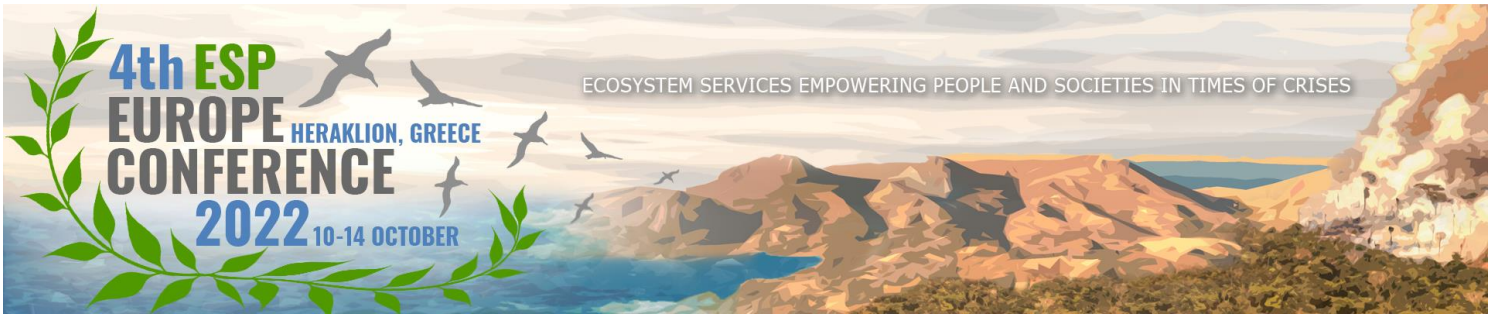


BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: S8a

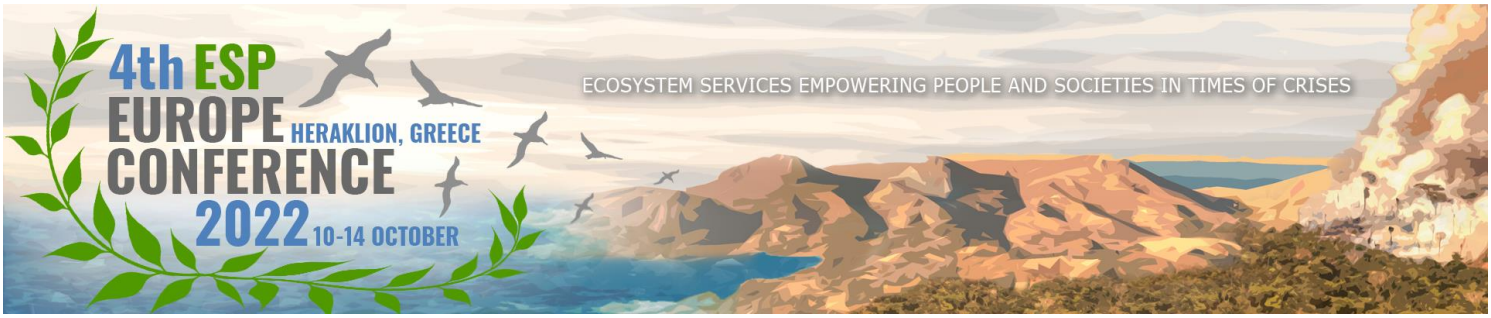
The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Hosts:

	Title	Name	Organisation	E-mail
Host:	Dr.	Ioannis Mitsopoulos	Natural Environment and Climate Change Agency (NECCA)	i.mitsopoulos@necca.gov.gr
Co-host(s):	Prof. Dr.	Maria Papadopoulou	Natural Environment and Climate Change Agency (NECCA)	m.papadopoulou@necca.gov.gr
	Dr.	Konstantinos Triantis	Natural Environment and Climate Change Agency (NECCA) / School of Rural Surveying and Geoinformatics Engineering, National Technical University of Athens (NTUA)	ktriantis@biol.uoa.gr

Abstract:
This session deals with the governance schemes across protected areas in Europe and aims to the instrumentation of the ecosystem services approach as holistic tool for sustainable management. The presentations should focus on policies for the conservation management of species, habitats, ecosystems, and ecosystem services as issued by the European and National Strategies for Nature and the EU Green Deal. Modern approaches for the assessment and mapping of ecosystem condition and ecosystem services actual and potential supply, with examples at national, regional, and local level of protected areas are welcome, in order to highlight their importance in bottom-up support of decision-making at the various governance levels.

Goals and objectives of the session:



The session aims to highlight how protected areas governance practice should be guided by multifaced approach to comply simultaneously with the national and EU targets and legislation, as well as to socio-cultural needs from the local to international level, especially in the times of crisis and socio-economic uncertainty.

Planned output / Deliverables:
Session outputs will include a collection of case studies related to protected areas management and governance schemes. Discussion will conclude to general guidelines for integrating ecosystem services studies in protected areas management and for the designation of new areas providing (or potentially providing) unique and/or important ecosystem services. Bottlenecks will be highlighted, and current and future challenges will be pointed out.

