AQUACROSS Case Study 5: Improving integrated management of Natura 2000 sites in the Ria de Aveiro Natura 2000 site, from catchment to coast, Portugal

Summary for Local Stakeholders

The interdisciplinary research project AQUACROSS[1] supports European efforts to protect biodiversity in Europe's lakes, rivers, coasts and oceans. These aquatic ecosystems provide numerous economic and societal benefits to Europe – but they are at risk of irreversible damage from human activities. To counter this and to support achievement of the EU Biodiversity Strategy to 2020 targets, AQUACROSS has developed practical guidance on identifying threats to biodiversity, understanding links between ecosystems and the services they provide, data management, modelling and scenario development, and policy analysis, which fit together as parts of the integrated AQUACROSS Assessment Framework for ecosystem-based management of aquatic ecosystems[2]. We have developed, tested, and applied this research in eight case studies across Europe to solve local biodiversity challenges. This brief summarises our work in **Case Study 5: Ria de Aveiro Natura 2000 site**, and makes recommendations for local policy.

Figure 1: The freshwater-marine Natura 2000 continuum (Credit: UAVR team)

Mitigating negative unintended impacts on biodiversity in a Natura 2000 freshwater-marine continuum

The selected Natura 2000 area is located in the Portuguese Atlantic coast. It comprises three water domains: freshwater, transitional and coastal/marine waters. The geographic location combined with its natural capital enables a variety of economic, cultural and recreational activities. The region is subject to a complex variety of land and water uses and potential conflicts, and a number of anthropogenic pressures that impact the hydro-morphological conditions of the Ria de Aveiro lagoon and the adjacent freshwater section of the Vouga River, the Baixo Vouga Lagunar. The region is also vulnerable to ocean storm surges, coastal erosion and flood events, meaning that it often requires human intervention for protection or to enable economic activities. In 2018/2019, two management interventions will be implemented: a dredging programme to enable hydrodynamic equilibrium and navigability in the lagoon, and the extension of a floodbank to disable surface saltwater intrusion into Baixo Vouga Lagunar agricultural area. The measures were under public consultation in accordance with the provisions of Portuguese law, financing is already available, and they have passed institutional fitness check. Our aim is to elaborate on the co-development of the Ecosystem-Based Management (EBM) planning process across the three water domains, all characterised by high biodiversity and by a wide range of services provided by ecosystems and their abiotic components, to mitigate unintended impacts from the management interventions under implementation.

[1] AQUACROSS (Knowledge, Assessment, and Management for AQUAtic Biodiversity and Ecosystem Services aCROSS EU policies), 2015-2018, has received funding from the European Union's Horizon 2020 Programme for Research, Technological Development and Demonstration under Grant Agreement no. 642317. More information: aquacross.eu
[2] All AQUACROSS guidance and outputs are freely available online at https://aquacross.eu/outputs

Step one: identify policy objectives, synergies, and gaps

We assessed EU water-related and nature Directives. Natura 2000 network sites should be "*managed in a sustainable manner, both ecologically and economically*", involving local policy-makers and stakeholders, but we identified priorities for improvement:

- **Monitor**: harmonisation of Water Framework and Habitats Directive monitoring programmes in water-dependent Natura 2000 sites to optimise the effort and outputs;
- **Management plan:** development of the Vouga estuary land use and management plan that aims to conserve and promote sustainable use of water resources, ecosystem functions, integrated management and coordination between various territorial management instruments;
- **Integrated management:** enhance communication between entities.

Local stakeholders and AQUACROSS: Co-creating solutions

Figure 2: Participatory workshops (Credit: UAVR team)

Stakeholders were engaged at different steps, contributing data, information, and perceptions to define the baseline and the management scenarios that were attained through: i) model-based scenarios built on causal links and habitat risk assessments (AQUACROSS AquaLinks tool); ii) stakeholders' perceptions regarding the present status and future trends; and iii) modelling the spatial multicriteria analysis results that were attained by stakeholders' valuation of ecosystem services. Stakeholders' active participation included two workshops:

Stakeholder workshop 1 – Estarreja – 27th of April, 2018 – detailed report available at http://dataportal.aquacross.eu/

Stakeholder workshop 2 – Ílhavo – 20th of September, 2018 – detailed report available at http://dataportal.aquacross.eu/

Step two: understand stakeholder objectives

Stakeholders representing different sectoral interests or activities – including policy/governance, public administration, business, non-governmental organization, citizens and other stakeholder with environmental sciences background – share several key objectives, namely:

- Foster **sustainable development** of economic activities and preservation of aquatic biodiversity
- **Integrate territorial management instruments**
- **Enhance participatory management**
- **Co-create adaptive management solutions**

Step three: understand the social-ecological system

To understand the impact of the floodbank and dredging in the Ria de Aveiro, we identified key human activities, resulting pressures, habitats, and how these support valuable ecosystem services, and interlinkages. We paid special attention to assessing ecosystem service risk and stakeholder values.

