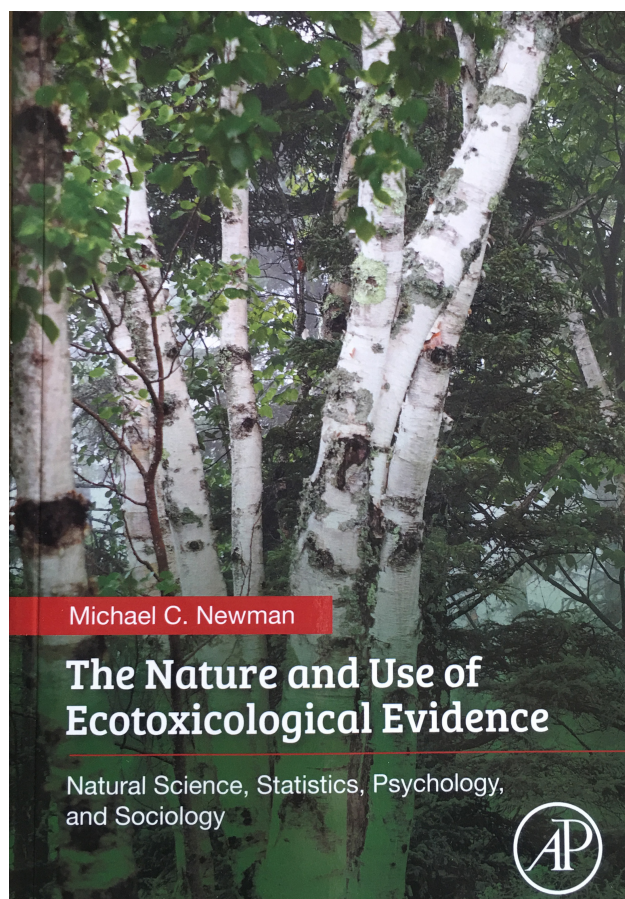


## BOOKS REVIEW



### THE NATURE AND USE OF ECOTOXICOLOGICAL EVIDENCE: NATURAL SCIENCE, STATISTICS, PSYCHOLOGY, AND SOCIOLOGY

by Michael C. Newman

"Weight of evidence" (WOE) is a commonly used term in scientific literature, particularly in forensic sciences, environmental risk assessment and in policy decision-making processes. Its concept, however, is often misunderstood. In fact, as Weed (2005) reported in his review on the use of WOE in literature, three main interpretations can be identified: (1) metaphorical, where it refers to a collection of studies or to an unspecified methodological approach; (2) methodological, where it points to established interpretative methodologies or implies that "all" rather than some subsets of the evidence is examined, or rarely, where it points to quantitative methods for evidence estimation; and (3) theoretical, where it serves as a label for a conceptual framework.

In the field of ecotoxicology the book of "The Nature and Use of Ecotoxicological Evidence: Natural Science, Statistics, Psychology, and Sociology" by Michael Newman clearly analyses this problem, introducing correlated topics and original considerations on the role of social dynamics. I agree with the author when he states: "the most serious impediments to wise action" such as actions to reduce chemical pollution "are the misconstruing of evidence by the scientific community and miscommunicating evidence to regulators and the public. ...What evidence comes to dominate the exchange among scientists, regulators and decision makers depends on both scientific soundness and social circumstances".

The book contains 9 chapters grouped into four broad sections. To avoid conceptual dissonance, most chapters include brief overviews of the relevant concepts.

Section I is an "introduction" illustrating the history of pollution and the reasons why timely and sound evidence is now absolutely essential for human wellbeing.

Section II focuses on individuals and starts with a chapter commenting on a series of tendencies (twenty-seven!!) with the potential of compromising cognition by individuals, including scientists and risk assessors. This is followed by two shorter chapters that look into how individual scientists reason, and perhaps, make errors in the process. The fourth chapter highlights statistical methods as the gold standard of objective scientific inference; several quantitative methods are commented on, including Fisherian significant testing, Nyman-Pearson hypothesis testing, confidence intervals, information-theoretic methods and Bayesian inference.

Section III, "how groups weigh and apply evidence" broadens coverage from interactions on a microlevel to those at a macrolevel or group interactions, particularly as they influence evidence-based judgments. With regard to microlevel interactions the following topics are examined: naïve realism, groupthink, satisficing and polythink; when referring to macrolevel interactions, first a basic description of types of networks is provided, and qualities and related metrics are then explored.

In Section IV the "conclusion" consists of a single chapter that brings together the most relevant points and potential remedies for the issues discussed in the book.

Finally, two appendices are included. The first examines 18 ecotoxicological innovative survey methods (at least for non-experts in ecotoxicology) used as examples to analyse how innovations enter into and move within groups. The second focuses on a series of publication indexes (h-index, Research Gate Score, etc.) for 80 anonymous ecotoxicologists used in chapter 8 as examples of social network analysis.

In summary, there is a wealth of information within the covers of this book on how pollutant-related evidence is gathered, assessed, communicated and applied in decision-making drawing on concepts and techniques from the natural, social and mathematical sciences. I am personally convinced that reading of the book will instil in the reader an increased awareness of the suggested means of reducing impediments to our “unbiased freewill and discriminating judgment”.

The well-written and carefully structured chapters comprising this volume will be of value to environmental scientists involved in issues relating to chemical pollution, including the majority of readers of *Detritus Journal*.

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## REFERENCE

Weed, D.L., 2005. Weight of Evidence: A Review of Concept and Methods. *Risk Anal.* 25, 1545–1557. <https://doi.org/10.1111/j.1539-6924.2005.00699.x>.

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