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Clear recognition of uncertainty is lacking in scientific advice for policymakers



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Sustainable management of complex ecosystems requires clear understanding of uncertainty. However, scientific guidance documents show a lack of clarity and coherence regarding uncertainties and tend to focus solely on the need for more data or monitoring, new research indicates. The researchers suggest that scientific guidance should recognise uncertainty as an inherent part of any complex ecosystem.

Ecosystem-based management is now advocated as an effective method for achieving sustainability. However, this holistic approach encompasses a vast array of different socio-economic and ecological factors, their interactions and the associated uncertainties. Unfortunately, there has been little research into how scientific advice for policymakers incorporates uncertainty, or what the best practices may be.

In this study, conducted under the EU BaltGene project¹, researchers use the management of the Baltic [Sea](#) as a case study. The study's authors focused on how uncertainties are dealt with in scientific advice regarding five key environmental issues affecting the Sea: eutrophication (the effects of nutrient pollution such as toxic algal blooms), fisheries, invasive species, chemical pollution and oil spills.

They used qualitative analysis to identify themes, biases and meanings from a wide array of documents providing scientific advice on environmental management of the Baltic Sea. These were published by HELCOM, the governing body of the Helsinki Convention regarding environmental issues in the Baltic, and the International Council for the Exploration of the Sea (ICES).

The results showed that although most documents mentioned uncertainty in some form, there was a lack of clarity and coherence and only a few contained a special section to deal with the issue of uncertainty. The lack of a coherent strategy to communicate uncertainty between advisory bodies was also evident. ICES documents generally did identify uncertainties and comment on strategies to deal with them; however, this was generally not the case for HELCOM documents.

Most of the documents examined focused on uncertainties related to lack of knowledge, for example, as a result of low availability of data. Other forms of uncertainty, however, were neglected. These included the inherent unpredictability of some natural processes and the uncertainties that arise as a result of complex ecosystem interactions, such as the differing effects of a single pollutant and those of a mixture.

Researchers also examined the strategies that were suggested for dealing with uncertainty. Most documents focused on 'reducing' strategies, highlighting the need for more data or continued monitoring. Many documents also used 'control' strategies, for example, where mathematical confidence intervals are used to qualify estimates. A 'coping' strategy, where uncertainties are recognised as an inherent part of an ecosystem and are included as important information, rather than a nuisance factor, was very rarely used.

The focus on lack of knowledge and strategies that regard uncertainty as simply a problem to be reduced, risks underestimating the complexity and diversity of uncertainties, the researchers conclude. They advocate using holistic strategies where uncertainties are characterised and examined and they also stress that clear communication is needed to ensure that uncertainties are recognised and incorporated into policy.

