ESP EUROPE

2018 REGIONAL CONFERENCE

Ecosystem services in a changing world:
moving from theory to practice

SAN SEBASTIÁN, SPAIN

15-19 OCTOBER 2018

BOOK OF ABSTRACT

I.   SESSION DESCRIPTION

ID: T4a

Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

Hosts:

	Title	Name	Organisation
Host:	Prof.	Benjamin Burkhard	Leibniz Universität Hannover
Co-host(s):	Dr. Dr.	Joachim Maes Fernando Santos-Martin	JRC Europe Autonomous University of Madrid Trento University
	Dr.	Davide Geneletti	

Abstract:

Mapping and Assessment of Ecosystems and their Services (MAES) is a fundamental strategy to bring ecosystem services (ES) into practical application in policy and decision making. ES maps can be applied to raise awareness and to provide information about areas of ES supply and demand and to reveal human dependence on functioning nature. These facts have been taken up by the European Union (EU) and its Biodiversity Strategy. The implementation of the working group on MAES and several related projects such as ESMERALDA, MESEU, OpenNESS, OPERAs or KIP-INCA are just a few examples following this strategy. Additionally, manifold ecosystem assessments studies have been initiated at different scales and for different policy purposes in EU member states. The outcome of all these initiatives has the potential

to support the needs of integrated assessments related to policy making (e.g. agriculture, climate, water and nature policy), planning (e.g. landscape and urban planning), various business sectors (e.g. natural accounting) and the society (eg. environmental awareness or social conflicts). Robust and reliable data of ecosystems and ES collected at multiple scales are needed if we are to make informed and evidence-based decisions.

Goals and objectives of the session:

The overall goal is to bridge the gap between scientific outcomes and practical real-life applications. We want to make solutions for ES mapping and assessment problems available to stakeholders from EU member states, building for instance on existing research projects, knowledge and data sharing systems.
The main objectives are:
• To share the work on mapping and assessment of ES and foster debate by experts, policy makers, and interested stakeholders.
• To share an update of country practice, as experimentation at Member State level is what is driving a lot of the progress, as well as the MAES initiative.
• To discuss the potential of MAES in contributing to policy and decision-making, identify paths to progress towards to 2020 Aichi target as well EU Biodiversity Strategy and the 7th Environment Action Programme

Planned output / Deliverables:

An open access journal publication on science-policy-society interactions within MAES.

Related to ESP Working Group/National Network:

Thematic Working Groups: T4 – Mapping ES

II.   SESSION PROGRAM

Date of session: Tuesday, 16 October 2018
Time of session: 8:45 – 18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
8:45–9:00	Benjamin	Burkhard	Leibniz Universität Hannover	Session Introduction • Block I: MAES Methods • Block II: ESMERALDA outcomes • Block III: National scale MAES • Block IV: European scale MAES
9:00–9:15	Sara	Vallecillo	European Commission – Joint Research Centre	Mapping and Assessment of Ecosystems and their Services (MAES): guidance and integration in policy
9:15–9:30	Mario	Torralba	University of Kassel	Operationalizing socio-cultural methods of mapping and assessment of ecosystem services and their contribution to cross-cutting policy and societal questions
9:30–9:45	Miguel	Villoslada	Estonian University of Life Sciences	From expert-based assessments to UAV-born images: a tiered framework for semi-natural grassland ecosystem services
9:45–10:00	Philip	Roche	IRSTEA	Comparing expert based capacity matrices ecosystem services scores with

Time	First name	Surname	Organization	Title of presentation
				biophysical quantitative indicators and models at regional level
10:00–10:15	Discussion Block I: Methods			
11:30–11:45	Benjamin	Burkhard	Leibniz Universität Hannover	Mapping and assessing ecosystems services in the EU – Lessons from the ESMERALDA Coordination and Support Action
11:45–12:00	Davide	Geneletti	University of Trento	Identifying representative case studies for ecosystem services mapping and assessment across Europe: Lesson learned
12:00–12:15	Inge	Liekens	VITO	Which questions drive the Mapping and Assessment of Ecosystems and their Services under Action 5 of the EU Biodiversity Strategy?
12:15–12:30	Anda	Ruskule	Baltic Environmental Forum – Latvia	Mapping and assessment of cultural ecosystem services of Latvian coastal areas
12:30–12:45	Panayotis	Dimopoulos	University of Patras	A multidisciplinary critical review of ecosystem services studies in Greece: approaches, shortcomings and the pathway to implementation

