aquacross

3

Introducing Ecosystem-based Management

WHAT MAKES EBM SO RELEVANT FOR THE PROTECTION OF AQUATIC BIODIVERSITY?

To support the achievement of the objectives of the EU 2020 Biodiversity Strategy for aquatic ecosystems, strong policy integration in terms of objectives, knowledge base, methods and tools, and engagement and exchange, is essential. The integrative nature of EBM is perfect for supporting such an integration exercise.

ECOSYSTEM-BASED MANAGEMENT OF AQUATIC ECOSYSTEMS

What is ecosystem-based management?

Any management or policy options intended to restore, enhance or protect the resilience of the ecosystem

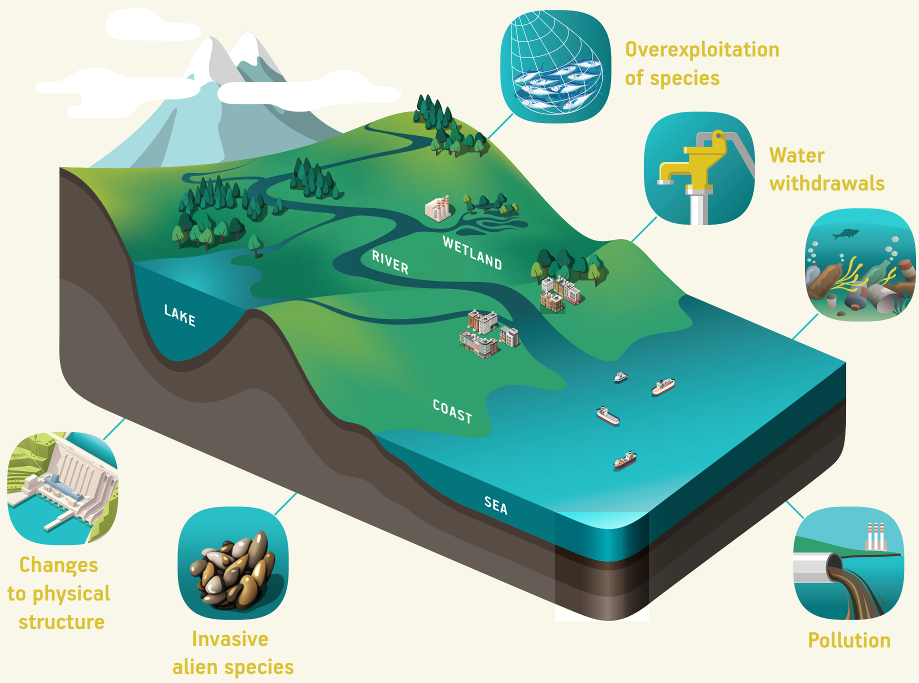
Ecosystem-based management helps to

protect aquatic biodiversity and the benefits that people receive from aquatic ecosystems. It involves tackling the threats facing aquatic ecosystems in an integrated way throughout the entire water system from source to sea.

Ecosystem-based management

tackles many threats to aquatic ecosystems from source to sea

aquacross



Benefits of ecosystem-based management

- Increased benefits for human wellbeing from ecosystems
- Improved ability of ecosystems to stay within environmental limits
- Increased ability to adapt to change
- Improved management of uncertainty
- Increased ability to meet multiple policy objectives

WHAT MAKES EBM DIFFERENT TO OTHER APPROACHES?

Ecosystem-based Management builds on six components that reach far beyond traditional management approaches (see table).

1 EBM considers ecological integrity, biodiversity, resilience and ecosystem services	• joint value of all ecosystem services • protects the integrity of the ecosystem as a means to preserve ecosystem services and biodiversity • focus on multiple benefits or ecosystem services
2 EMB is carried out at appropriate spatial scales	• taking into account ecosystem boundaries
3 EBM develops and uses multi-disciplinary knowledge	• understanding of the ecological and social systems to be managed
4 EBM builds on social-ecological interactions, stakeholder participation and transparency	• balance ecological and social concerns • prominence to transparent and inclusive descision making • advance collective action by building consensus on a shared vision for the future (e.g. the array of ecosystem services to be preserved)
5 EBM supports policy coordination	• break silos and create new opportunities of pursuing different policy objectives simultaneously
6 EBM incorporates adaptive management	• ability to respond to a range of possible future scenarios

Aquacross case studies

WHAT DOES ECOSYSTEM-BASED MANAGEMENT INVOLVE?

It is carried out at appropriate **spatial scales**

EXAMPLE: RIVERS OF THE SWISS PLATEAU
Ecological assessment was extended to the catchment scale to support the identification of optimal restoration measures

EXAMPLE: RIA DE AVEIRO, PORTUGAL
A planning process is co-developed across the river, coastal and marine area to avoid unintended consequences of management measures

