



BOOK OF ABSTRACT

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I. SESSION DESCRIPTION

ID: B1b

From the tropics to the poles: assessing marine cultural ecosystem services

	Title	Name	Organisation	E-mail
Host:		Ana Ruiz-Frau	IMEDEA (Instituto Mediterraneo de Estudios Avanzados) Spain	anaruiz@imedea.uib-csic.es
Co-host(s):		Evangelia (Valia) Drakou	University of Twente	e.drakou@utwente.nl
		Maria C. Uyarra	AZTI Tecnicalia, Spain	mcuyarra@azti.es

Abstract:

The contribution of ecosystems to the global value of ecosystem services has been notoriously highlighted in several occasions. The global nature of these assessments, however, has inherently forced the consideration of the contribution of the different ecosystems at large scales (e.g. coastal systems in general, open oceans...); this has precluded an in depth analysis of the contribution from the wide array of marine and coastal ecosystems at lower levels (e.g. coastal temperate, coastal tropical, deep-sea polar...) or by habitat type (with some exceptions). In addition, global assessments have been limited to economic approaches, which don't have the scope to capture all value types associated to ecosystems, particularly those related to cultural ecosystem services (CES); as their often intangible nature is not always suitable for economic valuation. In this session, we would like to assess the contributions of different marine ecosystem types, from tropical reefs to polar systems, to the global provision of CES with the aim of assessing whether particular ecosystems are greater providers of CES or if particular CES are linked to a greater extent to specific ecosystems. We invite the submission of contributions focusing on the assessment of the provision of marine and coastal CES, with a special focus on (but not limited to) recreational services for different ecosystem types using a range of valuation methodologies. Special priority will be given to contributions



that use sociocultural valuation methods and those who address a plurality of values for different beneficiary groups.

Goals and objectives of the session:

The main goals of the session are:

- i) to obtain an overview of the contribution of different ecosystem and habitat types (e.g. temperate, tropical, polar; rocky, sandy grounds, seagrasses, macroalgae, coral...) to the pool of CES; and
- ii) to evaluate whether the provision of specific CES (e.g. recreation, spiritual, identity...) is associated to a greater extent to particular ecosystem or habitat types and how that might change under different conditions (e.g. seasonality, social and cultural context...)

Planned output / Deliverables:

We will promote a special issue in a scientific journal and/or an opinion paper on the topic.

Related to ESP Working Group/National Network:

[Biome working group: BWG 1B – Coral reefs](#)

II. SESSION PROGRAM

Date of session: Thursday, 24 October 2019

Time of session: 16:30 – 18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
16:30–16:40	Maria	Uyarra	AZTI (Spain)	From the tropic to the poles: where do we stand with Cultural Ecosystem Services?
16:40–16:50	Susanna	Jernberg	Finnish Environment Institute, Finland	Importance of ecosystem components to recreational services in the Finnish Archipelago Sea
16:50–17:00	Serena	Zunino	OGS – National Institute of Oceanography and Experimental	Cultural ecosystem services provided by coralligenous assemblages and Posidonia oceanica in the Italian Seas

Time	First name	Surname	Organization	Title of presentation
			Geophysics, Italy	
17:00–17:10	David	Cabana	International Marine Center Foundation, Italy	Posterity values coastal cultural ecosystem services in Sardinia, Italy
17:10–17:20	Miju	Kim	Seoul National University, Republic of Korea	The economic valuation and value maps of coastal cultural ecosystem services in Korea
17:10–17:20	Silvia	de Juan	Instituto Ciencias del Mar (ICM)– CSIC, Spain	Coupling social media and graph theory to assess MPAs CES contribution around the globe
17:20–17:30	Maria C.	Uyarra	AZTI (Spain)	Multidisciplinary and integrated valuation of the recreational benefits gained after restoring a polluted estuary
17:30–17:40	João	Garcia Rodrigues	Campus Do Mar, University of Santiago de Compostela, Spain	Cultural ecosystem services from a marine protected area provide multiple benefits to subjective wellbeing
17:40–18:00				GROUP DISCUSSION