Time	First name	Surname	Organization	Title of presentation
12:45–13:00	Discussion Block II: ESMERALDA outcomes			
14:30–14:45	Katie	Medcalf	Environment Systems	Mapping Ecosystem Services in Wales for health, well-being and environmental resilience at a local to country scale
14:45–15:00	Karsten	Grunewald	Leibniz Institute of Ecological Urban and Regional Development	National mapping of ecosystems, their conditions and services in Germany
15:00–15:15	Ieva	Misiune	Mykolas Romeris University	LINESAM: Initial results of Lithuanian National Ecosystem Services Assessment and Mapping project
15:15–15:30	Peter	Mederly	Constantine the Philosopher University in Nitra	Ecosystem services mapping and assessment methods at national level in Slovakia
15:30–15:45	Eszter	Tanács	Centre for Ecological Research, Hungarian Academy of Sciences	Assessment and implementation of ecosystem condition indicators in the Hungarian MAES
15:45–16:00				Discussion Block III: National scale studies

Time	First name	Surname	Organization	Title of presentation
16:30-16:45	Lukas	Egarter Vigl	Eurac Research	A pan-Alpine approach to assess multiple Ecosystem Services
16:45-17:00	Maria C.	Uyarra	AZTI	Ecosystem services in European legislation: contribution of the Marine Strategy Framework Directive to the Biodiversity Strategy 2020
17:00-17:15	Luis	Inostroza	Ruhr-University Bochum	The entanglement of ecosystem services provision. Bundling Ecosystem services to ascertain spatiotemporal trade-offs and synergies in Europe
17:15-17:30				Discussion Block IV: European scale studies
17:30-17:45				Overall Discussion
17:45-18:00				Conclusions

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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**

T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

Mapping and assessing ecosystems services in the EU – Lessons from the ESMERALDA Coordination and Support Action

First author: Benjamin Burkhard, Joachim Maes

Other author(s): Fernando Santos-Martin, Davide Geneletti

Affiliation, Country: Leibniz Universität Hannover, JRC Ispra, Germany

The recently completed EU Horizon 2020 Coordination and Support Action ESMERALDA aimed at developing a flexible methodology for Mapping and Assessment of Ecosystems and their Services (MAES) to support EU member states in the implementation of the Biodiversity Strategy's Target 2 Action 5. ESMERALDA's key tasks included network creation, stakeholder engagement, enhancing ecosystem services (ES) mapping and assessment methods across various spatial scales and value domains, work in case studies and support of EU member states in MAES implementation. The overall aim was to provide guidance for integrated ecosystem assessments that can be used for sustainable decision making in policy, business, society, practice and science at EU, national and regional levels. The presentation will give an overview of ESMERALDA's key achievements, including the successful implementation of a stakeholder network in all 28 EU member states, Switzerland, Norway and Israel as well as the initiation of MAES activities in the EU overseas and several EU candidate states. The project collected a comprehensive overview of ES-related methods from biophysical, social-cultural and economic sciences and applied them in real world case studies related to questions from policy, business and the society. The overall ESMERALDA approach of integrating above-mentioned project components and outcomes and how they can be used to support MAES implementation in EU member states by using up-to-date open access information and data sharing tools are another key of success. Experience with implementing such a Coordination and Support Action in the context of EU policy will be discussed and recommendations for future actions will be given.