Session format:
Discussion forum

Voluntary contributions accepted:
Yes, I allow any abstract to be submitted to my session for review

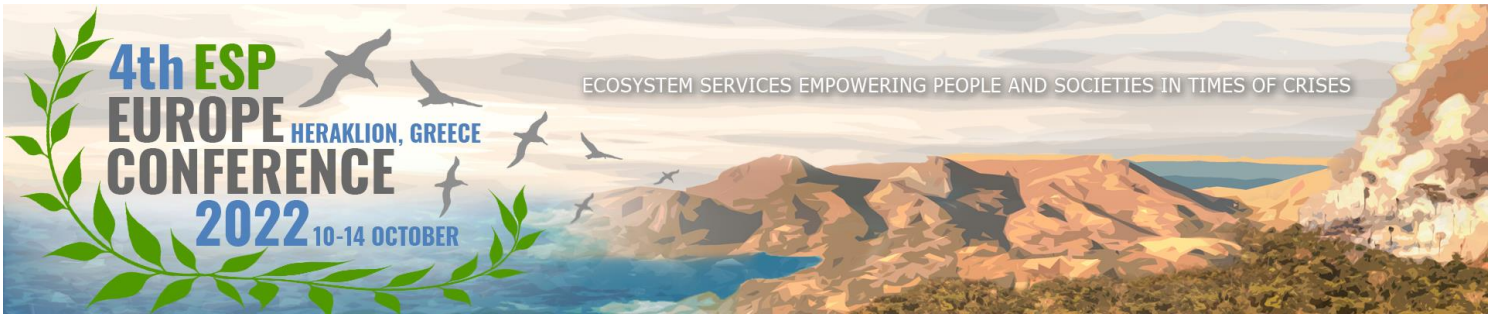
Related to ESP Working Group/National Network:
Sectoral Working Groups: SWG 8 – ES in Conservation

II. SESSION PROGRAM

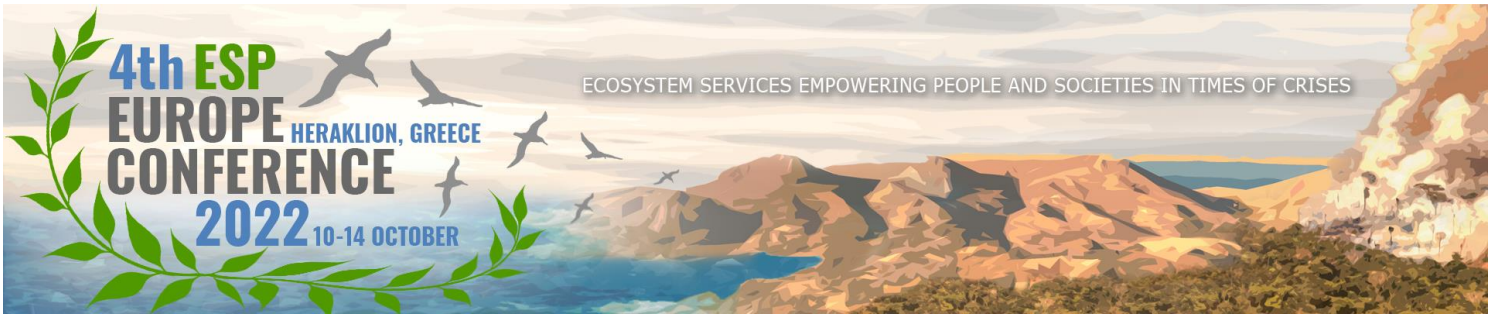
Date of session: Tuesday 11 October 2022
Time of session: 13:30-15:30

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30 – 13:35	Ioannis	Mitsopoulos	Natural Environment and Climate Change Agency (NECCA)	Session intro, goals, and objectives
13:35 – 13:45	Ioannis	Mitsopoulos	Natural Environment and Climate Change Agency (NECCA)	Management and policy implications in Natura 2000 protected areas in Greece: the role of the LIFE IP 4 NATURA integrated project
13:45– 13:.55	Giacomo	Laghetto	Etifor | Valuing Nature	The Environmental and Resource Costs (ERC) of the water sector as a key-driver to enhance the governance of protected