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: **Abstract**

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Posterity values coastal cultural ecosystem services in Sardinia, Italy

First author: David Cabana

Other author(s): Nicholas Barbieri, Simone Farina, Daniele Grech, Ivan Guala

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Around the globe the coastline encloses a vast number of habitats and ecosystems which contribute to a wide variety of services and benefits to humankind. This idiosyncratic capacity of the coast results in a clustering of uses and entanglement of activities turning coastal ecosystems into socioecological hotspots. Studies valuing coastal cultural ecosystem services commonly rely on different methodologies and disciplines which frequently acknowledge a wide array of groups of users. However yet low attention has been payed to underage citizens which configure the future generations.

Get to understand posterity links to nature and to recognize what they value it is capital for coastal management and essential to coordinate uses, maintain ecosystems health, and sustain human wellbeing.

The scope of this work is twofold, communicate and value cultural ecosystem services. Here we present a case study focused in the Sardinian coast for the assessment and valuation of cultural ecosystem services. We listen to secondary students living throughout the Sardinian territory and comprehending coastal and mountainous populations of villages, towns and cities. We integrate qualitative and quantitative evidence obtained by field surveys conducted to students with ages between 14 and 18 years old. This work provides a first look into Sardinian coastal cultural ecosystem services as an additional layer of information with potential use for coastal management. The incorporation of these considerations into policy is the following challenge to evaluate trade-offs and take more balanced management decisions. posterity, cultural ecosystem services, coastal habitats, environmental management.



Keywords: posterity, cultural ecosystem services, coastal habitats, environmental management

2. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Coupling social media and graph theory to assess MPAs CES contribution around the globe

First author: Silvia de Juan

Other author(s): Andres Ospina–Alvarez, Ana Ruiz–Frau

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The development of methods for CES assessment at large scales is crucial in marine ecosystems, as frequently CES are overlooked by decision makers who have traditionally dealt with tangible services such as fisheries landings or biodiversity estimates. The interpretation of social media data through graph theory is a promising approach to provide global information on users' perceptions and preferences for different marine ecosystem and the services they provide. Twelve Marine Protected Areas, representing a broad geographical coverage and a range of marine ecosystems types, were selected as case studies to illustrate the use of graph theory on social media data. The selected areas, known to protect key recreational, educational and heritage attributes of coastal and marine areas, were used to identify the variability in users' preferences for marine ecosystem services. Instagram data (i.e., hashtags associated to photos) was extracted for the 12 selected MPAs, allowing an in-depth assessment of the marine and coastal attributes most appreciated by the users in each of the areas. Hashtags were analysed using different network analysis measures, such as degree and betweenness, which allowed the identification of clusters or connections of words in the data, aspects not normally captured by traditional photo content analysis. Hierarchical cluster analyses on the hashtags' network were conducted to ascertain the type of CES provided by each MPAs, allowing a comparison of the provision of services across MPAs in different regions and characterised by different marine ecosystems. *instagram; network analysis; recreational services; marine ecosystems; coastal and maritime users.*

Keywords: *instagram; network analysis; recreational services; marine ecosystems; coastal and maritime users*



3. *Type of submission: Abstract*

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Multidisciplinary and integrated valuation of the recreational benefits gained after restoring a polluted estuary

