reader has a clear picture of what would help the survival of the MGRS. Other chapter topics include nesting sites, competition with the introduced Abert's squirrel, seed hoarding, reproduction patterns, effects of insect damage, and risk assessments.

Just as David Quammen's *Song of the Dodo* (Scribner, 1997) explores the concept of island biogeography and its relation to species extinctions, so this book “will prove useful on the many other ‘islands,’ be they literal or figurative, where conservation efforts are focused” (p. 9). The ability of the editors and contributors to objectively document their scientific findings mirrors that of *Recovery of Gray Wolves in the Great Lakes Region of the United States: An Endangered Species Success Story* edited by Adrian Wydeven, Timothy Van Deelend, and Edward Heske (Springer-Verlag, 2009). The scientists' work in Arizona represents a step in what will hopefully result in a similar success story for the MGRS.

Each chapter contains an extensive reference list and most have maps, graphs, charts, or photos. The book features an index and an appendix of recent research on the MGRS. Due to its scholarly nature, it would be helpful to upper-class undergraduate and graduate students in conservation biology and ecology, as well as to scientists and wildlife managers concerned with the management of endangered species.

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