Wetland Science & Practice

published by the Society of Wetland Scientists
Vol. 41, No. 3 July 2023
ISSN: 1943-6254

INCLUDES PROCEEDINGS FROM THE 2023 SWS ANNUAL CONFERENCE IN SPOKANE, WASHINGTON

BOOK REVIEW

Urban Biodiversity: The Natural History of the New Jersey Meadowlands

Richard Smardon[1]

This reviewer has worked with urban wetland projects in the Chicago metropolitan area, Central New York state and the Juneau Alaska SAMP so I was very interested in Kiviat and MacDonald's book on the New Jersey Meadowlands. Erik Kiviat is the Executive Director of Hudsonia – a nonprofit institute for scientific research and education at the Bard College research station in Annandale NY. Kiviat has done extensive biodiversity fieldwork in the Hudson River Valley (Kiviat and Stevens 2001) as well as New York City (Kiviat and Johnson 2013). Kristi MacDonald is a conservation scientist and director at Raritan Headwaters in Bedminster, New Jersey. Her focus is on human-caused stresses in the urban landscape as well as guiding local communities and individual landowners on science-based conservation and planning.

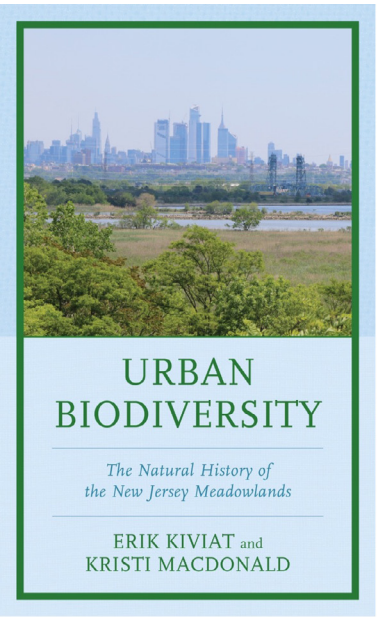

Figure 1. Urban Diversity Book cover. (Source: Lexington Press)

The book is based in part on a technical report (Kiviak and MacDonald 2002a) on the biology of the New Jersey Meadowlands, which previously had limited fragmented data for use by environmental professionals and scientists. As the authors state in the book's introduction ". It helps us understand how to manage the marvelous biological resources that exist in metropolitan areas in spite of, or even the cause of urbanization. It also helps us to mistakes that we can avoid…" (Kiviat and MacDonald 2022b). There are other books that address some of the biodiversity features of the Meadowlands but none with the detailed biodiversity covered within this book. The *Hackensack Meadowland Initiative* publication by the U.S. Fish and Wildlife Service (2007) does cover major species found in some of the Meadowland wetland areas plus Federal and State protected species and other species of concern.

Chapter one covers the environmental setting of the Meadowlands including such geographic history and features as bedrock geology, formative earthquakes, surficial geology and soils, hydrology, water and air quality, climate effects, paleology and environmental history plus effects of all these factors. This reviewer wished this chapter would have covered historical land use as Kiviat (2020) covered in his *Urban Naturalist* journal article. Or the authors could have referred the reader to the historical and current land use sections of the U.S. Fish and Wildlife Service's *Hackensack Meadowlands Initiative* publication (US FWS 2007). If we want to address urban ecology interactions, then one of the major stresses is the historical and current anthropogenic land uses and impacts on the Meadowlands.

Within chapter two the authors describe the major Meadowlands habitat types of marshes, ponds, and channels. There is detailed discussion of deep channels, vegetated shallows, tidal marshes, nontidal marshes, flotant zones, wet meadows, springs, ponds, lakes, intermittent ponds, streams, and wetland buffer areas. There are only two black and white photos within the chapter and this reviewer would like to have seen more illustrations to capture the vegetated character of these zones and or map coverage to show the coverage of these zones.

In chapter three the authors describe surrounding uplands and forested wetlands. Various types of non-vegetated upland habitats are described as well as upland forests and forested wetlands. The authors also discuss targets for conservation for non-vegetated areas, meadows, shrublands, forests and what they call the "urban matrix". Again, some type of mapped coverage of these zones would help us visualize their respective area coverage.

Within chapter four the authors address the various types of seed plants historically and currently found in the Meadowlands including grasses, cattails, composites, orchids, woodland riparian and wetland forbs, wildflowers of rockery crevices, trees, shrubs, and herbs. The chapter ends with a general discussion of Meadowlands flora regarding biological diversity of species.

In chapter five the authors cover cryptogams found in the Meadowlands including ferns, horsetails, spikemoss, and clubmoss plant communities. There are separate chapter sections on mosses and liverworts, fungi, lichens, stoneworts, and algae. The treatment of these plant communities is very detailed and includes comprehensive species lists. There is a brief conclusion section on plant biodiversity conservation and the need for more data.

Within chapter six the authors address the mammal communities within and surrounding the Meadowlands with specific reference to the Virginia opossum, rodents,

1 SUNY Distinguished Service Professor Emeritus, SUNY College of Environmental Science and Forestry; rsmardon@esf.edu

rabbits, shrews, moles, bats, white-tailed deer, various carnivores plus porpoises, dolphins and whales found in nearby waters. It is noted by the authors that specific habitat management for mammals is problematic for species that only occasional inhabit or use the Meadowland vegetated zones.