2. *Type of submission:* **Abstract**
T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

A multidisciplinary critical review of ecosystem services studies in Greece: approaches, shortcomings and the pathway to implementation

First author: Panayotis Dimopoulos

Other author(s): Ioannis P. Kokkoris, Evangelia Drakou, Eleni Bekri, Sinos Giokas, Athanasios S. Kallimanis, Stelios Katsanevakis, Georgios Mallinis, Ioannis Mitsopoulos, Maria Panitsa, Eva Papastergiadou, Dimitrios Skuras, Maria Tsiafouli, Jeroen Arends
Affiliation: University of Patras, Department of Biology, Section of Plant Biology, Greece

During the last two decades, ecosystem services (ES) research is used to inform the various steps of decision- and policy- making process, regarding environmental management, spatial planning and natural capital accounting. In the EU, this vast and rapid publication boom was triggered by the enactment of Action 5 of the EU Biodiversity Strategy to 2020, urging Member States to implement Mapping and Assessment of Ecosystem and their Services (MAES); few countries pioneered, while others are still lagging behind. In Greece, the implementation of MAES started in 2014 and since then an impressive progress has been made, with Greece now being among the countries with the most rapid progress. However, there are still major knowledge and data gaps on ecosystem services in Greece; know-how on specific methods, tools and practices is still to be developed. This poses obstacles in integrative efforts to identify and/or interpret the various co-variates affecting ecosystems and their services in space and time and hinders the incorporation of the ES generated information into the decision-making process. Making the first steps towards overcoming these hurdles, the present study aims to (i) synthesize the ecosystem services literature relevant to the ES implementation in Greece, (ii) validate and classify each literature source to the relevant ecosystem services categories, (iii) identify shortcomings in terms of ES assessed and data available, and (iv) critically review the variety of approaches to ES assessments that are followed. The outcomes of this study will facilitate the efficient implementation of ecosystem services assessments in Greece.

3.   Type of submission: **Abstract**

A pan-Alpine approach to assess multiple Ecosystem Services

First author: Lukas Egarter Vigl
Other author(s): S. Candiago, A. Labadini, T. Marsoner
Affiliation, Country: Eurac Research (Italy), Iceland

In the European Alpine region, the intersection of different socio-political boundaries draws a spatial mosaic in which management practices and values attributed to ecosystems and their services (ES) differ significantly across borders. This brings about a need for a transnational approach to the quantification and mapping of ES, their dynamics and relationships, able to support their management beyond administrative limits. In the framework of the project AlpES – Alpine Ecosystem Services: mapping- maintenance- management, we mapped the spatial distribution of key ES at the municipal level for over 16.000 municipalities throughout the Alpine Space (AS). The present study outlines the methodology used to quantify and map the respective ES, based on the biophysical processes that sustain their provision and on a socio-cultural approach for those studied upon human preferences, and provides insights into the results of our work. The provision dynamics of each ES were analysed and mapped by means of a multiple-indicator approach, studying, respectively, its supply, the demand from society and the actual flow of its use. Our results build on an interpretation of the spatial distribution of the different indicators through the calculation of ES budgets at different scales and the analyses of synergies and trade-offs. They confirm the inner core of the AS as a hotspot of ES supply, and substantial spatial mismatches with a high ES demand located in the Alpine foothills and AS border areas. They also show different spatial patterns in ES provision, and their strong interrelations with the extent of managed lands, practices of management and land use intensity in the different administrative regions. Drawing from these results, we advance some considerations on the potential of our methodology, as a coherent analytical

framework for large-scale ES assessment, to serve as basis for governance and ES monitoring at the pan-Alpine level.

Keywords: Ecosystem Service hot- and coldspots, mountain regions, municipal scale, indicators

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

Identifying representative case studies for ecosystem services mapping and assessment across Europe: Lesson learned

First author: Davide Geneletti
Other author(s): Blal Adem Esmail
Affiliation, Country: University of Trento, Italy

