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A response to the challenge of including the human dimension in integrated ecosystem assessment – Baltic salmon and clupeid examples

Päivi Haapasaari, Laura Uusitalo, Lena Bergström, Outi Heikinheimo, Heikki Peltonen, Atso Romakkaniemi

Ecosystem-based management requires an understanding of interrelationships within an ecosystem as well as between the ecosystem and society. Assessment models that can address a wide range of biological and human aspects, however, need to be developed. We created two conceptual causal models to map factors to be accounted for in the ecosystem-based management of Baltic salmon (model 1) and clupeid species i.e. Baltic herring and sprat (model 2). These species are widely distributed in the Baltic Sea and interact with elements of the marine ecosystem and the social system. The models depict 1) the structure of the food web relevant for the target species, 2) the key community level and population traits that contribute to the state of the species, 3) main pressures affecting the food web and their effects on the species, 4) key management measures, and 5) benefits that the species can produce for society. The models highlight the potential of ecosystem-based governance in managing pressures and in enhancing the well-being of a social-ecological system. The approach shows how social indicators can be used in parallel with biological indicators in an integrated assessment framework and illustrates their importance for evaluating the success of management. The case studies serve as a problem framing for developing quantitative integrated assessment models and for considering data availability and requirements. In the following steps, the salmon model and the clupeid model could also be integrated to provide an even more holistic social-ecological assessment surrounding these species.

Keywords: Causal relationship, Conceptual model, Food web, Social-ecological system, Social indicators

Contact author: Päivi Haapasaari, Fisheries and Environmental Management Group (FEM), Department of Environmental Sciences, University of Helsinki, Viikinkaari 2, PO Box 65, FIN-00014 Helsinki, Finland, Phone: +358 44 5351319, email: paivi.haapasaari@helsinki.fi