Time	First name	Surname	Organization	Title of presentation
				areas: a pilot experience from the Brenta river (Italy)
13:55–14:05	Silvia	Ronchi	Department of Architecture and Urban Studies – Politecnico di Milano	Limited consideration of climate change impacts on Ecosystem Services and biodiversity in planning in the highly vulnerable areas of the Italian Apennines
14:05–14:15	Keerthi	Srilakshmi	Centre for Economic Studies and Policy (CESP), ISEC, Bengaluru	Ecological Governance of Ecosystem Services as a trajectory to conservation planning in Bannerghatta National Park and associated challenges
14:15–14:25	Roy Joven	Amatus	Pampanga State Agricultural University	Integrating Ecosystem Valuation in Designing Sustainable Financing Mechanism for Mount Arayat Protected Landscape In Pampanga, Philippines
14:25–14:35	Luciana	Frazão	Centre for Functional Ecology – Science for People & the Planet (CFE), TERRA Associate Laboratory, Department of Life Sciences, University of Coimbra, Portugal.	People's perception on ecosystem services and its role as a tool for sustainable management of Portuguese Biosphere Reserves: a participatory approach
14:35–14:45	Chanthingla	Horam	Interdisciplinary Program in Climate Studies, Indian Institute of Technology, Bombay	Understanding the role of local governance in ecosystem services provided by the Community Conserved Areas (CCAs) of an indigenous community– A case of Tangkhul Naga tribe in Manipur, North east India.
14:45–14:55	Nesisa Analisa	Nyathi	University of Basel	Estimation of Habitat Quality using Sentinel-2 imagery in a semi-arid savannah ecosystem
14:55–15:05	Mike	Christie	Aberystwyth University	Comparison of the merits of the TEEB and IPBES Values Assessment approaches to valuing nature: Empirical evidence from assessments of the value of freshwater ecosystems in Ireland.



Time	First name	Surname	Organization	Title of presentation
15:05–15:15	Thaisa Fernandes	Bergamo	Estonian University of Life Sciences	Plant community shifts in Baltic coastal wetlands as a consequence of climate change
15:15–15:30	Ioannis	Mitsopoulos	Natural Environment and Climate Change Agency (NECCA)	Discussion & Take-Home-Messages

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

S. Sectoral Working Group sessions: S8a – The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Ecological Governance of Ecosystem Services as a trajectory to conservation planning in Bannerghatta National Park and associated challenges.

Presenting author: Keerthi Srilakshmi
Other author(s): Prof Krishnaraj, Ram Charan Thej Keerthi,
Affiliation: Institute for Social and Economic Change, India
Contact: keerthi@isec.ac.in

The paradigm of development that takes into account only economic growth fails to take into consideration the economic cost of the environmental destruction in pursuing that development. The National parks in India are Category II Protected Areas (PA) established as per the International Union for Conservation of Nature (IUCN) classification. In Karnataka, there are 30 listed PAs, of which five are national parks. One such PA is the Bannerghatta National park (BNP), a Category II PA adjacent to Bengaluru city.

The BNP is a conglomerate of many reserve forests and they have been rendering innumerable and valuable ecosystem services to people all through. Bengaluru witnessed a sudden population influx post-2000 due to the growth of the IT industry and start-ups. This created a lot of demand for housing, infrastructure and the resultant urbanisation, exerting

huge pressure on the green spaces and lakes of the city, which slowly started to shrink or even disappear altogether.

With the help of data collected in the villages of BNP, the paper tries to throw light upon certain issues and challenges in managing and conserving the national park with a focus on tenure rights of the dwellers and their land documents. It finds that participatory approach with local communities' engagement is critical in ensuring the rights based conservation of protected areas.

Keywords: Bannerghatta National Park, Protected Areas, Ecological Governance, Ecosystem Services, Local communities

2. Type of submission: Abstract

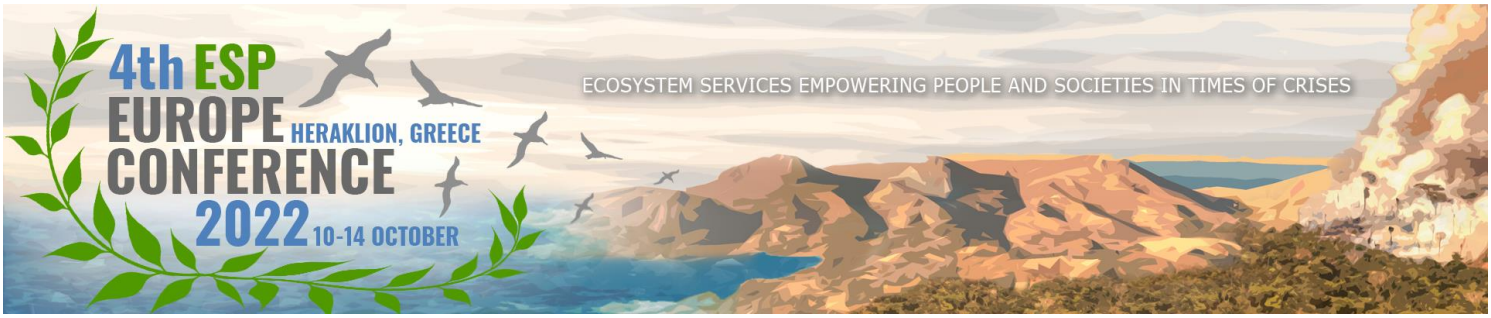
S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

The Environmental and Resource Costs (ERC) of the water sector as a key-driver to enhance the governance of protected areas: a pilot experience from the Brenta river (Italy)

Presenting author: Giacomo Laghetto
Other author(s): Giulia Amato, Alessandro Leonardi, Giuseppina Cristofani
Affiliation: Etifor | Valuing Nature, Italy
Contact: giacomo.laghetto@etifor.com

About 63% of the Natura 2000 network extends over land area, where the sites often rely on the presence of freshwater bodies (e.g., rivers, lakes, and wetlands). Governance innovations can have a substantial impact on biodiversity conservation and ecosystem services (ES) delivery in protected areas, especially in those contexts affected by the lack of a local management authority or allocated fundings - as in the case of the Brenta river in Northern Italy.