This paper illustrates the selection and analysis of case studies performed during the Horizon2020 ESMERALDA to test and apply a 'flexible methodology' for ecosystem services mapping and assessment. Case studies consist of working examples in which mapping and assessment of ecosystem services was applied to address specific decision problems. Case studies were selected in such a way that they are representative of: (i) the variety of existing conditions across the EU, in terms of data availability, spatial scale, levels of implementation of EU 2020 targets, and expertise and experience in ES mapping and assessment; (ii) the geographical regions and biomes of the entire EU, including marine areas and the outermost regions; (iii) the variety of cross-EU themes relevant for ecosystem services, such as Common Agricultural Policy, Green Infrastructure, Natura 2000 network, forestry strategy, water policy, energy, business and industry sectors, and health; (iv) the variety of policy and planning processes that can be used to mainstream ecosystem services in real-life decisions, such as spatial and land use planning, water resource management, flooding under the EU climate adaptation action, energy policy, strategic environmental assessment, protected area planning. The resulting database of case studies is presented and discussed in the light of the lesson learned associated to the different stages of the ecosystem services mapping and assessment (e.g., identification of stakeholders, assessment of ecosystem conditions, implementation, etc).

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

T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

National mapping of ecosystems, their conditions and services in Germany

First author: Karsten Grunewald

Other author(s): Ralf-Uwe Syrbe

Affiliation, Country: Leibniz Institute of Ecological Urban and Regional Development, Germany

In accordance with the requirements of the EU Biodiversity Strategy 2020, a system of national indicators for Germany was developed and coordinated. The presentation gives an overview of the ecosystem extent account and condition as well as services indicators for Germany in the context of recent research projects. The national classification of ecosystems is based on the CORINE Land Cover (CLC) data scheme and considers the European University Information System (EUNIS). The ecosystem mapping in Germany make use of the so-called LBM-DE data set, an improvement of topographical geo-data with detailed land-use information according to the CLC scheme, regularly provided by the Federal Agency for Cartography and Geodesy. We developed a nationwide classification and analyzed the above-mentioned data according to the 1 x 1 km raster grid in a first step for 5 primary and 14 secondary ecosystem classes measuring their dominance and areal proportion.The politically most relevant ecosystem services have been selected and assessed by use of quantitative indicators that fit into the EU-wide indicator schemes. The aspects of data selection, calculation and their negotiation with different national experts and authorities will be illustrated by way of examples. The German indicator-based approach measure ecosystem services in their spatial expression and temporal change and compares them with specific target values. As far as possible, this is carried out according to the demand-supply concept. We proposed a total of 51 indicators, of which 14 indicators were accepted, implemented and published up to now. In most cases, there is a main indicator that captures the essential service of a certain class, supplemented by several side indicators measuring special aspects. The national mapping and assessment of ecosystem services in Germany is still an ongoing process.

Keywords: ecosystem extent, conditions, indicators, monitoring, relevance

6. *Type of submission:* **Abstract**

The entanglement of ecosystem services provision. Bundling Ecosystem services to ascertain spatiotemporal trade-offs and synergies in Europe

First author: Luis Inostroza, Harald Zepp
Other author(s): Richard Lemoine-Rodriguez
Affiliation, Country: Ruhr-University Bochum, Ruhr-University Bochum, Germany

The classification of Ecosystem Services (ES) into regulating (RES), provisioning (PES) and cultural (CES) is a powerful analytical tool for the ex-ante identification of the benefits coming to society from the healthy functioning of ecosystems. While classifying ES into RES, PES and CES make sense a priori, the particular interaction of ES in space and time might be geographically determined, and therefore particular bundles of ES will not necessarily respect those categorical boundaries. The spatiotemporal entanglement of ES is crucial to design adequate policies, while ES responses would not be constrained by RES, PES and CES classes, rather by the specific geographical and socio-economic circumstances determining them. This spatial dependence of ES is determinant regarding trade-offs and synergies between bundles of ES. Bundling ES using the current classification system might be hiding synergies or even fostering trade-offs between ES belonging to different groups. In this research, a bundling exercise of ES provision was done for 27 countries in Europe. Using the CORINE dataset we run a Principal Component Analysis (PCA) for the years 1990, 2006 and 2012. To ascertain for the spatiotemporal changes we used three scales of analysis, the country, the NUP3 and a hexagonal 100 km2 grid. We report those changes regarding RES, PES and CES to compare them with spatiotemporal bundles of ES using the three spatial units. Our results suggest that bundles of ES do not respect a-priory classifications, with strong trade-offs between apriori categories. Furthermore, administrative units like countries and regions can greatly hide trade-offs and synergies, which are only evident at smaller spatial scales and not respecting such artificial boundaries. While bundling of ES is one of the priority areas to advance towards sustainability, bundling ES in a spatially explicit manner is fundamental to support adequate policy making.

