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Integrated management of the aquatic continuum supported by causalities between biodiversity, ecosystem functions and services

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Abstract

Biodiversity (BD) and the ecological processes that ensure crucial ecosystem functions (EF) enable the supply of ecosystem services (ESS). The flows between these key elements need to be characterized, and ideally also quantified, to understand the causal links between biodiversity, ecosystem functions and services. These are central themes for evaluating the supply-side of the socio-ecological systems by the Assessment Framework proposed in the AQUACROSS Project. The current knowledge on BD-EF-ESS causal relationships will be reviewed and the concept applied to eight case studies across different types of aquatic ecosystems in Europe: from lakes, to rivers, wetlands, estuaries, coastal and marine ecosystems.

The supply of ecosystem services, i.e. the potential or capacity of the ecosystem to supply services, is directly linked to the ecological system while the demand of ecosystem services, i.e. whether and how the service is actually used, is the entry point to the socio-economic system (see Fig. 1).

For example, from the **supply side**, an assessment could be made of the capacity of the system to supply 'Seafood' and would include the biomass of all fish and invertebrate species that can potentially be used for 'Nutrition' (i.e. the stocks). From a **demand side**, the flow of the 'Seafood' service to society would be the individuals that are actually taken (i.e. the catch). In this sense, a change in ecosystem state and biodiversity can lead to a change in the supply of services but not necessarily change the demand on the service.

AQUACROSS research is looking at the **mechanisms** by which biodiversity sustains functional ecosystems, and how healthy ecosystems ensure regulating services, provisioning services and cultural services. This **complex network of relationships** between BD components, multiple EF and a myriad of ESS will be explored, in addition to the assessment of "impact-pathways" from multiple activities on biodiversity.

This work will be implemented in eight case studies, two of them in Portugal, the Ria de Aveiro coastal lagoon (see Fig. 2) and the Canal Pico-Faial in the Azores.

Conclusion

AQUACROSS research dwells in the frontier between ecosystem capacity and society needs to support sustainable use of natural resources and promote integrated management of aquatic ecosystems.

References

Gómez et al. (2016) Developing the AQUACROSS Assessment Framework. Deliverable 3.2, AQUACROSS, European Union's Horizon 2020 Framework Programme for Research and Innovation Grant Agreement No. 642317.

Nogueira et al. (2016). Guidance on methods and tools for the assessment of causal flow indicators between biodiversity, ecosystem functions and ecosystem services in the aquatic environment. Deliverable 5.1, European Union's Horizon 2020 Framework Programme for Research and Innovation Grant Agreement No. 642317.

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Supply perspective

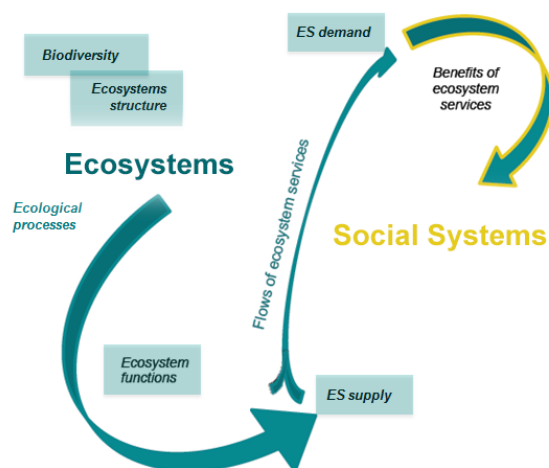


Fig 1 / The supply-side of the socio-ecological systems in the AQUACROSS Framework (adapted from Gómez et al., 2016).

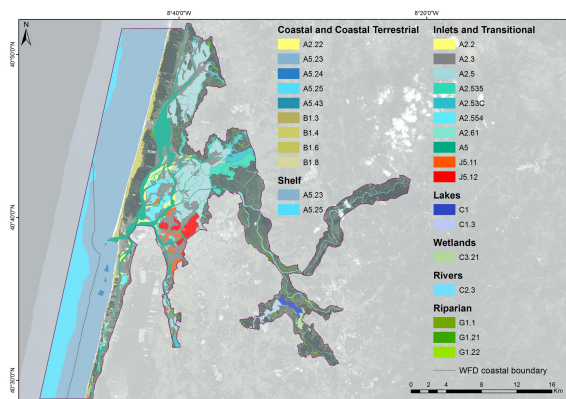


Fig 2 / Aveiro Natura 2000 continuum (AQUACROSS case study 5).