Foreword

It is my honor to present the foreword of this book — a book that advances the fields related to reptilian biology, conservation, and ecological risk assessment. Historically, most reptilian toxicity information has been associated with tissue concentrations (e.g., Meyers-Schöne and Walton, 1994) with little cause-and-effect information available. In their book entitled *Ecotoxicology of Amphibians and Reptiles*, Sparling, Linder, and Bishop (2000) alerted us to the scarcity of relevant contaminant effects information on reptiles compared with other vertebrate taxa. The editors and authors of specific chapters stressed the need for research in areas such as the following:

- Physiology: to better understand the dynamics of chemical contaminant exposure, uptake, and elimination, with emphasis on reproductive physiology and endocrine modulators
- Pathology and disease: to better understand the influence of contaminants on humoral and cell-mediated responses
- Ecotoxicology: to better understand critical organ concentrations and regulatory capacities
- Population ecology: to better understand potential impacts of contaminants on the ability of reptiles to withstand perturbations that may affect the population

This book serves as a very useful text because it cohesively summarizes some of the cutting-edge research that is taking place in areas such as reptilian endocrinology, neurophysiology, immunology, and ecology. Conservation needs are also addressed as well as the issues related to complications associated with conducting population studies. This information is easily available for synthesis and use in the evaluation and understanding of potential risks of reptiles to environmental contaminants.

As we know, reptiles are often not included in the ecological risk assessment process. When present within an ecosystem, they

frequently occupy key positions within the food web — one of the primary considerations when considering an ecological receptor. The dilemmas faced by risk assessors, however, are the absence of sufficient reptilian toxicity information and the lack of specific exposure information. Assumptions can be made with respect to the use of "default" values with uncertainty factors. One must determine what level of confidence such information would yield and what level would be acceptable. The selection of an appropriate receptor and utilization of technically defensible data to support the estimate of potential risk to that receptor are essential to both the scientific and regulatory management processes.

The question is likely to be asked whether reptiles are more toxicologically sensitive to chemical contaminants than birds or mammals. The few studies that have been conducted indicate metallothionein-metal metabolic systems in reptiles are similar to those in other vertebrate classes. However, the temperature-associated sex determination reproductive strategy in turtles and alligators may make them more susceptible to endocrine disruptors compared with other vertebrates. This comparison remains an area of fruitful study.

Significant progress has also been made in the establishment of at least one model test species, specifically, the Western fence lizard (*Sceloporus occidentalis*). Suitable wild populations have been located in the California Valley, the species is sexually dimorphic, females lay from 3 to 6 clutches of 8 to 15 eggs each, many assay endpoints have been identified for testing purposes, and the species is easily raised in the lab.

Historically, the reptilian ecotoxicology database has been extremely limited and has prevented us from sufficiently addressing the question "How similar are all reptiles?" From an evolutionary prospective, traditionally, crocodilians, turtles, snakes, lizards, amphisbaenids, and tuataras were grouped together under the class Reptilia. However, recent cladistic analysis proposes a classification system that places turtles and crocodilians in separate classes. Although this is not widely accepted among herpetologists, it does provide additional food for thought as we consider issues such as the most appropriate test model species and toxicological data that best represent "reptiles" as a whole.

This book, and the investigators who have supported the research discussed within it, prove that we are making great strides in the area of reptilian ecotoxicology. To the editors and authors — congratulations on a much needed and comprehensive effort. To the readers — give reptiles a try if you haven't already. We could use your help!

References

Meyers-Schöne, L. and Walton, B.T. 1994. Turtles as monitors of chemical contaminants in the environment. *Rev. Environ. Contam. Toxicol.*, 135, 93–153.

Sparling, D.W., Linder G., and Bishop C.A., Eds., *Ecotoxicology of Amphibians and Reptiles*, SETAC Press, Pensacola, FL, 2000.

Linda Meyers-Schöne, Ph.D.
Blue World Environment