



BOOK OF ABSTRACT

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I. SESSION DESCRIPTION

ID: T2a

Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

Hosts:

| | Title | Name | Organisation |
|-----------------|-------|----------------|--|
| Host: | Dr. | Manuel Lago | Ecologic Institute (Berlin, Germany) and coordinator of H2020 project AQUACROSS (www.aquacross.eu) |
| Co-host: | Dr | Ana I. Lillebø | |

Abstract:

The proposed session will seek to advance the application of ecosystem-based management for aquatic ecosystems (freshwater, coastal and marine) in an effort to support the timely achievement of the EU 2020 Biodiversity Strategy and other international conservation targets in an integrative manner. These are the objectives of the H2020 project AQUACROSS (www.aquacross.eu), which concludes at the end of 2018. In this regard, the session will aim to showcase some results of the project. Specifically, its policy applications and conceptual elements will be presented using a concrete example of the project's case studies. Results from the Aveiro case study will be discussed with session participants.



Goals and objectives of the session:

Two main objectives: 1) communicating AQUACROSS results to ESS practitioners: Organisation of a session to showcase the conceptual work developed in AQUACROSS with example applications from case studies; and 2) discuss results and get feedback for the project’s late deliverables.

Planned output / Deliverables:

Discussions from the session will be reported in the AQUACROSS website and through dedicated tweets from the project’s account. In addition, discussions with session participants will inform the development of the following project’s deliverables:

D3.3 Cookbook for the evaluation of EBM

D2.3 Policy guidance for aquatic ecosystem based management

The conference and session participants will be acknowledged in both reports.

Related to ESP Working Group/National Network:

[Thematic Working Groups: T2 – Biodiversity & Ecosystem services](#)

II. SESSION PROGRAM

Date of session: Tuesday, 16 October 2018

Time of session: 14:30 – 18:00

Timetable speakers

| Time | First name | Surname | Organization | Title of presentation |
|-------------|-------------------|------------|---|---|
| 14:30–14:40 | Manuel | Lago | AQUACROSS project coordinator and Ecologic Institute (Berlin) | Introducing the AQUACROSS project: Knowledge, Assessment, and Management for AQUatic Biodiversity and Ecosystem Services aCROSS EU policies |
| 14:40–15:00 | Gonzalo Carlos | Delacamara | IMDEA–Water (Madrid) | Assessing the water–biodiversity nexus – integrating natural and social sciences: An |



| Time | First name | Surname | Organization | Title of presentation |
|--------------|------------|----------|--|--|
| | Mario | Gomez | | assessment framework for the complex and adaptive dynamics of social-ecological aquatic systems |
| 15:00-15:30 | Antonio | Nogueira | University of Aveiro (Portugal) | AquaLinksTool – a versatile tool to address causal links involving activities, pressures, biodiversity, ecosystem functions and services in aquatic ecosystems |
| 15:30-16:00 | Ana I. | Lillebø | University of Aveiro (Portugal) | Improving ecosystem-based management of Natura 2000 sites in the Vouga River, from catchment to coast, Portugal |
| 16:30-16:50 | Javier | Martinez | Basque Centre for Climate Change (BC3) | Participatory integrated management options using modelling tools |
| | Heliana | Teixeira | University of Aveiro (Portugal) | |
| 16:50 -17:10 | Simone D. | Langhans | University of Otago | Eight research areas that could foster the uptake of ecosystem-based management in fresh waters, if combined |
| 17:10-17:20 | Manuel | Lago | AQUACROSS project coordinator and Ecologic Institute | AQUACROSS: Introducing key policy messages and research highlights |



| Time | First name | Surname | Organization | Title of presentation |
|-------------|---|---------|--------------|-----------------------|
| (Berlin) | | | | |
| 17:20–18:00 | Panel discussion with the audience (moderated by Manuel Lago) | | | |

III. ABSTRACTS

The abstracts appear in alphabetic order based on the last name of the first author. The first author is the presenting author unless indicated otherwise.

1. Type of submission: **Invited speaker abstract**

T. Thematic Working Group sessions: T2a – Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

Participatory integrated management of habitats and ecosystem services in the Aveiro lagoon

First author(s): Javier Martínez-López, Heliana Teixeira

Other author(s): Heliana Teixeira, Mariana Morgado, Maria Almagro, Ana I Sousa, Ferdinando Villa, Stefano Balbi, Ana Genua, Antonio J A Nogueira, Ana Lillebø

Affiliation, country: Basque Centre for Climate Change – BC3BC3 Basque Centre for Climate Change, Dep. Biología & CESAM – Universidade de Aveiro, Spain