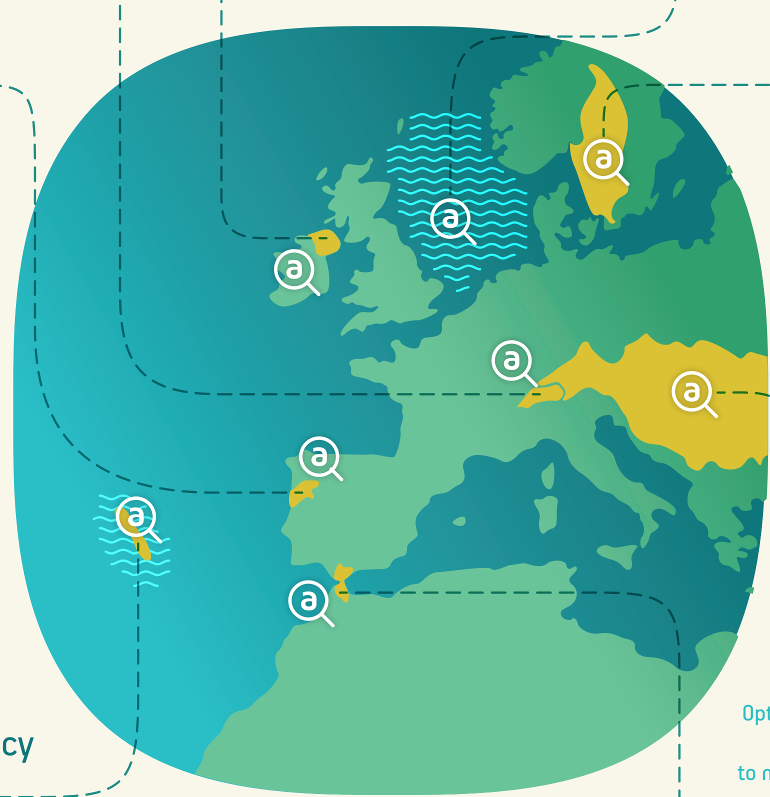
It uses **adaptive management** to handle uncertainty in how ecosystems respond to management measures

EXAMPLE: LOUGH ERNE, NORTHERN IRELAND
Considers raising water levels in the lake alongside farm best management practices to manage long-term impact of invasive alien species

It develops and uses **multi-disciplinary** knowledge

EXAMPLE: NORTH SEA
A risk-based approach was used to compare management measures that reduced risks to biodiversity while achieving other societal goals

EXAMPLE: LAKE RINGSJÖN, SWEDEN
Social and ecological dynamics were modelled to understand the lake's responses to restoration measures



It builds on **social-ecological** interactions, stakeholder participation and transparency

EXAMPLE: MARINE PROTECTED AREA, AZORES
Stakeholders identified shared objectives: long-term sustainability, monitoring and compliance with legislation, participatory and holistic management

It supports **policy** coordination

EXAMPLE: DANUBE RIVER
Optimal sites were identified for ecological restoration to meet objectives of several policies including the Water Framework Directive and the Biodiversity Strategy

It considers **ecological integrity**, biodiversity, resilience and ecosystem services

EXAMPLE: INTERCONTINENTAL BIOSPHERE OF THE MEDITERRANEAN (SPAIN-MOROCCO)
Biodiversity and ecosystem services were modelled across the region to design a network of green and blue infrastructure

aquacross

Sources: Rouillard et al., 2017; www.aquacross.eu/casestudies

GLOSSARY OF KEY TERMS

For a more detailed glossary see D3.1 and D3.2

Term	Straightforward definition	More info?
Biodiversity = Biological Diversity	means the variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (Convention on Biological Diversity, article 2). Biological diversity is often understood at four levels: genetic diversity, species diversity, functional diversity, and ecosystem diversity.	**D5.1 and D5.2**
Ecosystem Process	is a physical, chemical or biological action or event that links organisms and their environment. Ecosystem processes include, among others, bioturbation, photosynthesis, nitrification, nitrogen fixation, respiration, productivity, vegetation succession.	**D5.1 and D5.2**
Ecosystem Function	the biological, geochemical and physical processes and components that take place or occur within an ecosystem. Ecosystem functions include decomposition, production, nutrient cycling, and fluxes of nutrients and energy.	**D5.1 and D5.2**
Resilience	refers to the capacity of a system to deal with changes and continue to naturally evolve. The term is related to the overall health of the ecosystem in terms of the amount of damage it can hold and still maintain the same structure and functions. In AQUACROSS, this refers to the capacity of the socialecological systems to co-produce the ecosystem services and abiotic outputs that would be demanded by society in the long term.	**D3.1 and D3.2 Case Study 6**
Adaptability	is the capacity of actors in the system to manage change so as to maintain the system within sustainability boundaries. One critical objective of policy actions within AQUACROSS consists of enhancing the robustness of the system, meaning its capacity to absorb shocks and adapt to circumstances that are not completely predictable in advance.	**D3.1 and D3.2**
Transformability	is the capacity to create a new system when, due to pressures, the current system can no longer survive. Transformability addresses active steps that can be adopted to change the system to a different, potentially more desirable, state. It includes actions to identify potential future options and pathways to get to the new state.	**D3.1 and D3.2**
Pressure	means direct and indirect transformation of the ecosystem structure. It includes, for instance, water abstractions, diversion, impoundment, pollution, land use, soil transformation, alterations of nutrient and sediment balances.	**D4.1 and D4.2**
Indicator	refers to a variable that provides aggregated information on certain phenomena, acting as a communication tool that facilitates a simplification of a complex process. It relates to the component or process responsive to changes in a system of interest, but does not possess a measurable dimension, and therefore it is not an operational tool in itself.	**D5.1 and D5.2**

← Go to Brief #2: Current biodiversity management: Issues

www.aquacross.eu/results

Go to Brief #4: Mobilising stakeholders →

Further information

This is one of 38 short briefs summarising the key results of the AQUACROSS Project.

AQUACROSS has received funding from the European Union's Horizon 2020 Programme for Research, Technological Development and Demonstration under Grant Agreement no. 642317.