The pilot experience of the ongoing LIFE Brenta 2030 project (2019-2023) established a long-term, innovative, and effective governance by exploiting the synergy between water and biodiversity. By putting together aims and principles of EU Directives in both sectors, a PES scheme is now able to finance the co-management of those resources, without producing new ad-hoc management superstructures.



Building up on the work on design and governance of PES developed inside the PESFOR-W COST Action, this scheme arises from the introduction of the so-called Environmental and Resource Costs (ERC) in the recent legislation of the water sector (Water Framework Directive, 2000/60/EC) which establishes the full recovery of the costs relating to water services according to the polluter/user-pays principle, which also includes ERC. Calculating such Costs and including them in the tariff has therefore made resources available for biodiversity and water conservation through the realization of nature-based solutions on the long term, for the 1st time in Italy.

Three main phases characterized the governance approach: 1. ES evaluation and prioritization; 2. stakeholder involvement and participated decision on the governance scheme (how to apply and how to integrate the ERC revenues); and 3. integration of the River Basin Management Plan with drinking water and biodiversity aspects and measures.

The approach can be easily replicated in other similar EU contexts.

Keywords: Environmental and Resource Costs (ERC); innovative water governance; ecosystem services; Natura 2000; Nature-Based Solutions (NBS)

3. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Limited consideration of climate change impacts on Ecosystem Services and biodiversity in planning in the highly vulnerable areas of the Italian Apennines

Presenting author: Silvia Ronchi
Other author(s): Mattia Brambilla,
Affiliation: Politecnico di Milano, Italy
Contact: silvia.ronchi@polimi.it

Many inner areas in Europe have a long-standing tradition of agricultural and pastoral use, which has contributed to scenic landscapes and high biodiversity also in many protected areas. Traditional, low-intensity farming areas have been dramatically changed in the last decades. Ecosystem Services (ES) provision in agricultural landscapes is strongly conditioned by farming practices and is interlinked with socio-economic activities. Agricultural intensification has caused a biodiversity collapse (e.g., birds, insects, wildflowers): several

species once common in rural areas have been wiped out by high mechanization and chemical inputs and simplified landscape structures (the latter also resulting from land abandonment in marginal areas). The conservation of biodiversity and many ES is inextricably linked to the maintenance of sustainable agricultural activities. Climate change (CC) is critically affecting biodiversity, ES and farming in many rural areas. CC has significant impacts on ecosystem functions and thus conditions their ability to provide ES and biodiversity, altering the distribution, abundance and interactions of plant and animal species. At the same, it is severely impacting agriculture and hence contributes to disrupting the traditional equilibrium between farming, ecosystems and biodiversity, especially in mountain areas, which are particularly affected.

The link between agriculture, biodiversity and landscape requires a multi-function perspective, where an ES-based approach to territorial planning, supported by spatially explicit models, may allow a synergic consideration of the three components and a proper evaluation of the cross-impacts.

This presentation provides the results from a literature review aiming at understanding the relationships between territorial management and ES in rural mountain areas in the Apennines (Italy) and CC impacts on biodiversity, agricultural practices, landscape and nature-based recreation. Results highlight scarce integration of these issues in planning and suggest strategies and solutions for improving ES supply and biodiversity conservation in rural areas.

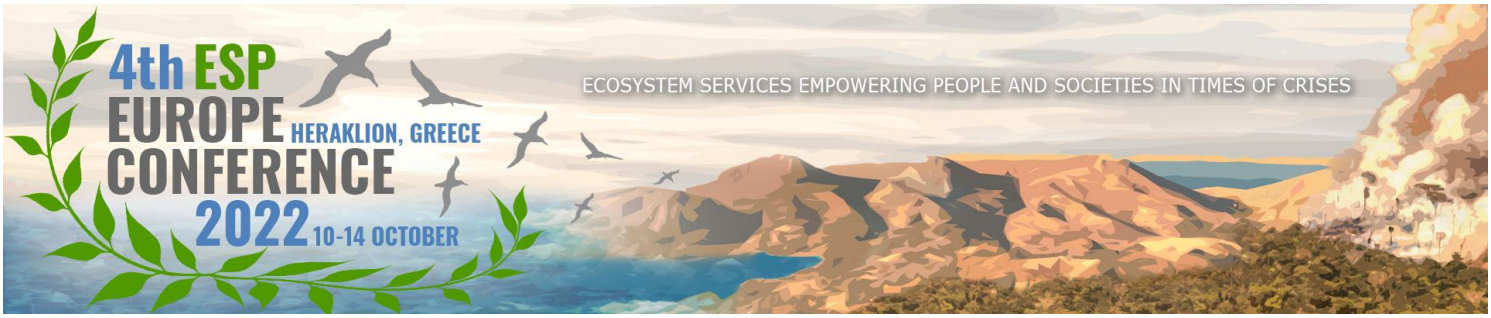
Keywords: Climate change; Territorial vulnerability; Agroecosystem, Landscape, Spatial Planning

4. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Estimation of Habitat Quality using Sentinel-2 imagery in a semi-arid savannah ecosystem

Presenting author: Nesisa Analisa Nyathi
Other author(s): Nikolaus J. Kuhn, Juliane Krenz,
Affiliation: University of Basel, Switzerland
Contact: nesisa.nyathi@unibas.ch

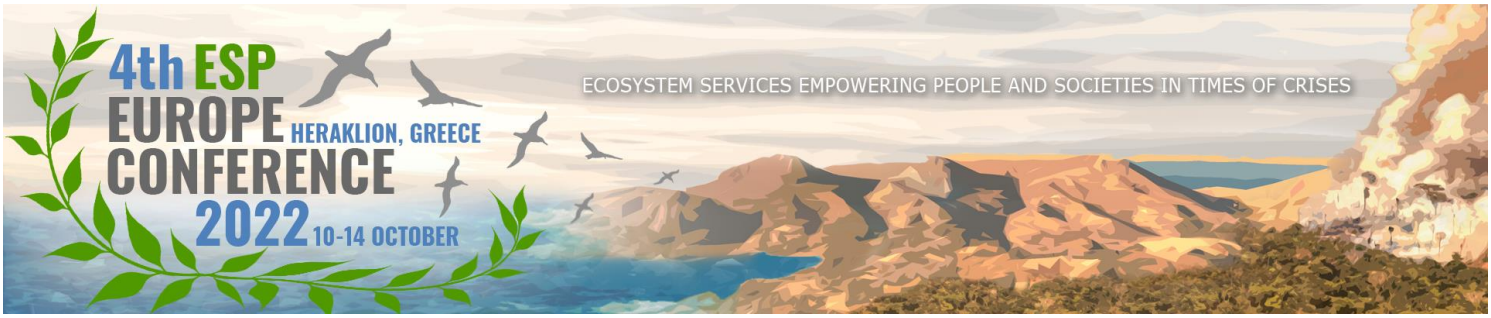


Woody vegetation is one of the most significant indicators of habitat quality in heterogeneous protected areas. With an increase in population pressure as well as climatic changes, habitat quality is highly influenced by woody vegetation pattern changes. In Southern Africa, these semi-arid ecosystems play a vital role in combating forest degradation and enhancing biodiversity conservation. Earth observation techniques are useful in monitoring woody plant species diversity in heterogeneous environments, however, the performance of satellite imagery in assessing woody plant species diversity in dry seasons has been understudied. This study aims to assess the performance of vegetation indices derived from Sentinel-2 imagery to quantify woody plant species diversity in a savannah environment during a dry season. Woody plant species will be counted in 200 plots (30 m radius) and subsequently converted to a continuous scale of the Shannon species diversity index in the Kruger National Park, South Africa. Vegetation indices will be extracted from the different sentinel bands and will be compared against each other to see the index that performs best to isolate vegetation species on satellite imagery. The index will be regressed against the Gray level Concurrence Matrix (GLCMs) using the all-possible-subsets regression approach that builds competing models to choose from. The effect of the number of predicting bands on species diversity estimation will also be explored. It is envisaged that accuracy will increase when three-five bands are used in models but stabilized or gradually decreased as more than five bands are used. The effect of GLCM window size will also be assessed. Findings will demonstrate the capability of GLCMs combined with satellite imagery in estimating woody plants species diversity in a savanna environment during a dry period. Finally, GLCMs results could be used to assess species diversity and habitat quality in other savanna ecosystems.

Keywords: Habitat Quality, Ecosystem services, Earth Observation, Sentinel-2

5. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas



People's perception on ecosystem services and its role as a tool for sustainable management of Portuguese Biosphere Reserves: a participatory approach

