BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: B1

Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Hosts:

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Abstract:

The oceans provide us with multiple benefits related to cultural heritage, sense of place and well-being essential for human existence. However, mainstream models for development and the plea for Blue Economy coupled with climate change effects are pushing marine and coastal ecosystems towards their resilience limits, compromising their ability to contribute to societal well-being. Understanding how ecosystem functions deliver services under existing and future threats is fundamental for a sustainable society in the Anthropocene. The scientific community is calling for the urgent development of transformative knowledge to address our complex interaction with the marine natural world. To achieve this, a new research agenda is needed to increase the understanding of non-linear interactions between oceans and people in different environmental, social and political contexts in marine and coastal areas.

Along with the scientific community, several European policy agendas have been also directly or indirectly considering safeguarding elements of marine and coastal systems that are beneficial to society. For instance, the EU Marine Strategy Framework Directive (MSFD), the Water Framework

Directive (WFD), the Common Fisheries Policy, but also the EU Biodiversity policy for 2020. EU-wide directives extending also to national and local level policies are in place to safeguard marine and coastal biodiversity and associated Ecosystem Services (ES). Although we have arrived in the year 2020, the deadline for EU specific targets to be reached, the ambitions and promises outlined in the early 2000s, have yet to be achieved.

Evidence and past work from the Marine and Economic Valuation Working Groups of ESP and external peers have shown that we, as a global society, are not meeting targets set out for ourselves, despite good intentions and progress from science, practice and policy. To achieve our goals, ES assessments could pave the way to integrate different priorities and viewpoints. Still, the application of MCES assessments to tackle policy questions with regards to EU policy objectives e.g., Marine Spatial Planning (MSP) remains to be limited. On top of that, the way MCES assessments are perceived and understood by policy-makers does not always match the intentions of the scientific community and vice versa. An open dialogue between research and policy communities that increases the understanding of non-linear interactions between oceans and people in different environmental, social and policy contexts is needed.

With this session, we aim to bring together these different communities and assess the way forward towards a more efficient strategy in the inclusion of ES within marine and coastal related policies. More specifically, the session will consist of three parts:

a) **Scientific research**. Participants will be requested to present concrete outputs of scientific research on marine and coastal ecosystem services (MCES) along with a reflection on the efficiency of the scientific outputs for decision- making. Communication methods and information sharing modes can include but are not limited to maps, reports, indicator sets, and extends to more sophisticated tools that allow the decision- makers to become aware and utilize the concept. Presentation of tools and methods developed by researchers to incorporate ES into policy and management is encouraged.
b) **Policy and Decision-Making Requirements**: Invited contributors from the decision-making side at both EU and national levels will also participate and present their needs in line with existing and forthcoming policies. These contributors will present a reflection on the type of scientific outputs that they have so far experienced as most effective in communicating ESs. In addition, they are asked to think outside the box and include a “wish-list” of what approaches and tools would aid in the making and roll-out of Europe’s Green New Deal, in times when competition for space and resources offshore are challenging the functioning of ecosystems and their services. Their contributions are expected to outline priorities for different sectors and a reflection on the type of challenges ecosystem services are poised to resolve within the governance of marine and coastal systems.
c) **Open Dialogue**: A guided dialogue of the two communities will take place, with the intention to build an integrated set of shared priorities for the communities of research and policy.

Participants will be requested to present their experience in using specific MCES assessment methods, while reflecting on the ability of the applied methods to match specific decision-making needs. All the work and the group discussions will be facilitated by the hosts. Voluntary contributions are welcome which will be complemented by a set of invited talks given by decision-makers.

Goals and objectives of the session:

Within this session, we aim to build on participants’ experiences in order to:

1. Discuss knowledge gaps on inter-relations between human activities and ecosystem service provision contingent on the ecological condition of marine and coastal areas, and develop guidelines to advance socio-ecological science on this direction;
2. Develop methodologies for the integration of marine ecosystem services flows in assessment frameworks;
3. Develop a repository of MCES research priorities aligned with the tools in place for communicating these to managers and policy makers;
4. Align these research priorities with potential uses of MCES for specific policy demands, application domains, at different scales;
5. Open the dialogue and tentatively reach a consensus among the science and policy communities, which will be summarized in a concrete list of action points for the coming two years

Planned output / Deliverables:

A position paper on the research topic and a policy brief are to be prepared out from the session.

