

## An Approach for Multilayered Ecological Networks

**Authors :** N. F. F. Ebecken, G. C. Pereira

**Abstract :** Although networks provide a powerful approach to the study of a wide variety of ecological systems, their formulation usually does not include various types of interactions, interactions that vary in space and time, and interconnected systems such as networks. The emerging field of 'multilayer networks' provides a natural framework for extending ecological systems analysis to include these multiple layers of complexity as it specifically allows for differentiation and modeling of intralayer and interlayer connectivity. The structure provides a set of concepts and tools that can be adapted and applied to the ecology, facilitating research in high dimensionality, heterogeneous systems in nature. Here, ecological multilayer networks are formally defined based on a review of prior and related approaches, illustrates their application and potential with existing data analyzes, and discusses limitations, challenges, and future applications. The integration of multilayer network theory into ecology offers a largely untapped potential to further address ecological complexity, to finally provide new theoretical and empirical insights into the architecture and dynamics of ecological systems.

**Keywords :** ecological networks, multilayered networks, sea ecology, Brazilian Coastal Area

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