First author: Sarai Pouso

Other author(s): María C. Uyarra, Ángel Borja

Presenting author: Maria C. Uyarra

Affiliation: AZTI, Spain

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The multiple values of ecosystem services call for combining different disciplines when assessing and valuing them. It is increasingly recognized that integrated valuation approaches (combining ecological, social and economic valuation tools) will help to better inform decision-making processes about possible affections to ecosystem services. In 25 years, Nerbioi estuary (North Spain) changed from being one of the most polluted estuaries in Europe to one with a moderate/good ecological status, mainly due to the implementation of a Waste Water Treatment Plant in 1990. However, little is known about how these improvements influenced cultural ecosystem services. We analysed recreational fishing and beach recreation from three approaches: (i) environmental, analysing the trends in key biotic and abiotic parameters; (ii) social, exploring users' behaviour and perceptions; and (iii) economic, performing travel cost analysis. We built a system dynamic modelling (SDM) that represented the supply and demand for recreational services, running simulations to analyse the consequences of management decisions and climate change. Results showed that improvements on environmental conditions boosted social changes (users changed their behaviour moving to previously polluted areas; and they had a positive attitude towards the recreational conditions of the estuary). The economic valuation revealed that the recreational use covered an important percentage of the costs needed to maintain the water quality. The results of the SDM indicated that Nerbioi is now a more resilient system, able to overcome short-term acute pressures. This study highlights how investing in restoration of degraded marine ecosystems can cause great achievements in the ecological integrity and in human wellbeing, by increasing recreational opportunities with important social and economic benefits. Also, it emphasized the importance of adopting a multidisciplinary approach to obtain a complete understanding of the functioning of restored systems and the multiple benefits they provide, which is crucial for



providing guidance to policy and decision-makers.integrated valuation, recreation, marine ecosystem services, restoration, multidisciplinary approach.

Keywords: integrated valuation, recreation, marine ecosystem services, restoration, multidisciplinary approach

4. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Cultural ecosystem services from a marine protected area provide multiple benefits to subjective wellbeing

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Cultural ecosystem services are frequently the most valued and demanded ecosystem services by people because they provide many benefits to human wellbeing in the form of identities, experiences, and capabilities. Many of these cultural ecosystem services benefits are of a complex and subjective nature, and hence are not prone to standard metrics and straightforward indicators. This might explain why cultural ecosystem services, especially those provided by marine and coastal ecosystems, have been arguably the least assessed and understood category of ecosystem services.

To understand cultural ecosystem services benefits and their contributions to subjective wellbeing, we did a survey of 453 users (nearby residents and visitors) of Litoral Norte Natural Park, a marine protected area located in the North of Portugal, on November and December 2018. We included in the survey 18 statement indicators to reflect constructs of subjective wellbeing. The statement indicators were based on frameworks of eudaimonic conceptions of wellbeing, that is conceptions of a good, meaningful, and worthwhile life. Besides statement indicators, we included questions to test possible effects of i) respondents' knowledge and opinions about the marine protected area; ii) respondents' environmental attitudes and behaviour; and iii) respondents' social-economic characteristics.



Results are expected to shed light on the role played by cognitive and physical interactions between cultural practices (e.g., caring, playing) and environmental spaces (e.g., beaches, seascapes) on the subjective wellbeing of marine protected area users. Cultural ecosystem services, subjective wellbeing, marine protected areas, benefits, eudaimonia.

Keywords: Cultural ecosystem services, subjective wellbeing, marine protected areas, benefits, eudaimonia

5. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Importance of ecosystem components to recreational services in the Finnish Archipelago Sea

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There is a growing need of assessing various services produced by ecosystems and to analyze their interrelationships. The importance of recreation is increasing and people are spending more time in nature than before. However, it is difficult to link the recreational and other cultural services to the ecosystems that produce them, and assess the value of these services. This leads to a risk that the importance of cultural services is underestimated and the other forms of services overrule the assessments and trade-off analysis. The Archipelago Sea in the Finnish coast of the Baltic Sea consists of a patchy landscape with variety of habitats ranging from hard rocky bottoms to soft sediments. It is an important recreational area for locals and tourists alike. We take a step forward in linking the recreational services to the Archipelago Sea ecosystem by presenting the results from a questionnaire survey conducted during the summer 2018 with 158 respondents. We explore people's perceptions on ecosystem components such as abundance of local fish species, water clarity and different types of algae, and how they contribute to people's recreational experience and their livelihoods. We also show how people value different aspects of ecosystem components and how the views of various stakeholder groups differ from each other. Our results contribute to better understanding of the cultural services and their values, and thus solidify their role in the future ecosystem services assessments. cultural services, Baltic Sea, coastal system.