Related to ESP Working Group/National Network:

Biome working group: BWG 1 – Marine systems

II. SESSION PROGRAM

Date of session: Monday, 7 June 2021

Time of session: 13:30 – 17:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30 13:40	Evangelia	Drakou		Introduction
13:40 13:55	Ana María	Gómez-Aguayo	NGENIO (CSIC Universitat Politècnica de València)	Marine ecosystem services in Xàbia, north of Alicante (Spain): An economic valuation via multicriteria analysis
13:55 14:10	Liselotte	Hagedoorn	Institute for Environmental Studies	Angry waves that eat the coast: an economic analysis of nature-based and engineering solutions to coastal erosion
14:10 14:25	Jacinto	Cunha	CIIMAR/CITAB	Assessing Regulation and Maintenance Ecosystem Services capacity along a coast-sea gradient in NW of Portugal
14:25 14:40	Christian	Riisager-Simonsen	Technical University of Denmark	Towards ecosystem-based management of marine wildlife using ecosystem service

Time	First name	Surname	Organization	Title of presentation
				assessments at the population level
14:40 14:55	Esther	Robbe	Leibniz Institute for Baltic Sea Research Warnemünde	The impact of beach wrack and marine litter on Baltic sandy beach ecosystem services
15:30 15:45	João	José	University of Trás-os-Montes e Alto Douro	Assessment of cultural ecosystem services: A framework for collaborative management of MPAs linked to SCUBA Diving activities
15:45 16:00	Laura	Basconi	Ca' Foscari University - Venice	Multiple ecosystem services assessment in the North Adriatic Sea (Italy)
16:00 16:15	Kristina	Veidemane	Baltic Environmental Forum	Integrating ecosystem services in participatory scenario building for addressing new EU marine policies in land-sea interface and maritime spatial planning of Latvia
16:15 16:30	Migue	Inácio	Environmental Management Laboratory	Looking at the future: the impact of alternative scenarios in the supply of ecosystem services in Lithuania Economic Exclusive Zone
16:30 17:00				Discussion

III. ABSTRACTS

Abstracts are ordered based on the session program. The first author is the presenting author unless indicated otherwise.

1. Type of submission: Abstract

B. Biome Working Group sessions: B1 – Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Marine ecosystem services in Xàbia, north of Alicante (Spain): An economic valuation via multicriteria analysis

Presenting author: Ana María Gómez-Aguayo

Other author(s): Vicent Estruch-Guitart

Affiliation: INGENIO (CSIC-Universitat Politècnica de València), Camino de Vera s/n, E-46022 Valencia, Spain

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This paper provides an estimation of the economic value of the Ecosystem Services (ESs) in the marine coastal strip of Xàbia, north of Alicante, Spain. The proposed method combines an Analytic Network Process (ANP) and a Discounted Cash Flow model. The study area includes some high value natural resources and is characterized, in particular, by ecosystems that are typical of the Mediterranean Sea, which makes it relevant for an assessment of ESs. We confirmed the presence of nine ESs in this natural area (including seafood, climate regulation, waste treatment, biological control, lifecycle maintenance, gene pool protection, recreation, cultural heritage, and knowledge development) based on the Economics of Ecosystems and Biodiversity classification. Our results reveal substantial economic value attached to non-marketed services provided by the underwater environment. The economic value of these ESs ranges between €3.539 and €3.815/ha/yr. Our use of an ANP to identify habitat services and to show how much of this value is distributed across other ESs is a novel contribution to the literature. Our findings should be relevant to marine management decisions and stronger territorial conservation policies.

Keywords: economic valuation, multicriteria analysis, ecosystem services, marine ecosystems, Mediterranean Sea

2. Type of submission: Abstract

B. Biome Working Group sessions: B1 - Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Angry waves that eat the coast: an economic analysis of nature-based and engineering solutions to coastal erosion

Presenting author: Liselotte Hagedoorn

Other author(s): Kwasi Appeaning Addo, Mark KoetseKen Kinney, Pieter van Beukering