Presenting author: Luciana Frazão

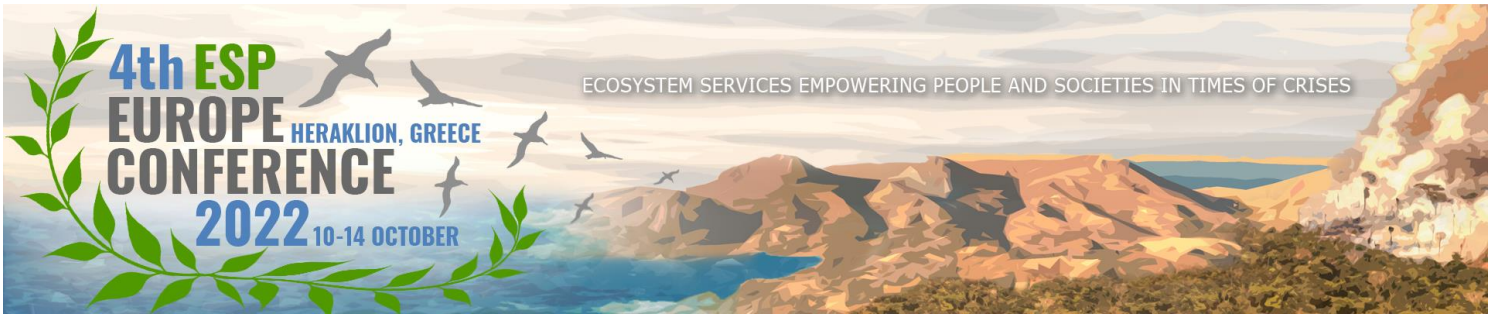
Other author(s): Miguel Moreira, Paula Castro, Maria João Martins

Affiliation: Centre for Functional Ecology – Science for People & the Planet (CFE), TERRA Associate Laboratory, Department of Life Sciences, University of Coimbra, Portugal.

Contact: luca.frazao@uc.pt

Defined as the benefits humans derive from nature, the concept of ecosystem services (ES) clarifies how ecosystems contribute to human well-being. Despite its importance, the idea of ES is hardly implemented in decision-making processes, especially when it is not explicitly treated with its individualities in different areas of intervention. A participatory approach with stakeholders is an essential tool to address the interests of different ES actors and thus help develop the mechanism for the management, conservation, sustainable use, and valuation of ES. Biosphere reserves (BRs) were initially conceived by UNESCO as an international network of nature conservation areas that would "lead through/by example" (by) reconciling the protection of nature with human development. In this sense, the BRs have a crucial role in achieving the UN Sustainable Development Goals, based on three guiding principles: conserving biodiversity, restoring, and enhancing ecosystem services, and promoting the sustainable use of natural resources. Based on participatory methodologies and with a holistic assessment encompassing the different ES's ecological, economic, and social perspectives, we identified the key ES provided by the Portuguese RBs. To achieve this objective, we use a standardized and transdisciplinary approach to integrate stakeholders into the ES assessment conducted in workshops in each BRs in Portugal and then explore the ES based on stakeholders' perceptions. The three key ES identified by the stakeholders and grouped into Nature Contributions to People (NCPs) were Habitat and Conservation, Food and Feed, and Water quantity and flow regulation. Our results are the first step toward putting the concept of ecosystem services (ES) into conservation planning and policy in Portuguese BRs, based on the direct participation of stakeholders and making BRs better examples of how to reach the UN Sustainable Development Goals.

Keywords: Biodiversity, Conservation, Participatory methodology, Local knowledge, Sustainability



6. Type of submission: Abstract

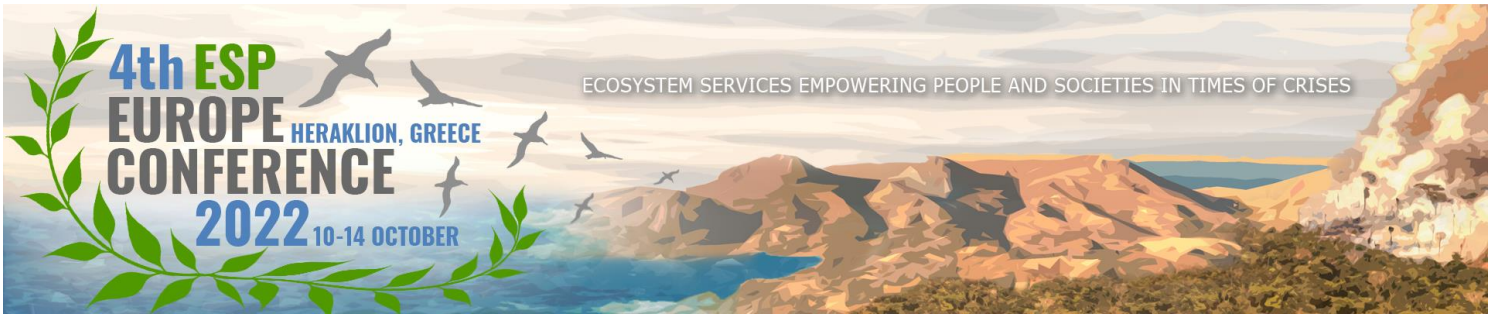
S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Comparison of the merits of the TEEB and IPBES Values Assessment approaches to valuing nature: Empirical evidence from assessments of the value of freshwater ecosystems in Ireland.

