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Title:
Food-web assessment models to support integrated ecosystem assessment
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Abstract:
One aim of integrated ecosystem assessments (IEA) is to describe the current state and historical changes in food-web structure and trophic interactions. Unlike fish stock assessments in which stock dynamics models play a central role in reconstructing past dynamics, there is little tradition of using food-web models to reconstruct past changes in food-web structure and interactions. A major challenge for the development of food-web assessment models is the scarcity of data available to document changes in biomass of many trophic groups (e.g. benthic infauna, gelatinous zooplankton, etc.) and the difficulty to reliably measure trophic flows. This leads to a situation in which food-web representations are complex (many trophic groups and links) but the data to document their dynamics are scarce. We introduce a food-web dynamics modelling approach based on 'Chance and Necessity' (CaN) that can accommodate such type of situation. The method can be applied even if data on several trophic groups are uncertain or unavailable. Explicit consideration of input and output uncertainties is central to this modelling approach. Modelling principles, underlying assumptions and input data are presented in a transparent way making this approach suitable for participatory modelling, i.e. modelling jointly conducted by expert modellers, expert marine ecologists and end-users.

Keywords: linear inverse modelling, trophic interactions, ecosystem-based fisheries management, food-web dynamics

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