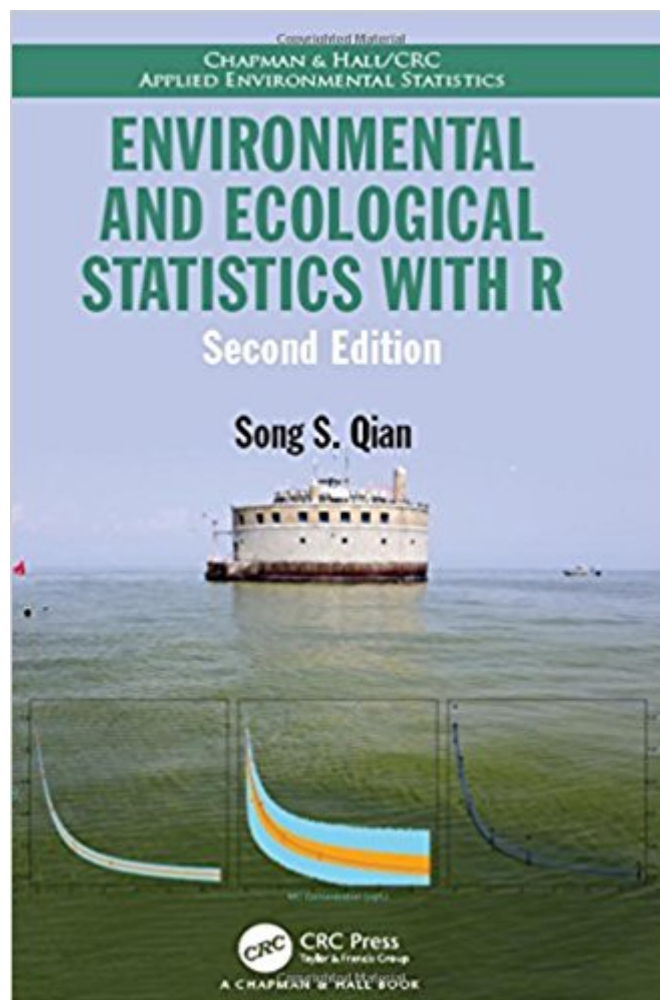




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# Environmental And Ecological Statistics With R, Second Edition (Chapman & Hall/CRC Applied Environmental Statistics)



## Synopsis

Emphasizing the inductive nature of statistical thinking, *Environmental and Ecological Statistics with R, Second Edition*, connects applied statistics to the environmental and ecological fields. Using examples from published works in the ecological and environmental literature, the book explains the approach to solving a statistical problem, covering model specification, parameter estimation, and model evaluation. It includes many examples to illustrate the statistical methods and presents R code for their implementation. The emphasis is on model interpretation and assessment, and using several core examples throughout the book, the author illustrates the iterative nature of statistical inference. The book starts with a description of commonly used statistical assumptions and exploratory data analysis tools for the verification of these assumptions. It then focuses on the process of building suitable statistical models, including linear and nonlinear models, classification and regression trees, generalized linear models, and multilevel models. It also discusses the use of simulation for model checking, and provides tools for a critical assessment of the developed models. The second edition also includes a complete critique of a threshold model. *Environmental and Ecological Statistics with R, Second Edition* focuses on statistical modeling and data analysis for environmental and ecological problems. By guiding readers through the process of scientific problem solving and statistical model development, it eases the transition from scientific hypothesis to statistical model.

## Book Information

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## Customer Reviews

"*Environmental and Ecological Statistics with R, Second Edition*™ offers a comprehensive and highly engaging look at modern statistical modeling. It covers a wide range of topics, including linear and non-linear regression models, classification and regression tree structures, and generalized linear models. I particularly enjoyed the third section of the book covering interesting areas of advanced statistical modeling, where the reader can find many didactical examples that are highly relevant to environmental management such as the problem of *Cryptosporidium* in drinking water, the uncertainty in water quality measurements using the ELISA method as an example, or the threshold indicator taxa analysis. The author has the unique ability of being able to clearly explain difficult statistical concepts whilst still making the book accessible for researchers of all levels, from undergraduate students to researchers already conducting serious empirical research. The emerging philosophical consensus that both the frequentist and Bayesian way of thinking are important in statistical practice is nicely articulated throughout the book. R codes are also provided, enabling researchers to apply statistical techniques to their own ecological or environmental management problems. Overall, this book is exceptionally well written and should prove an invaluable tool either as a classroom text or as an addition to the research bookshelf. I am very confident that *Environmental and Ecological Statistics with R, Second Edition*™ will end up being a classic!"

•George Arhonditsis, Professor and Chair of the Department of Physical & Environmental Sciences, University of Toronto "Shortly after it was published, the first edition of *Environmental and Ecological Statistics with R*™ by Song S. Qian became a go-to book for environmental scientists interested in the application of Bayesian methods in R to address a broad range of environmental issues. The book serves to introduce Bayesian statistical analysis in an accessible way to ecologists and environmental scientists, with numerous applications in R. An important aspect of this book is that it is written primarily for scientists, not statisticians; thus the author emphasizes the broader context of scientific inference, within which statistical analysis plays a critical role. The second edition includes several important additions and improvements including: an expanded introduction to R code, greater emphasis on hypothesis testing and p-values, and an iterative approach to scientific inference through the continued refinement of a model for a data set as the book's chapters explore more advanced statistical methods. The R code included in the book outlines key computational procedures and provides a workable foundation upon which researchers can conduct scientific inference and statistical analysis with their own data."

•Kenneth H. Reckhow, Professor Emeritus, Duke University "Statistics is a science to interpret, model, and explain variation. It provides us with a strategy to evaluate potential models rather than a rule to

specify a specific statistical model as most people expected. However, most of the time, the importance of model evaluation is largely underestimated in the training of students. Most students, like mine, are taught about statistics in a classical way. They are impressed but somehow intimidated by some technical terms like significance and power effect, thus becoming afraid of applying statistics to real data and questions. This book gives us a new way to teach statistics to biological and ecological students at research level. This book not only teaches us about statistical methodology but also philosophy and strategy in applied statistics. With the modification of chapters 1 to 10, with the addition of a new chapter, this edition features a stronger emphasis on model evaluation compared to that of the previous edition."

•Prof. Bo-Ping Han, Department of Ecology, Jinan University Praise for the First Edition: "...Overall, I liked the book. I expect that I will be pulling examples from it when I teach methods courses to students in the sciences. It does contain many interesting and intriguing examples, and good examples of R code. So I can and do recommend it as a helpful resource"

•Jane L. Harvill, *The American Statistician*, November 2011

"Qian effectively blends fundamentals of scientific methods with statistical thinking, modeling, computing, and inference. The text is well formatted with liberal use of illustrative portions of R code. It is clear that Qian has taken great care in developing this book and has succeeded in meeting his stated purpose. The book reflects Qian's insights into teaching environmental and ecological modeling developed over many years in applied statistics and as an educator in applied sciences"

•Biometrics, June 2011 "This book gives a data-oriented introduction to statistical modeling of environmental and ecological phenomena. It is a beautiful scientific guideline for a computer-based model building and evaluation process. This introductory book gives a diversified overview of modern applied statistics while always following an inductive, data-based approach...Meaningful graphics and R code/output embedded in the text support the conclusions drawn and facilitate the application to own data sets. Students and researchers of environmental sciences with basic knowledge in statistics will find this book valuable as both a work of reference and an introductory guide to statistical modeling with R"

•Sebastian Engelke and Martin Schlather, *Biometrical Journal*, 2011

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