Affiliation: Institute for Environmental Studies (IVM), VU University Amsterdam, Amsterdam, Netherlands
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Coastal areas in developing countries are very vulnerable to the effects of sea-level rise. Adaptation to sea-level rise can include both engineering and nature-based solutions. However, comparative economic analyses across both types of solutions are sparse. Moreover, stated preference studies in developing countries that are commonly applied to estimate the benefits of adaptation projects increasingly include time payments as an alternative to money payments. The implications of this payment mode on policy recommendations remains unclear. In this study, we conduct cost-benefit analyses (CBA) that incorporate the results of discrete choice experiments with money as well as time payments for both an engineering (groynes) and a nature-based (beach nourishment) solution. We provide a range of sensitivity analyses regarding discount rates, effectiveness of the measures, cost estimates and different benefits calculations. These quantitative CBAs are complemented by qualitative insights from focus group discussions. We find overall negative net present values of both engineering and nature-based erosion solutions when money payments are applied, but positive values when time payments are used. Qualitative insights describe the disruptive effects of erosion on local livelihoods. The qualitative results combined with previous studies provide support for the use of the time payment results. Furthermore, our results indicate that nourishment has a larger positive effect on welfare than groynes. These results provide relevant insights for decision-makers with regards to coastal adaptation and stated preference practitioners in developing countries regarding the use of time payments.

Keywords: coastal erosion, cost-benefit analyses, discrete choice experiment, nature-based solutions, time payment vehicle

3. Type of submission: Abstract

B. Biome Working Group sessions: B1 - Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Assessing Regulation and Maintenance Ecosystem Services capacity along a coast-sea gradient in NW of Portugal

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

Presenting author: Jacinto Cunha
Other author(s): Edna Cabecinha, Sebastián Villassante, Sandra Ramos
Affiliation: CIIMAR/CITAB, Portugal
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Coastal and marine ecosystems provide valuable Ecosystem Services (ES), from provisioning to regulation or cultural services. The integration of ES assessments in regional and local management is crucial to achieve sustainability and maintaining ecosystems productivity, particularly when attending the EU Blue Growth objectives. Marine and coastal ES assessments are often done at national levels and assume equal ES delivery from similar ecosystems. However, regional and local ecological variations and the connection of the different ecosystem components at local levels, play a critical role at different steps of the ES cascade and ES provision capacity. This work aimed to assess the provision capacity of Regulation and Maintenance ES by local coastal and marine ecosystem, by evaluating the different steps of the ecosystem service cascade. Key ecological processes and functions responsible for each Regulation and Maintenance ES were evaluated and local indicators for their valuation were assessed. These ecological processes and functions were then connected to local ecosystem structures, habitats and associated species that play a role in the delivery of those processes and functions. This association was then used to evaluate the relative contribution of each components for the provisioning capacity of Regulation and Maintenance ES, based on existent local data and literature review. The results provide the linkage of local data on ecosystem functions and ES supply capacity that can be used in providing locally based ES supply maps and ultimately be used in support of local environmental management.

Keywords: regulation and maintenance ecosystem services, marine and coastal ecosystems, local scale assessment, ecosystem service cascade

4. Type of submission: Abstract

B. Biome Working Group sessions: B1 – Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

Towards ecosystem-based management of marine wildlife using ecosystem service assessments at the population level

Presenting author: Christian Riisager-Simonsen
Other author(s): Olivia Rendon, Anders Galatius, Morten Tange Olsen, Nicola Beaumont
Affiliation: Technical University of Denmark, National Institute for Aquatic Resources, Denmark
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To advance ecosystem-based management of marine ecosystems, conservation science has moved towards testing the value of area-based ecosystem service assessments to support e.g. better biodiversity protection. However several types management challenges and trade-offs might not be solved by pure attention to area-based assessments, considering that key marine resources such as fish, marine mammals and bird populations move extensively in time and space. To address this challenge, we present the case for applying ecosystem service assessments at the population level, using marine mammals as a case. We further provide the literature evidence for inclusion of multiple ecosystem service and disservice categories, availability of data and national examples of how the approach is likely to have impacted management perspectives. Local adaptation of assessments to particular management and policy settings are discussed in addition to the need for stakeholder involvement in the scoping of assessments.

Keywords: ecosystem approach, human-wildlife conflict, environmental trade-offs, marine management

5. Type of submission: Abstract

B. Biome Working Group sessions: B1 - Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

The Impact of Beach Wrack and Marine Litter on Baltic Sandy Beach Ecosystem Services

