

# Preface

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This is to my knowledge the first book in systems ecology with the features of a textbook: illustrations, exercises, summaries, and emphasis on the most important statements. The reason is probably that there are several useful theoretical angles to systems ecology or ecosystem theories: the thermodynamics, the hierarchical organization, the network theory, and biochemistry or ecological stoichiometry, and it is difficult to integrate these theories into one holistic theory. I hope that it has been possible for me with *Fundamentals of Systems Ecology* to make a useful first attempt, but I would like to encourage the readers to give me feedback, because it would make it possible to make a better and improved second edition in a few years. Please, send me an e-mail if you have good ideas about what is missing, what could be presented and organized more clearly, and how the book generally could be improved. My e-mail address is msijapan@hotmail.com.

Systems ecology is used more and more in a number of ecological disciplines. We use it in ecological modeling, because you cannot model a system if you do not know the properties and the reactions of the system. We use it in ecological engineering, because you cannot engineer a system unless you know the system. We use it to choose ecological indicators, because selection of the best ecological indicators for the health assessment of an ecosystem requires, of course, that we know the system and its properties and possible shortcomings. We use systems ecology generally in ecological and environmental management, because ecosystem management requires that we know the reactions of the ecosystems to changed impacts. Therefore, there is an obvious need for a textbook in systems ecology that can be used as a general frame of reference in ecological disciplines.

Systems ecology has four main aspects: thermodynamics, hierarchical organization, network theory, and biochemistry. The textbook is built on all four combined with a holistic systems approach that attempts to understand the system and not go into the details that are integrated in the system. The last chapter of the book is devoted to the applications of systems ecology in the above-mentioned ecological disciplines, and it is my hope that it will inspire more ecologists to apply systems ecology more widely in the future. Only by application of the ecosystem theory in many different contexts will it be possible to improve systems ecology in the future. Two of my scientific friends have expressed their interest to translate the textbook into Chinese and Russian. It would be very beneficial for

systems ecology, because it would allow many more researchers and managers to contribute to the progress of systems ecology and to the general application of ecology to understand nature and to make a better environmental management.

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