7. *Type of submission:* **Invited speaker abstract**
T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

Which questions drive the Mapping and Assessment of Ecosystems and their Services under Action 5 of the EU Biodiversity Strategy?

First author: Joachim Maes, Inge Liekens
Other author(s): Claire Brown
Affiliation, Country: JRC, VITO, Belgium

Action 5 of the European Union's Biodiversity Strategy to 2020 asks that Member Statesmap and assess the state of ecosystems and their services in their national territory.Policymakers and stakeholders of these countries frequently ask why this work is necessary. This article shows that this question can be broken down into a number of specific questions which, in turn, bring specific requests for knowledge and guidance to the surface. This paper develops a typology of questions and identifies the following five categories: knowledge requests, policy support questions, questions on resources and responsibilities, application questions and technical and methodological guidance questions. Next, this typology of questions is framed in an adaptive policy cycle and coupled to a set of available solutions.

Mapping and Assessment of Ecosystems and their Services (MAES): guidance and integration in policy

First author: Joachim Maes
Other author(s): Anne Teller, Markus Erhard, Sara Vallecillo
Presenting author: Sara Vallecillo
Affiliation, Country: Joint Research Centre, European Commission, Italy

Target 2 of the European Union's (EU) Biodiversity Strategy to 2020 aims to maintain and enhance ecosystem services in Europe. To this end, the European Commission is developing a knowledge base on ecosystems and ecosystem services. Action 5 of the Strategy sets the basis for this knowledge base. It requires that the EU Member States, together with the European Commission, map and assess the state of ecosystems and their services in their national territory by 2014 and to assess the economic value of such services. Member States are also required to promote the integration of these values into accounting and reporting systems at national and EU level by 2020.This paper updates on the guidance developed under the MAES initiative, in particular on ecosystem condition. Furthermore, we show specific examples of how mapping and assessment of ecosystem condition and ecosystem services can or has been integrated in policymaking at different spatial scales. Case studies include pollination, and the implementation of green infrastructure at regional and urban scales. These case studies share an ad hoc approach to mapping and assessment. A deeper integration of ecosystems and their services in various policies would benefit from regularly updated data on the spatial distribution of ecosystems, ecosystem condition and ecosystem services. This is the objective of ecosystem accounts, an important next phase of Action 5. By making use of maps that display ecosystem service potential and demand we show how biophysical mapping of pollination can be organized into pollination account.

Keywords: MAES, pollination, green infrastructure

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9. *Type of submission:* **Abstract**

Mapping Ecosystem Services in Wales for health, well-being and environmental resilience at a local to country scale

First author: Katie Medcalf, Russell Elliott

Other author(s): Gemma Bell, Elsa-Kristin Naummann, Tim Pegella

Affiliation, Country: Environment Systems, National Resources Wales, United Kingdom

Natural Resources Wales (NRW) have a responsibility under the Environment Act (Wales) 2016 to help Wales achieve the sustainable management of natural resources. This requires the safeguarding and building of ecosystem resilience through activities such as maintaining biodiversity and understanding ecosystem services. This project used ecosystem services mapping to deliver wide-ranging wellbeing benefits, including reduced flood risk to people and properties, decreased pollutant loads in the water environment, enhanced access to green infrastructure, and woodland planting for multiple-benefits in order to maximise health-and-well-being in Wales. NRW, together with Environment System Ltd, have modelled and mapped a range of factors linked to ecosystem services opportunities and demand to underpin the delivery of the Welsh Government Natural resources policy.The modelling builds on the SENCE (Spatial Evidence for Natural Capital Evaluation) framework and uses the expertise of key NRW staff to understand the contribution of individual habitats to various ecosystem services. The mapping shows the 'opportunity space', i.e. where the land management can be changed to benefit the ecosystems and their services. These maps create a spatial understanding of where it is biophysically possible to undertake action for specific services (or for multiple services) together with constraints and sensitivities, i.e. extra considerations that need to be taken into account during management. In addition, we have considered demand for services spatially. These maps help on-the-ground decision making and national staff working at a policy level to prioritise management interventions. The talk will address how mapping of ecosystem services has been addresses in Wales. It will also cover how Wales Environment Act (2016) is taking forward the European Green Infrastructure Strategy thinking. It concludes by demonstrating how the maps are being used in practice at a local level with communities and stakeholder groups.

