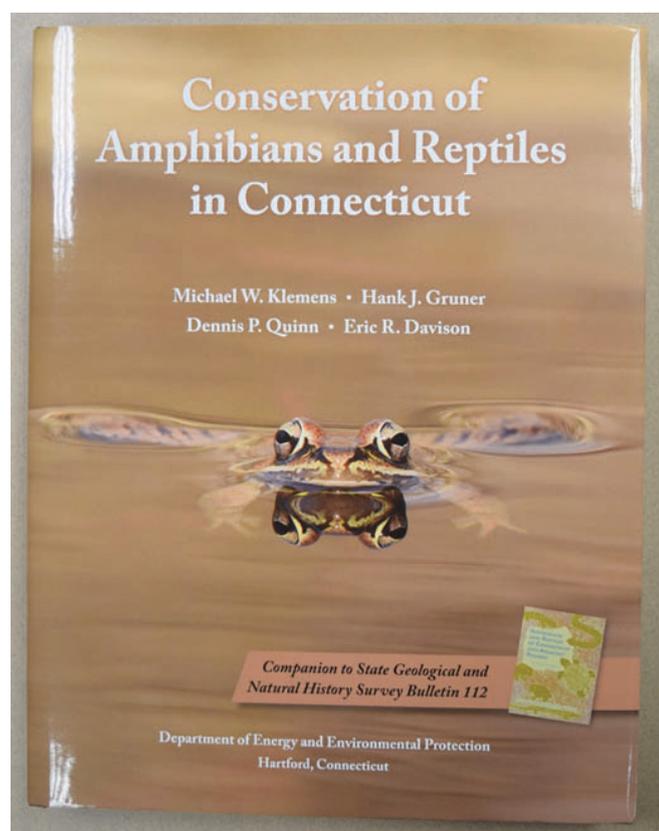


## Conservation of Amphibians and Reptiles in Connecticut

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Regional guides to herpetofauna are often labours of love by highly dedicated fieldworkers, who spend much of their lifetimes surveying wetlands, woodlands, mountains and moorlands in pursuit of the greater cause. Such publications can take many forms, ranging from a few distribution maps for a given state or county, to more comprehensive natural histories. Given that they often reflect the life's work of an individual (or a small group of individuals) regional accounts are frequently a snapshot in time. Consequently, it is unusual for regional surveys to be continued on a timeframe that spans decades, and therefore comprehensively document the changes that have occurred in the interim. This lavishly produced volume does all of this, and much more.

In 1993, Michael Klemens authored 'Amphibians and Reptiles of Connecticut and Adjacent Regions'. In over 300 pages of lucid natural history based on his PhD research as one of the very first herpetology students at the University of Kent, the author described the results of some 17 years of painstaking fieldwork on all of the amphibian and reptile species that occur in this region (Klemens, 1993). In this entirely new volume – and with the assistance of his

co-authors – Dr Klemens provides an equally comprehensive update about the status and distribution of herpetofauna in Connecticut some thirty years after his original surveys.

An introductory chapter sets the scene and provides some background to Connecticut and its herpetological fauna. At 5543 square miles Connecticut is the third smallest state in the USA, but comprises a remarkable diversity of habitats and species. Indeed, the Introduction to the book lists 12 salamanders, 11 frogs, 8 (non-marine) turtles, 1 lizard and 14 snakes. In addition to these, there are two non-native turtles and the introduced Italian wall lizard *Podarcis siculus*. A concise table neatly summarises how conservation challenges have changed between 1993 and 2021. As in the United Kingdom and elsewhere, inconsistency in the scope, intensity and standardisation of surveys by consultant biologists has remained largely unchanged over recent decades. The authors cogently point out the limitations of reaching conclusions from mapped data. Point locations are not indicative of viable populations, an issue neatly illustrated by records of bog turtles. Many records of bog turtles were of individuals crossing roads while vacating sites that were no longer suitable, so sightings have increased while populations have declined.

Chapter 1 goes on to describe the biogeography of the State and the landscapes and habitats that these species occupy. Interestingly, power-line rights-of-way in rural areas can provide important areas for some species and can be managed sensitively, including the incorporation of wetlands. The implications of life history for conservation are introduced here, as are the principles of the 'conservation guilds' that underpin the conservation strategies that emerge later on in the book.