In chapter seven the authors address the bird communities found in the Meadowlands including wading birds, gruiforms, shorebirds, gulls and terns, raptors, galliforms, passerines, doves, cuckoos, woodpeckers, and Kingfisher. The authors stress the diversity and population levels of birds found in the Meadowlands as well as their ability to use and adapt to their various habitat zones. Kiviat also stresses the positive use of invasive nonnative wetland plant communities such as common reed, purple loosestrife, and Japanese knotweed, which is counter to the U.S. Fish and Wildlife Service's recommendations concerning control or elimination of these species (US FWS 2007).

Within chapter eight the authors describe occurrence of reptiles and amphibians in the Meadowlands including historic species, peripheral species, and the state of species' pools. There is specific discussion of frogs, salamanders, turtles, lizards, and snakes. The authors discuss the low levels of species diversity and species pools and factors affecting such. The following discussion on conservation, remediation and management of reptile and amphibian habitat is very good, and this reviewer wishes there could be such a discussion for the other species taxa covered within the book.

In chapter nine the authors address Meadowlands fish and adjacent waters. Separate chapter sections cover resident fish to the Meadowlands, migratory fish, upstream freshwater fish, upstream freshwater fish as well as the major stressors on fish populations. There are very short sections on fish remediation, fish habitat quality and further research needed. The chapter ends with an annotated list of fish found in the Meadowlands and adjacent waters.

Chapter ten is an exhaustive coverage of Meadowlands invertebrates including; clam shrimp, amphipods, crabs, crayfish, grass shrimps, millipedes, centipedes , spring tails, harvest men, ticks, mites, spiders, aphids and scale insets, dragon flies, damsel flies, katydids, crickets, grasshoppers, moths, mosquitoes, biting and nonbiting midges, blackflies, horseflies, deerflies, bees, wasps, ants; terrestrial, freshwater and estuarine mollusks; benthic invertebrates, and freshwater stream macroinvertebrates. The thoroughness and breadth of discussion on invertebrate species covered is admirable given the paucity of data. There is a brief discussion of conservation needs at the end of the chapter.

The authors summarize much of the biodiversity patterns by taxa in the conclusions chapter. Such is followed by a section entitled "Lessons from the Meadowlands" which stress lack of biota data, the variation of Meadowlands habitat quality and quantity plus the need to attend to rare and unique species, improve water quality and manage for the "urban context". Specific sections also include habitat fragmentation, sources of mortality and morbidity, use of BMPs for land use, and effects of climate change. Lastly urban biodiversity lessons are compared with four other geographic regions.

This reviewer found the coverage of biodiversity and habitat quality to be very thorough and systematic regarding seed plants, cryptogams, mammals, birds, reptiles and amphibians, fishes, and invertebrates- especially given the lack of data for some taxa. This reviewer would like to have seen more equality of conservation and management measures presented such as those covered in chapter eight on reptiles and amphibians, or maybe one could manage for certain taxa at most risk and there maybe benefits for other taxa. Also, the historic and current land uses on and adjacent to the Meadowlands have a major impact on diversity and habitat quality of the Meadowlands (Kiviat 2002; US FWS 2007) as previously noted and it would have been better to integrate land use BMP's both in the introduction and conclusion chapter. It also would have been better to cover the human use, actors, and management of Meadowland ecosystem services and how this can be integrated for future biodiversity conservation measures (Smardon 2009; US FWS 2007).

The detail of coverage of species biodiversity and habitat quality for the heavily impacted urbanizing Meadowlands is commendable and could be used as a template for urbanized wetland areas elsewhere.

REFERENCES

Kiviat E. 2020. Use of wetlands in the urban coastal meadowlands of New Jersey USA. *Urban Naturalist* 37:1-16.

Kiviat E. and E. Johnson. 2013. *Biodiversity Handbook for New York City.* American History Center for Biodiversity of the Hudson, New York, NY.

Kiviat E. and G. Stevens. 2001. *Biodiversity assessment manual for the Hudson River estuary corridor*. New York State Department of Environmental Conservation, New Paltz, NY.

Kiviat E. and K. MacDonald. 2002a. *Hackensack Meadowlands, New Jersey biodiversity: A review and synthesis.* Hackensack Meadowbrook Partnership.

Kiviat E. and K. MacDonald. 2022b. *Urban Biodiversity; The Natural History of the New Jersey Meadowlands*. Lexington Books/Rowman and Littlefield, Lanham, Boulder, New York, and London.

Smardon, R.C. 2009. *Sustaining the Worlds Wetlands; Setting Policy and Resolving Conflicts*. Springer, Dordrecht, Heidelberg, London, and New York.

U.S. Fish and Wildlife Service. 2007. *The Hackensack Meadowlands Initiative: Preliminary Conservation Planning for the Hackensack Meadowlands Hudson and Bergen Counties, New Jersey*. New Jersey Field Office, Pleasantville, NJ.

https://rucore.libraries.rutgers.edu/rutgers-lib/28283/PDF/1/play/