10. Type of submission: **Abstract**
T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

Ecosystem services mapping and assessment methods at national level in Slovakia

First author: Peter Mederly

Other author(s): Matej Močko, Martin Jančovič, František Petrovič, Ján Černecký, Ľuboš Halada

Affiliation, Country: Constantine the Philosopher University in Nitra, Slovakia

The presentation describes methodology and results of national ecosystem services (ES) assessment in Slovakia; based on results of MAES process, existing spatial and statistical data and original research methodology. The first step of national ES assessment was realised during the Slovak MAES process and included the selection of important ES for evaluation process. As a result of deliberative valuation of involved experts, 14 ES were selected – from these 10 ES were finally selected for further assessment in our research (3 provisioning, 5 regulating & maintenance and 2 cultural). In the next stage, the theoretical and methodological framework for the national ES assessment is being established. The basic step is to determine the landscape capacity for ES provision based on development and actual state of ecosystems and natural landscapes. The further ES demand evaluation is based on socio-economic indicators at the level of administrative units. The expression of the real ES flows, the overall balance and the identification of spatial and functional mismatches is the final methodological step. Thus, a comprehensive conceptual model of ES assessment was created, inspired also by other national studies. The ES assessment process is currently being implemented. It is based on the selection of spatial units and indicators at the level of ecosystems (habitat types, watersheds), administrative units (municipalities, districts), natural features (topology, geology, soils, climate, water, biota) and the selected socio-economic parameters (population, human activities, resources use). Models of capacity, demand, flow and final balance of ES use are gradually created and evaluated for each of the 10 ES.

T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

LINESAM: Initial results of Lithuanian National Ecosystem Services Assessment and Mapping project

First author: Ieva Misiune, Paulo Pereira

Other author(s): Paulo Pereira, Katarzyna Miksza, Kristina Simonaityte, Daniel Depellegrin

Affiliation, Country: Mykolas Romeris University, Environmental Management Laboratory, Lithuania

National Mapping and Assessment of Ecosystems and their Services (MAES) is becoming an essential knowledge base for strategic planning and policy-making. Little research has been carried out regarding national ES mapping and assessment in Eastern European country, namely Lithuania. The LINESAM Project (Lithuanian National Ecosystem Services Assessment and Mapping) aims to fill this gap and proposes a Lithuanian wide ES assessment and mapping methodology in response to Article 5 of the Biodiversity Strategy 2020 requiring to map and assess ecosystems' state and their services. The project has the following objectives: 1) to develop a scalable and flexible national ES mapping and assessment framework to improve the understanding of the relationships between ecosystems, biodiversity and human wellbeing. Assessment and mapping procedure are based on a multi-tiered approach and will provide a full set of terrestrial and marine MAES methodologies; 2) to develop and apply stakeholders engagement strategy; 3) to provide methodologies for the analysis of environmental and socio-economic drivers of change relevant on national level and assess areas of highest effect to ES provisioning supply; 4) to develop the four case studies on regional or local scale considering geographical representativeness, socio-ecological and economic relevance, heterogeneity of ecosystems and diversification of methodologies; and 5) to develop and implement the LINESAM Geoportal, which makes available datasets, metadata, assessment methods, maps and documentation for national level analysis. This supports transparent and replicable data and knowledge sharing, makes it open to scientific community, researchers, planners and decision-makers as well as to the other stakeholders.The main aim of this presentation is to demonstrate the initial results from ES mapping for the terrestrial and marine biome and give the examples on the functionality of the geoportal. The support of an enhanced

knowledge about national ES assessment and mapping through the knowledge sharing system will be discussed.