Presenting author: Esther Robbe

Other author(s): Gerald Schernewski

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Ecosystem services at sandy beaches include a wide range of provisioning (e.g. organic material for energy conversion), regulating (e.g. coastal protection by wave attenuation) and cultural services (e.g. nature observation). Yet they are often only associated with recreation and tourism. Natural material, like beach wrack, and marine litter (mostly plastics) accumulate at sandy beaches representing nuisances to beach goers and consequently causing regular beach cleanings. Management nor policies within the European Union address sandy beaches adequately, as there is a lack of understanding their ecosystem services and interactions with regard to human intervention (e.g. beach cleanings). Common ongoing discussions deal with the question how to manage and clean beaches sustainably. The prevailing question of this study is how marine litter and beach wrack affect the provision of ecosystem services at southern Baltic sandy beaches. Using a new online multidisciplinary methodological assessment approach, we developed beach scenarios representative for Baltic sandy beaches and assessed the impact of marine litter and beach wrack on their ecosystem services. We identified trade-offs and synergies between ecosystem services and their management. Linking the costs of management measures to our results, we developed criteria and recommendations for improved beach management showing their practical relevance as well as the applicability and opportunities of ecosystem service assessments within international coastal and marine policy implementation. We will discuss the limitations and opportunities of our combined multidisciplinary assessment approach that is easy-to-apply and highly adaptive in its study design also allowing for tailor-made, fast, online and remote expert and stakeholder involvement ranging from local case studies up to international policy making.

Keywords: coastal management, beach cleaning, multidisciplinary approach, expert-based, online involvement

6. Type of submission: Abstract

B. Biome Working Group sessions: B1 - Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

3rd ESP EUROPE CONFERENCE Tartu, Estonia 2021 7-10 June
Ecosystem Services Science, Policy and Practice in the face of Global Changes

Assessment of cultural ecosystem services: A framework for collaborative management of MPAs linked to SCUBA Diving activities

Presenting author: João José

Other author(s): Jorge Campaniço, Sebastian Villasante, Edna Cabecinha

Affiliation: University of Trás-os-Montes e Alto Douro, Vila Real, Portugal; Campus Do Mar, International Campus of Excellence, Spain, Portugal

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There is increasing recognition of the importance of cultural ecosystem services (CES) of marine habitats for supporting the marine environment's management. Despite relevant contributions, assessed it continues to be a big challenge. As coastal populations and tourism increase, the popularity of recreational and scientific scuba diving (SD) has increased, evidenced by the increasing locations to became scuba diving destinations. These increased recreation and tourism activities have been accompanied by concern for human activities' impacts on marine and coastal ecosystems. There is increasing research in this area comprising a broad enquiry from marine environment impacts through human physiology, health and safety, diver motivation and satisfaction. Many studies support an effort to understand scuba diving issues and related tourism, but very few holistically integrate multiple stakeholders and perspectives in these fragile ecosystems. Working closely with Underwater World Federation (CMAS) and other stakeholders involved in managing and conserving marine protected areas (MPAs) and underwater heritage areas, an assessment of CES related to underwater recreational sites will be performed as a framework for collaborative management. Understanding divers' perceptions of the impacts of diving activities and their involvement in conservation activities are fundamental. We expected to develop an ecosystem services approach, to perform an economic and environmental assessment, that can support the management of MPAs. With this tool we intend to enhance the diver behaviour norms and regulations, as well as willingness to participate in conservation and communicate the benefits of ecosystem protection to foster the growth and ecological awareness of scuba divers, who are then, able to communicate best practices in marine environmental management elsewhere, promoting the aims and success of governance strategies. Through participatory approaches to engage key stakeholders, a more profound understanding of the different aspects of the ES will provide better tools to integrated management and safeguard our oceans' future.

Keywords: cultural ecosystem services, marine protected areas, scuba diving, integrated management

7. Type of submission: Abstract

B. Biome Working Group sessions: B1 – Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Multiple ecosystem services assessment in the North Adriatic Sea (Italy)

Presenting author: Laura Basconi
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Ecosystem services (ES) represent multi-facets metrics of the natural environment. They can be assessed at different spatial scales but in the sake of the holistic approach, the appropriate one to understand the complex socio-ecological system is assessed of multiple ecosystem services. In this work, the assessment of multiple ecosystem services has been carried out across the North Adriatic coastal-marine system, making them spatially explicit. Each ES has been assessed for its flow and capacity. The former is the actual use of the service, the latter is the capability of the natural system to provide that peculiar ES. The cultural service recreation activities, the regulating services CO2 sequestration and coastal protection and the provisioning fishery and aquaculture have been assessed. Trough and ecosystem model indicators of ecosystem functioning have been extracted and spatially compared with ES to see which are the linkages. In the following work is presented the methods used to assess flows and capacities of the whole set of the ESs mentioned and first attempts to compare them with maps of ecosystem functioning. The spatial explicit nature of the multiple ES assessment allows to see how climate change will impact on the supply of these ES in the future. Moreover, it allows highlighting spatial concordance among ESs (or lack of it), synergies and trade-off which can result in suitable management strategies over the seascape scale (scale for ecosystem-based management (EbM)) to maintain multiple ESs in the long-term.

