Biology and Conservation of North American Tortoises

Edited by David C. Rostal, Earl D. McCoy, and Henry R. Mushinsky. 2014. The Johns Hopkins University Press, 2715 North Charles Street, Baltimore, MD, USA, 21218-4363. 190 pages, 69.95 USD, Cloth.

The North American tortoises, or gopher tortoises, are known for their digging ability. Most of the species dig extensive burrows for shelter. These tortoises are limited to the southern parts of the United States, from California to Florida, as well as parts of Mexico, but all of them face significant conservation challenges.

This book consists of 18 chapters on various aspects of the biology and conservation of North American tortoises. None of the chapters focus on individual species. Instead, each chapter addresses what is known about a topic for all of the species. Chapter topics include the fossil record, systematics, thermo-regulation, reproduction, growth, health issues, habitat, movement patterns, genetics and conservation. Over half of the chapters have multiple authors, usually with experts on different species collaborating on a topic.

It is difficult to name the five species covered in this book, as the 33 authors could not agree on either the common or scientific names. Until recently there were four accepted species in one genus. The western Desert Tortoise was split into two species, and it is possible that further genetic analyses will reveal more species within the group. Most of the authors of this volume consider all of the North American tortoises to be in the genus *Gopherus*, but a few consider that three of the species should be placed in a different genus, *Xerobates*. Common names are also contentious. The two Desert Tortoises are commonly referred to as the Mohave (or Mojave) Desert Tortoise and the Sonoran Desert Tortoise but some herpetologists object to these names, preferring Agassizi's and Morafka's Desert Tortoises.

Overall, these chapters provide a thorough overview of the biology of North American tortoises, including research published up to the year 2012. For the most part the chapters just summarize the scientific literature on the five species, but a few chapters provide additional analysis of existing data. Some of the chapters are vague on some topics. Climate change is mentioned as likely resulting in more droughts which would likely affect many of these species, but there is no attempt to quantify such statements. Drought certainly is a significant threat to tortoises as individuals can lose 40% of their body weight during a severe drought. Longer or more frequent droughts as a result of climate change could lead to desertification and local extinctions.

Other threats are more clearly addressed. Invasive exotic grasses are a significant issue in many western areas, but since tortoises will eat both grasses and forbs, it might be thought that exotic grasses pose little threat to the tortoises. Forbs, however, are more nutritious than grasses, so if plant communities become more grass dominated this could be a serious threat to the tortoises. In addition, many exotic grasses promote severe wildfires that can kill tortoises.

The final chapter of the book provides a detailed overview of the threats and conservation needs of these tortoises. Despite protection of some populations dating back over 20 years, all these species are still declining. The Bolson Tortoise, limited to a small area of northern Mexico, has even been listed as one of the top 40 turtles or tortoises at risk of extinction. And new threats continue to emerge. For example, fracking potentially affects nearly 50% of the range of Berlandier's Tortoise in Texas. Not surprisingly then, the major issues facing these species are adequate protection of populations and their habitat. This book successfully summarizes the state of knowledge about North American tortoises, but it is hard to be optimistic for the future of these species.

DAVID SEBURN

Seburn Ecological Services, 2710 Clarenda Street, Ottawa, ON, Canada, K2B 7S5