The phenomenon of ‘coastal squeeze’, by which the extent and functioning of saltmarshes and other coastal habitats is reduced over time, is increasingly becoming the focus of many management programmes in coastal ecosystems. The Baixo Vouga Lagunar (BVL) is part of Ria de Aveiro coastal lagoon in Portugal, which is classified as a Special Protection Area under the European Habitats and Birds Directives. This system is also very important culturally and socioeconomically for the local communities, taking place several human activities, such as agriculture. To prevent the entry of saline water from the Ria de Aveiro during high tide periods, a flood bank was built in the 90’s. In the following years, a program of soil and vegetation monitoring was carried out in order to evaluate its effects on the soil-plant system. Due to the effectiveness of this intervention, the existing flood bank will be completed to avoid surface saltwater intrusion into the freshwater wetlands and agricultural fields, introducing further changes in the ecological dynamics of the BVL and its adjacent area. As a consequence,



the water level in the flood bank west side is expected to rise, increasing the submersion period in tidal wetlands. In this study, we have modelled how several hydrological and related environmental variables will change due to the flood bank extension, its implications on four saltmarsh species and habitats distribution in the future, as well on the associated ecosystem services, both upstream and downstream of the flood bank. Finally, several ecosystem services of interest were prioritized by stakeholders' elicitation, which were then used as an input to a spatial multi-criteria analysis aimed to find the best management actions to compensate for the predicted loss of biodiversity and ecosystem services in the BVL.

Keywords: coastal lagoons, ecosystem-based management, spatial multi-criteria analysis, ecosystem services, biodiversity

2. *Type of submission: Invited speaker abstract*

Thematic Working Group sessions: T2a – Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

Ecosystem-based management (EBM) planning process at Natura 2000 sites from catchment to coast: Ria de Aveiro region as showcase

First author(s): Ana Isabel Lillebø, Heliana Teixeira

Other author(s): Mariana Morgado, Javier Martínez-López, Asya Marhubi, Gonzalo Delacamara, Pierre Strosser, António J A Nogueira

Affiliation, country: University of Aveiro Department of Biology & CESAM, Portugal

Ria de Aveiro represents an environmental and socio-economic coastal territory, in which its natural capital, mostly classified under Natura 2000 network of protected areas, is of paramount importance for the regional and national economy, supporting harbor activities and maritime traffic, agriculture, fisheries, aquaculture, industries, tourism, sports and recreational activities. Current and foreseen changes connected to human activities, namely land and water uses and potential conflicts, in frame of environmental policies, sustainable economic development and human well-being requires the implementation of EBM planning processes taking into account the connectivity across marine, transitional, freshwater, and terrestrial realms. Having this coastal territory as showcase the main objective is to elaborate on the co-development of the EBM planning process across aquatic realms, all characterised by high biodiversity and by the wide range of services provided by ecosystems, including their abiotic



components. Therefore, the approach takes into account the analysis of the relationship between the social and ecological components and on how these are connected through the risk assessment of the ecosystem services. As an essential component of EBM, stakeholder expectations, the demand for ecosystem services and the promotion of cooperation were taken into account at different steps of the processes. These included the identification of the main drivers, the valuation of ecosystem services by stakeholders and the EMB plan of measures to be considered. As well an overview of the policy context, the foreseen management actions to be implemented in the short term and how they influence the main drivers identified and ecosystem services were considered. Results are discussed taking into account stakeholders' views regarding societal goals of restoring ecosystems and their services, the effectiveness, efficiency and equity of the considered plan of measures, and the relevance of policy instruments to effectively implement EMB actions or measures.

Keywords: ecosystem services; biodiversity; stakeholders engagement; aquatic realms; policy instruments

3. *Type of submission: Invited speaker abstract*

T. Thematic Working Group sessions: T2a – Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

AquaLinksTool – a versatile tool to address causal links involving activities, pressures, biodiversity, ecosystem functions and services in aquatic ecosystems

First author(s): António Nogueira

Other author(s): Heliana Teixeira, Ana I. Lillebø, Florian Pletterbauer, Daniel Trauner, Leonie Robinson, Fiona Culhane, GerJan Piet, Ana Barbosa, Alejandro Iglesias-Campos, Andrea Funk, Tim O'Higgins, Romina Martin, Mathias Kuemmerlen, Peter Reichert, Hugh McDonald, Ben Boteler, Manuel Lago

Affiliation, country: Universidade de Aveiro, Department of Biology & CESAM, Portugal

Human activities create pressures on habitats, their components and associated biota (responsible for ecosystem functions and services) and in this may compromise the sustainability of ecosystems and human well-being,. AquaLinksTool was developed, in the framework of the EU H2020 AQUACROSS project, to support the implementation of Ecosystem-based Management (EBM) in different aquatic ecosystems (freshwater and marine) from Sweden



to Marroco and from Romania to the Azores islands (Portugal) in the Atlantic ocean. The tool can be used to access the likelihood of a significant risk associated with linkage chains of activities–pressures–ecosystem components–ecosystem services and/or activities–pressures–ecosystem components–ecosystem functions. To achieve this goal for each chain an impact score and a supply score from which a risk quotient is calculated. The scores are derived from the knowledge base produced within AQUACROSS with contributions and expertise from case–studies.

