

What are the limitations and challenges of implementing ecosystem-based management?

The implementation of ecosystem-based management (EBM) ([see Introducing EBM](#)) is a social and political challenge rather than merely a technical one. To successfully apply EBM, several barriers need to be overcome: a lack of cooperation between institutions not used to working together; the focus on recognised, traditional, technical measures; the use of models that do not consider ecosystem dynamics and future uncertainties; planning processes prone to managing crises or opportunities rather than anticipating; and piecemeal approaches that hinder the effective advance towards a more integrative and holistic framework. Crucially, ecosystem-based management depends on coordination between sectors and the relevant policy institutions, which is a challenge when those policy units lack political leverage and are each responsible for complying with an individual EU Directive. These limitations of current practice and the need to adjust existing governance frameworks to the requirements of innovative EBM approaches was a challenge identified in all AQUACROSS [case studies](#).

Implementing EBM involves applying an integrated approach. However, considering the whole social-ecological system is a complex and potentially time-consuming task, which includes **risks of inaction from overwhelming complexity**.

The possibility for carrying out an integrated assessment depends on the **availability and type of data** to be used in the analysis. **Gaps in data** availability pose challenges, for example, when making a homogenous assessment of human pressure across aquatic realms, or when evaluating the current state of an ecosystem and its deficits compared to agreed policy objectives (in the precision and resolution of indicators) ([D4.2](#)).

Evidence from the work in the AQUACROSS case studies shows that methodological limitations exist for predicting changes in the ecological system induced by the management measures. These changes, however, and the changes in the provision of ecosystem services that are linked to it, are necessary for assessing benefits and evaluating management. Mapping ecosystem services for fresh and marine water ecosystems is complex, especially in comparison to the simpler case on land.

In some AQUACROSS case studies (e.g. see [Case Study: Ria de Aveiro, Portugal](#), and [Case Study: Azores](#)), data availability did not allow for clear-cut statements on the expected performance of EBM approaches compared to currently applied and planned management approaches. However, even in these cases, reflecting on potential consequences of measures, bringing in more (even if imperfect) information, clearly identifying uncertainties, etc. still turned out to be very useful in the process of improving management, as it allows stakeholders to take more informed decisions.

Accounting for ecosystem services is the first step for balancing costs and benefits between different societal groups. The costs of new management measures often fall disproportionately on those imposing the pressures today, whereas other groups of the population would benefit from the improvements in the environment. A key focus of the Azores case study ([see Case Study: Azores](#)) has been to decrease conflicts between different stakeholders, by involving them in the process of elaborating the EBM plan. The question of who will finance conservation measures has been identified as a main issue with regards to equity and fairness.

The AQUACROSS Linkage Framework ([see Linkage Framework](#)) identifies potential impacts on ecosystem services, but does not enable the quantification of these potential impacts. Also, modelling did not allow predicting how all ecosystem services are affected by the introduction of measures. While estimates can be made more easily for provisioning ecosystem services (e.g. water, food, raw materials), which are often traded in markets and for which extracted quantities are usually known, making reliable assumptions for regulating or maintenance services, for example, is much more difficult. In fact, there are major information gaps regarding ecosystem services that are not traded in markets, particularly regulating, cultural, and supporting services (Millennium Ecosystem Assessment, 2005). However, it is this change in ESS provision – together with estimates of the financial costs of measures – which is the basis for a proper evaluation of efficiency. These methodological limits explain why evaluations linked to impacts on ecosystem service provision remain qualitative in the AQUACROSS case studies – or are addressed together with stakeholders (see for example [Case Study: Lough Erne](#) or [Case Study: Ria de Aveiro, Portugal](#)) (D8.2) .

The results of the work undertaken within AQUACROSS case studies seem to highlight that the failure to meet the Biodiversity Strategy objectives is to a great extent due to the lack of knowledge and limitations around assessment tools employed to inform policy choices on ecosystem restoration options. There is a real need for change in the way policy decisions are informed and institutions organised to make these changes happen. To inform biodiversity protection choices we need to understand how ecological systems work and interact with humans. Only from the understanding of how nature organises itself, will we be able to design effective policy/restoration action that will bring real ecological benefits. In a second step, if public policy really seeks to achieve efficiency across the board, the right analytical instruments need to be developed in order to come up with reliable advice (D8.2). Ecosystem-based management provides an integrated decision-making framework that, despite the limitations identified, enables changes in the way policy decisions are made to better protect aquatic biodiversity.

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Further information

This is one of 38 short briefs summarising the key results of the AQUACROSS Project. For more detailed information on the topics covered in this brief, see the following:

- [Identifying ecosystem-based management measures and policies: taking action, Introducing EBM, Evaluating ecosystem-based management options, Pre-conditions for "making EBM happen](#)
- Costea et al. (2018) Assessment of drivers and pressures in the case studies. Deliverable 4.2, European Union's Horizon 2020 Framework Programme for Research and Innovation grant agreement No. 642317. ([Deliverable](#) and [Executive Summary](#))
- DeFries, Ruth, and Harini Nagendra. 2017. Ecosystem management as a wicked problem. [Science 356: 265-270](#).
- Mattheiß et al. (2018) Evaluation of Ecosystem-Based Management Responses in Case Studies. Deliverable 8.2, European Union's Horizon 2020 Framework Programme for Research and Innovation grant agreement No. 642317. ([Deliverable](#) and [Executive Summary](#))



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