Keywords: marine ecosystem service, multiple ES assessment, regional assessment, climate change

8. Type of submission: Abstract

B. Biome Working Group sessions: B1 – Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Integrating ecosystem services in participatory scenario building for addressing new EU marine policies in land-sea interface and maritime spatial planning of Latvia

Presenting author: Kristina Veidemane
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Latvia adopted its first maritime spatial plan in May 2019 including initial results on mapping and assessing ecosystem services (MAES) based on best available data and knowledge about marine ecosystems of the Baltic Sea. The plan also addressed land-sea interactions (LSI); however, the issue was mainly considered from national maritime perspective, particularly offshore wind energy development, and focused on marine ecosystems. Local and regional development needs, particularly coastal tourism, and interlinks between coastal and terrestrial ecosystems were not analysed in detail. This gap and inconsistencies between marine and land policies and various planning levels were addressed by a case study of South Kurzeme region of Latvia. The case study applied MAES results in participatory target seeking scenario building and trade-off analysis to identify spatial solutions for reaching the national policy goals for offshore wind energy 2030 and beyond, biodiversity protection targets related to marine protected areas, and local coastal tourism development. A combination of different methods – biophysical and social – were used to deliver an integrated assessment of ecosystems and services they deliver in marine and coastal areas. The MAES results were displayed in an online GIS based web platform available for stakeholders during the scenario building workshop. The workshop invited stakeholders representing different sectors and interests from local to national planning and implementation

levels and resulted with elaborated scenarios that would meet the established goals. As stakeholders considered MAES results, four working groups elaborated spatial solutions that were to large extent overlapping. Moreover, the sea and landscape quality values plaid an important role in seeking the least conflicting and most suitable spatial designations. The collaborative work on scenarios also revealed that it is possible to find a balance between ambitious national maritime and biodiversity objectives and local tourism development needs. The study was supported by the Interreg Baltic Sea Region Programme project "Land-Sea-act" (#R098).

Keywords: marine ecosystem services, participatory approach, scenario building, European maritime policies, Latvia

9. Type of submission: Abstract

B. Biome Working Group sessions: B1 - Bridging the gap between science and policy on marine ecosystem services operationalization in the light of the upcoming EU agenda for 2030

Looking at the future: the impact of alternative scenarios in the supply of ecosystem services in Lithuania Economic Exclusive Zone

Presenting author: Miguel Inácio
Other author(s): Donalda Karnauskaitė, Eduardo Gomes, Katažyna Bogdzevič, Marius Kalinauskas, Paulo Pereira
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Nowadays, coastal and marine areas and their ecosystems are subjected to numerous pressures (e.g., urban sprawl, invasive species, fisheries overexploitation, climate change, sea level rise) with serious socio-economic impacts (e.g., flooding and erosion). With multiple uses explored in an unsustainable way, coastal managers, land planners, and decision-makers, need to evaluate the full implications of this into their choices to manage coastal and marine areas. Ecosystem Services (ES) and the importance of their sustainable use are hot topics on the political agenda (e.g., United Nations Sustainable Development Goals, European Union Green Deal, EU Biodiversity 2030 strategy). While ES have been increasingly explored to inform stakeholders there is still a gap in systematically incorporating them into operational management and decision-making

tools. Especially when assessing the impact of drivers of change into ES provision. Our work adapts and extends the future scenarios narratives explored in previous works. The alternative scenarios combine Shared Socioeconomic Pathways, Representative Concentration Pathway, and Nutrient emission scenarios, as drivers of change for the Baltic Sea's future development, with focus on the Lithuanian Exclusive Economic Zone. A Neural Network time-series regressions method was also used to project biogeochemical variables into the future. We then apply biophysical modelling to assess and map the influence of future human-environment interaction on the future provision of marine ES in Lithuania. Additionally, we present how policymakers and managers can use the long-term future scenarios of marine ES as powerful tools for exploring the future of human development under changing environmental and socio-economic conditions. This work also contributes to better understand how global and regional developments could impact the Baltic Sea region. “Lithuanian National Ecosystem Services Assessment and Mapping (LINESAM)” No. 09.3.3-LMT-K-712-01-0104 is funded by the European Social Fund according to the activity “Improvement of researchers’ qualification by implementing world-class R&D projects” of Measure No. 09.3.3-LMT-K-712.

Keywords: shared socioeconomic pathways, representative concentration pathway, Baltic Sea, climate change, ecosystem services