Chapter 2 moves on to discuss anthropogenic stressors. Connecticut has 65 % of its area comprising wildlife-urban interfaces, which is the highest of any state in the USA. Intriguingly, timber rattlesnakes are attracted to areas of fractured stones that cover gas pipelines. Because the pipelines are warm, the rattlesnakes have shifted their hibernation and birthing sites accordingly, but by doing so put themselves at risk of disturbance. Given ongoing discussions about how significant railway lines in Britain are as barriers to amphibians and reptiles, I was also intrigued to read that – with the possible exception of turtles – most amphibians and reptiles can traverse railroads in Connecticut. Railroads also seem to have provided a conduit for the dispersal of non-native Italian wall lizards. These are just examples of numerous nuggets of useful information in this chapter, contained within a lucid narrative with sections on habitat

fragmentation, climate change, harvesting, disease and invasive species. Indeed, I would recommend this chapter to anyone seeking a synthetic and readable account of these threats to herpetofauna in general.

Some two-thirds of the book (Chapters 3–7) apply the concept of conservation guilds to classify the habitats, threats and management to the Connecticut herpetofauna. The authors point out that traditional conservation management tends to focus on individual species, threat or habitats. Given the complex interactions between these factors, a more cost-effective methodology may be to adopt an assemblage-based approach where the issues facing a ‘guild’ of species can be tackled collectively. Research has shown that the wider, ecological impact of a development may be an order of magnitude higher than that on the development footprint alone. Classifying species into one or more of ‘Rare habitat dependent’, ‘Early successional habitat dependent’ and ‘Habitat mosaic dependent’ or ‘Long-lived/delayed sexual maturity/low fecundity’ can inform the state-level listings and status of each species. Each species is assigned in this way along with an informative map of past and present records in relation to geographical features. A fascinating interlude at the end of Chapter 3 is a history of bounty hunting of rattlesnakes in the state. With habitat fragmentation and roadkills now taking their toll, the authors predict that just 8–10 % of the state’s timber rattlesnake population may remain by 2050.

Chapters 4–7 systematically discuss the challenges facing each of the four conservation guilds that the species have been assigned to. These embrace ecology, habitat succession and resilience, and land-use planning. When it comes to mitigation banking, the authors rightfully point out the importance of distinguishing between remnant populations of long-lived species that are effectively the ‘living dead’, from more viable populations that have a chance of a long-term future.

Chapter 8 concludes the volume by focusing on local governance with an assessment of the issues concerning gaps in federal and state protection. In a densely populated state such as Connecticut, the key word here is ‘fragmentation’, and the chapter concludes with twelve strategies to improve land-use decision making. All of these recommendations (e.g. ‘Avoid check-the-box conservation’, ‘Standardize assessment methods’, ‘Know your resources’), should resonate with anyone who has tried navigating the ecological, logistical, financial and political minefield that is land-use planning. Their relevance therefore goes way beyond the state boundaries of Connecticut.

It is refreshing – and indeed quite rare – to see long-term scholarly survey and research translated so effectively into a volume that is directly related to on-the-ground conservation. Apart from the maps, the whole book is lavishly illustrated with superb photographs of the species and the habitats and some colourful and informative diagrams of different habitats and landscapes and how they are used. There is a comprehensive glossary, list of acronyms and extensive reference list, but where these are incorporated into the text they do not detract from a readable and incisive narrative. This book is much more than a regional guide.

Anyone seeking a general and well-informed introduction to herpetological conservation that uses Connecticut as a detailed case study would benefit from reading it.

All proceeds from the sale of the book go toward the conservation of reptiles and amphibians. This publication is available for purchase via the Connecticut Department of Energy and Environmental Protection’s online bookstore: [https://www.ctdeepstore.com/Wildlife\\_c24.htm](https://www.ctdeepstore.com/Wildlife_c24.htm). At \$54.95, this is a quality publication at a very competitive price.

## REFERENCE

Klemens, M.W. (1993). *Amphibians and Reptiles of Connecticut and Adjacent Regions*. State Geological and Natural History Survey of Connecticut, Bulletin No. 112.

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