The linkage chain integrated in AquaLinksTool addresses explicitly five out of fifteen key principles of EBM: consider ecosystem connections, APPROPRIATE SPATIAL & TEMPORAL SCALES, adaptive management, USE OF SCIENTIFIC KNOWLEDGE, integrated management, stakeholder involvement, account for dynamic nature of ecosystems, ECOLOGICAL INTEGRITY & BIODIVERSITY, sustainability, RECOGNISE COUPLED SOCIAL–ECOLOGICAL SYSTEMS, decisions reflect societal choice, distinct boundaries, interdisciplinarity, appropriate monitoring, and ACKNOWLEDGE UNCERTAINTY. The tools allow the user to create suitable linkage chains to infer hazard risks of specific linkage in the form of risk quotients. The approach used will greatly benefit the selection of suitable management options as it will be possible to identify which activities pose a greater risk to provisioning of ecosystem functions and services by a given ecosystem component. The knowledge built into the tool covers aquatic habitats (from freshwater to marine environments) and associated terrestrial interfaces as well as highly mobile biotic groups (mammals, birds, amphibians, reptiles, fish & cephalopods, and adult insects).

Keywords: biodiversity, ecosystem services, linkage chains, Ecosystem–Based Management (EBM), management tool



4. *Type of submission: Invited speaker abstract*

T. Thematic Working Group sessions: T2a – Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

Eight research areas that could foster the uptake of ecosystem-based management in fresh waters, if combined

First author(s): Simone Daniela Langhans

Other author(s): Sami Domisch, Stefano Balbi, Gonzalo Delacámara, Virgilio Hermoso, Mathias Kümmerlen, Romina Martin, Javier Martínez-López, Peter Vermeiren, Ferdinando Villa, Sonja C. Jähnig

Affiliation, country: University of Otago and Basque Centre for Climate Change University of Otago and Basque Centre for Climate Change, New Zealand

Despite the implementation of various environmental regulations, the challenges of safeguarding freshwater biodiversity while sustaining freshwater-based ecosystem services (ESS), have so far not been tackled successfully. A promising way forward is ecosystem-based management (EBM), an environmental planning and adaptive management approach that considers social and ecological needs concurrently. Being responsible for recent advances in sustainably managing marine ecosystems, a major reason for EBM's delayed uptake in freshwaters maybe its complexity, requiring planners to be familiar with the latest developments in a range of different research areas. To provide more clarity in this regard, we introduce eight research areas and their innovations, which are of core relevance for EBM. We then explain how they feed into a workflow that guides through the EBM-planning process. The workflow links species distribution modelling with ESS supply and demand modelling, SMART (specific-measurable-attainable-relevant-timely)-target planning including scenario- and cross-realm perspectives, prioritization of management alternatives, spatial prioritization of biodiversity conservation and ESS areas, and the quantification of uncertainties. The workflow is not intended to be a rigid blueprint – instead it is an adaptive procedure that can be modified to account for new information and localized changes depending on the freshwater system to be managed. Due to the documented success of EBM in the marine realm, we believe that our study will provide the means to foster on-the-ground applications of EBM in fresh waters, improve management effectiveness, and create socio-ecological benefits through buy-in from the community.



Keywords: biodiversity, ecosystem approach, ecosystem services, spatial optimization, species distribution modelling

5. *Type of submission: Invited speaker abstract*

T. Thematic Working Group sessions: T2a – Integrating biodiversity and ecosystem services in ecosystem-based management of aquatic systems

Assessing the water–biodiversity nexus – integrating natural and social sciences: An assessment framework for complex and adaptive dynamics of social–ecological aquatic systems

First author(s): Gonzalo Delacámara, Carlos M.Gómez

Affiliation, country: IMDEA Water Research Foundation/IMDEA Water Research Foundation, Universidad de Alcalá, Spain

In the European Union, both biodiversity policy and aquatic ecosystem management practices have been evolving towards a more integrative and holistic framework so that they could be both connected as part of ecosystem–based management (EBM) approaches. Biodiversity policy has progressed from conserving single, charismatic species towards protecting status and communities, enhancing connectivity and sustaining the delivery of ecosystem services and abiotic components of ecosystems in line with the targets of the EU 2020 Biodiversity Strategy and other international commitments. The management of aquatic ecosystems, in turn, has evolved from single parameter standards and single services towards framework directives (WFD, MSFD), and also from managing services to maintain water bodies to preserve aquatic ecosystems so as to meet the good ecological status and potential. The water–biodiversity nexus may well be the cornerstone to coordinate sectoral policies for sustainable land use and the provision of ecosystem services. Integrated assessment frameworks are thus required to harmonise and streamline environmental policies under the overall framework of biodiversity conservation strategies; to coordinate policies in transitional and coastal waters, where different policy directives apply; to amalgamate the relevant analytical approaches for the assessment of aquatic ecosystems and their abiotic outputs across the freshwater–saltwater continuum; and to address social–ecological systems in a holistic way, as complex adaptive systems that co–evolve, thereby avoiding traditional silos (both in assessment and policy–making) and biased approaches.



Keywords: Ecosystem Based Management (EBM), water–biodiversity nexus, complex–adaptive systems, environmental management and policy