Presenting author: Mike Christie
Other author(s): Jasper Kenter, Craig Bullock, Mary Kelly-Quinn
Affiliation: *Aberystwyth University*
Contact: mec@aber.ac.uk

Freshwaters contribute disproportionately to ecosystem services (ES) / Nature's Contributions to People (NCP) despite covering less than 1% of the Earth's surface: freshwater habitats provide water for consumption and food production, flood protection, sanitation, sense of place and recreation (UNEP 2005). Over the past few decades, there has been a growing academic and policy interest in assessing the environmental, economic and social impacts of ecosystem degradation and policies to restore degraded ecosystems. Two broad approaches have emerged from this discourse. The Economics of Ecosystems and Biodiversity (TEEB) initiative advocated the use of economic tools to assess the market and non-market values of ecosystem services. More recently, IPBES has advocated the more encompassing concept of NCP, and its recent Values Assessment highlights a wider range of nature's values and value indicators, as well as approaches to integrate multiple values into decisions. Whilst there is much overlap between the TEEB and IPBES approaches, it is interesting to explore their relative merits for informing policy decision.

This paper draws on two projects funded by the Irish Environmental Protection Agency that explored the value for freshwater systems in Ireland. The first project (ESManage) followed a TEEB-style approach and utilised choice experiments to place economic values on freshwater ecosystem services. The second project (ESDecide) followed an approach similar to that advocated by the recent IPBES Values Assessment, and utilised deliberative valuation methods to explore a wider range of NCP values and also aimed to reconcile value conflicts to form shared visions for future conservation efforts. Drawing on the empirical evidence



from these two studies, we draw broader conclusions on the relative merits of the TEEB and IPBES approaches.

Keywords: TEEB, IPBES, Value, Nature, Freshwater

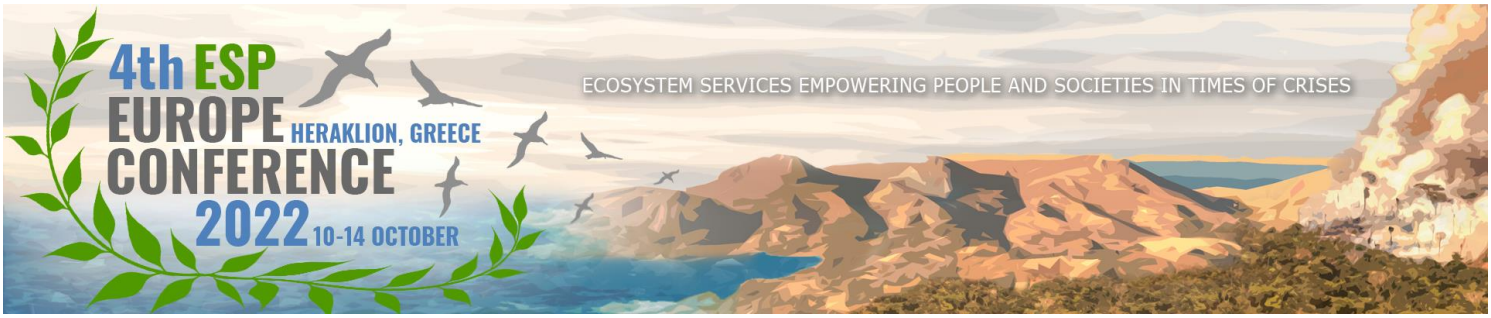
7. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Integrating Ecosystem Valuation in Designing Sustainable Financing Mechanism for Mount Arayat Protected Landscape In Pampanga, Philippines

Presenting author: Roy Joven R. Amatus
Affiliation: Pampanga State Agricultural University, Philippines
Contact: rramatus@up.edu.ph

In the Philippines, the integration of ecosystem valuation to aid protected area (PA) management had been gaining attention, particularly in the development of market-based strategies to augment PA financing. This paper presents the use of economic valuation in assessing the feasibility of two proposed financing mechanisms for Mount Arayat Protected Landscape (MAPL) located in Pampanga, Philippines. One option is the entrance fee increase, and another is the collection of acceptable user fee for recreational bikers. For both options, contingent valuation method (CVM) was employed using different design. For the entrance fee increase, the willingness-to-pay (WTP) of tourists for a proposed forest restoration program was used as the contingent scenario. Meanwhile, for the user fee of recreational bikers, a scenario-based WTP study was conducted considering recreation development, species conservation, landscape conservation, and status quo as scenario. Results showed that the target user groups were amenable to both financing mechanism as indicated by their high WTP. The result of this two WTP study was incorporated into a multi-criteria analysis (MCA) to assess their feasibility for adoption, along with the assessment of legal, administrative, operational and financial criteria. Increasing entrance fee resulted to be highly feasible, while imposing user fee from recreational bikers was less feasible due to higher complexity of implementation. This paper also suggests that the integration of economic valuation with other decision tool could provide a more substantial information to support decision-making in addressing management issues in PAs, in this particular, PA financing.