Keywords: cultural services, Baltic Sea, coastal system

6. *Type of submission:* Abstract

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

Cultural ecosystem services provided by coralligenous assemblages and *Posidonia oceanica* in the Italian Seas

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Coastal marine ecosystems are largely recognised as providers of cultural ecosystem services (CES), which are described as the physical and cognitive human interactions with nature. Here, we focus on the CES provided by *Posidonia oceanica* and coralligenous which are classified as non-consumptive recreational benefits that are related to well-being, aesthetic inspiration, cultural identity, and spiritual experience. Our study aims to highlight some of the societal implications of the degradation of coralligenous and *P.oceanica* meadow ecosystems which are highly threatened by current anthropogenic impacts and by future scenarios of climate changes. We apply non-market analysis techniques to Italian scuba divers, a category which explicitly recognise the value of marine ESs, to assess their diving habits, environmental attitude, and preferences for different diving experiences following marginal changes to ecosystems due to degradation. Diving preferences were assessed using a multinomial logit model and a latent class model. The results confirm and measure how the high degradation of coralligenous and *P.oceanica* habitats may reduce the attractiveness of the underwater environment for Italian scuba divers by decreasing scuba diver satisfaction and consumer surplus. Considering a 50% reduction in the coverage of keystone species, the marginal willingness to pay decreased by approximately €56 and €18, respectively, for coralligenous reefs and *P. oceanica*, while the willingness to pay decreased by approximately €108 and €34, respectively, for a total reduction in coverage. The coastal underwater landscape attracts millions of scuba divers yearly and depends on the presence of healthy environments. The current threats imposed by human pressures on the marine environment, which are exacerbated by climate change, are degrading these ecosystems and the flow of their ESs. By highlighting the losses that could be caused by habitat destruction, our estimates can be used to support sustainable and non-disruptive diving tourism activities and the implementation of



local conservation policies.ecosystem degradation, scuba divers, willingness to pay, cultural services, choice experiment.

Keywords: ecosystem degradation, scuba divers, willingness to pay, cultural services, choice experiment

7. *Type of submission:* **Abstract**

B. Biome Working Group sessions: B1b From the tropics to the poles: assessing marine cultural ecosystem services

The economic valuation and value maps of coastal cultural ecosystem services in Korea

First author: Chi-Ok Oh

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As coastal areas have a distinct nature with the interaction of the land and water, they attract people to enjoy and experience the natural environment physically and intellectually, which forms the cultural ecosystem services. The two most common coastal areas for cultural services are beaches and mudflats: in Korea, there are about 280 beaches managed by local governments during the summer season; the area of mudflats is 2,500km², which is about 2.5% of the land area. Because the mudflats are exposed up to 4–5 kilometers seaward during ebb tide, they used to be a target of land expansion. A government report indicated that a quarter of total mudflats have disappeared by reclamation and converted to the land for the last 30 years in Korea. The purpose of this study is to 1) estimate the economic values of cultural ecosystem services derived from coastal beaches and mudflats, 2) project the values using a benefit transfer method and 3) visualize the values using GIS mapping. We divided the values of cultural ecosystem services into three categories based on an extensive literature review: recreation and tourism, landscape and aesthetic, and educational values. The primary data were collected from two different online surveys for beaches and mudflats. Each survey was conducted with about 1,000 respondents, who were nationally recruited from 17 different geographic regions of Korea. The survey questionnaire included the choice experiment (CE)



questions with six different attributes. Besides the attribute of the conservation fund, the rest of the five attributes represent the three values to assess the economic values of the cultural ecosystem services. The results were transferred to other beaches and mudflats of the southern part of Korea and a valuation map was subsequently generated. Policy-related implications are discussed related to spatial decision-making and planning in coastal areas. beaches, coastal wetlands, cultural ecosystem services, choice experiment, economic valuation.

Keywords: beaches, coastal wetlands, cultural ecosystem services, choice experiment, economic valuation