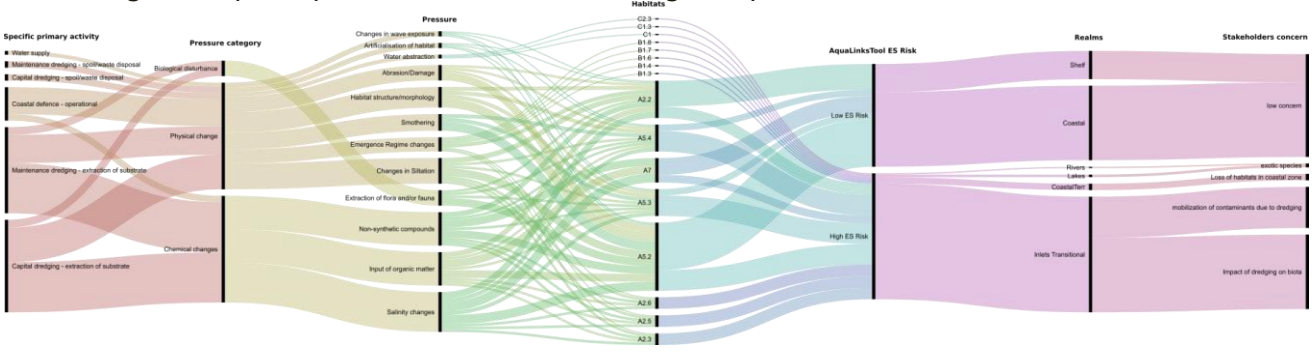

Figure 3 – Linkage framework: linking Drivers-Pressures-Ecosystem Component-Ecosystem Services Risk Assessment (using AquaLinksTool) and major concerns identified by stakeholders.

Step 4: Specification of relevant EBM solutions

Although the extension of the floodbank and the dredging activities are acknowledged as important to enable shipping and agriculture, concerns remain, namely the impact of dredging on seagrasses, saltmarshes and juvenile fauna due to changes in the ecosystem eco-hydrology.

Overall policy instruments applicable to water-dependent Natura 2000 sites

- **Harmonised WFD and HD monitoring programmes** across freshwater, coastal and marine/coastal environments with water continuum shared data bases; foster coordination with other policies.

Case study specific policy plans and programmes

- **Restoration of tidal wetlands, namely saltmarshes and seagrasses**
- **Development of the Vouga estuary management plan**
- **Engage local users and landowners in the restoration actions**
- **Promote the value of ecosystems services provided by tidal wetlands**

Overall, we concluded that Stakeholders' sectoral activities (including public and private sectors), or spheres of interest (including direct and indirect users) generate conflicting interests that need to be considered in the context of co-creation of adaptive management solutions. These should also consider better coordination between policies crossing freshwater, coastal and marine environments.

Step 5: Evaluate the EBM solutions

Stakeholders evaluated our mapping and ecosystem indicator results and proposed EBM solutions and discussed the benefits and constraints regarding implementation. They concluded that responses should be framed in the Sectoral Plan for Natura 2000 Network, which is the territorial management tool for the implementation of the national policy for the conservation of biological diversity, and should consider climate change projections and the National Strategic Plan for Climate Change adaptation.

Conclusions and next steps

The EBM plan is foreseen to support the development of the Vouga estuary management plan, as well as actions for a more comprehensive understanding of the social-economic implications of ecosystem services provided by aquatic habitats.

Local EBM solutions: stakeholder evaluation and feedback

1. Overall, the environment and biodiversity will be the main beneficiaries from tidal wetlands restoration.
2. Some economic activities related to fisheries and ecotourism, which has a recognised potential, might benefit.
3. Restoration actions need to ensure the involvement of users due to conflicting activities and landowners, as most of the area is private property.
4. Large interventions should include financing for the implementation of the corresponding minimising measures.
5. Need for post-licensing supervision to ensure compliance with environmental protection obligations.
6. Need for clear communication between institutions and enforcement of existing regulations.
7. Reinforcement of integrated management and development Vouga estuary management plan.

Final local policy recommendations

- **Continue to increase stakeholder participation:** stakeholders want to contribute to management and actively participate in the co-creation of adaptive management solutions.
- **Integrate and coordinate policies:** proceed with the development of the Vouga estuary management plan considering connectivity cross water domains, landowners and users.
- **Adaptive management and unintended impacts:** Harmonise Water Framework and Habitats Directive monitoring programmes to support regular evaluation and enable adaptive management involving stakeholders to respond future management needs and challenges.