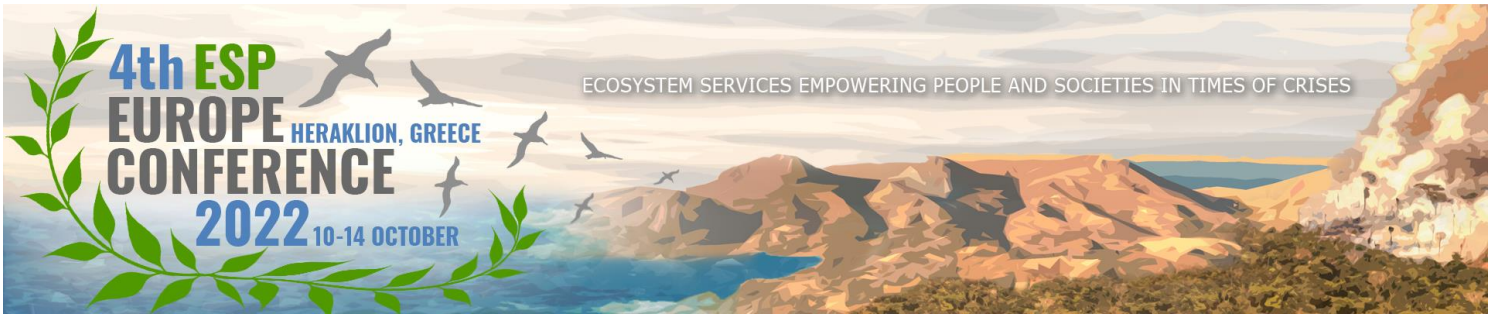
8. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Understanding the role of local governance in ecosystem services provided by the Community Conserved Areas (CCAs) of an indigenous community- A case of Tangkhul Naga tribe in Manipur, North east India.

Presenting author: Chanthingla Horam
Other author(s): Prof. Anand B. Rao, Prof. K Narayanan,
Affiliation: Indian Institute of Technology, Bombay, India
Contact: athingnao@gmail.com

Community Conserved Areas (CCAs) are eco-culturally established forms of forest conservation among the Tangkhul tribes in India since time immemorial. The community under study practices shifting cultivation in mosaic landscape of forests, fallow land and agricultural land. Almost every village has a designated greenbelt (Uyok in local dialect) around the settlement areas and separate conserved areas. The management and governance of these forests lands has been done by the local institution/government known as the Hangva or the Village Authorities (VAs). It also falls under commons where the resources from the areas are equally accessed and utilized by every household under traditional (oral/written) rules and regulations. Although, there is limited study on ecosystem services and functions in the area, the aspect of socio-cultural and capabilities benefits in the form of traditional knowledge and ideas has not been given enough importance. The study specifically aims to come up with a framework for ecosystem services that recognizes these local specific issues. The methods of focus group discussions with the VAs across 10 sample villages in two districts and in-depth interviews of key informants (local practitioners and government officials) were used to collect data. The study comes out with three crucial and synergistic results. Firstly, understanding the local perspective of multi-functional landscape management and the unique local governance system of natural resources by the VAs. Secondly, an alternative ecosystem services framework tailored in the context of the study area entailing well-being of the community and the need for economic capacitation through incentive methods. Thirdly, recognizing the existing non-uniform land laws across the state that impedes effective multi-level governance of the conserved areas.



Keywords: Ecosystem services, Local governance, Indigenous community, Well-being

9. Type of submission: Abstract

S. Sectoral Working Group sessions: S8a - The role of Ecosystem Services as a tool for successful multilevel governance of protected areas

Plant community shifts in Baltic coastal wetlands as a consequence of climate change

Presenting author: Thaisa Fernandes Bergamo
Other author(s):
Affiliation: Estonian University of Life Sciences, Estonia
Contact: thaisafbergamo@gmail.com

Coastal wetlands are valuable ecosystems for their biodiversity and ecosystem services. However, coastal wetlands worldwide are subject to various impacts resulting from natural and anthropogenic drivers. Climate change consequences are evident in the Baltic Sea region, with modifications in sea water circulation, temperature and salinity. Due to the high importance of coastal wetlands, it is essential to determine how future conditions will influence coastal plant community functioning. In order to assess the climate change effects in coastal wetlands, an investigation of the influence of altered water level and salinity on coastal wetland plant communities was undertaken. Future scenarios of Baltic coastal wetlands were evaluated using a three-year mesocosm experiment simulating altered environmental conditions. The response of three plant communities (Open Pioneer-OP, Lower Shore-LS and Upper Shore-US) were assessed in terms of species composition changes over time. The experiment included 45 mesocosms, 15 per community with 5 treatments (3 replicates per treatment) with control, altered water level and salinity. In order to analyse the differences among treatments in plant communities through time, Permutational Multivariate analysis of variance (PERMANOVA) was performed. Finally, a principal coordinate analysis (PCoA) based on Bray-Curtis dissimilarity was used to visualize the community responses to treatments in each year. The results showed that year and treatment influenced plant community composition. PCoA revealed plant community shifts in OP in the second year of experiment. Species were clustered in LS and US communities compared to OP, but changes were still noted. The small species spread throughout the years in ordination space in LS and US suggests a higher similarity degree between communities across treatments. Based on these experiments, it can be concluded that

altered water level and salinity in Baltic coastal wetlands can impact species composition in communities, which support high diversity and are important for conservation.

Keywords: Coastal wetlands, plant communities, climate change