12. *Type of submission:* **Abstract**

Comparing expert based capacity matrices ecosystem services scores with biophysical quantitative indicators and models at regional level

First author: Philip Roche
Other author(s): C. Sylvie Campagne
Affiliation, Country: UR RECOVER, IRSTEA, France

The use of expert based estimates of ecosystem services provision or demand is a widely used approach to obtain rapid estimates of ecosystem services based on the experience and the knowledge of some people on specific habitats or regions. The capacity matrices resulting from these estimates link habitats and/or land cover classes with the capacity of provision of ecosystem services. Despites methods that can be used to strengthen the robustness of scores derived from expert assessment, the quality of those scores and their relation with quantitative estimates are often criticized for not being proper estimates of ecosystem services. Quantitative estimates based on published model outputs and quantitative indicators for 7 ecosystem services were compared with expert based capacity matrix scores for the "Haut de France" region in the North of France at habitat and landscape levels. We estimates and tested ES scores and quantitative values at habitat level and at regional level using maps at 1km2 resolution. Our results point toward the existence of significant nonlinear positive correlations between the experts scores and the quantitative estimates. These results support our hypothesis that the collective experts' knowledge can be mobilized to produce relevant ES biophysical estimates. This study confirms that expert based ecosystem services assessment and capacity matrices allows to have a quick and efficient assessment at ecosystem services capacity at habitat level, that can be used for ecosystem services mapping at regional level.

Mapping and assessment of cultural ecosystem services of Latvian coastal areas

First author: Anda Ruskule

Other author(s): Andris Klepers, Kristina Veidemane

Affiliation, Country: Baltic Environmental Forum, Latvia

Despite the high decision-making relevance for coastal and maritime spatial planning, the mapping of Cultural Ecosystem Services (CES) in coastal areas is still recognised as a conceptually and technically challenging task and is consequently underrepresented in the overall efforts of ecosystem service mapping and assessment. The intangible character of CES makes it difficult to establish a clear link between the biophysical features of the coastal ecosystem and the supply of services such as recreation and tourism, bird watching and enjoyment of other assets of nature. This was also one of the major challenges in ecosystem service mapping for the Maritime Spatial Plan for Internal Waters, Territorial Waters and Economic Exclusive Zone of the Republic of Latvia. Suitability of the coastal areas for marine tourism and leisure activities was chosen as an indicator to map the CES – physical and experiential interactions. The method involved the compilation of field data from a survey of visitors at the beach and on coastal infrastructure, serving as the input for the multi-criteria assessment of CES. Suitability of coastal areas for tourism and leisure was assessed on the scale 1–5, where "1" meant very low suitability and "5" – very high suitability. The results were presented on the map in grid cells of 3 x 3 km. The map of cultural ecosystem services was applied in the maritime spatial planning for proposing areas of priority for tourism development, as well as assessing the impacts of the proposed solutions for other uses of the sea. The Latvian approach for mapping of the cultural services in coastal areas was selected as the ESMERALDA case study and examined at the stakeholder workshop in Prague, September 2016.

Keywords: Cultural ecosystem services, coastal ecosystems, maritime spatial planning, tourism potential, multi-criteria analysis

Assessment and implementation of ecosystem condition indicators in the Hungarian MAES

First author: Eszter Tanács

Other author(s): Ágnes Vári, Bálint Czúcz, Lívia Fodor, Ágnes Kalóczkai, Márton Kiss, Anikó Kovács-Hostyánszki, Rita Rezneki, Katalin Török, Ildikó Varga, Anikó Zölei, Zita Zsembery

Affiliation, Country: Centre for Ecological Research, Hungarian Academy of Sciences, Hungary

Only healthy ecosystems are able to provide ecosystem services (ES) in adequate quality and quantity. However, the use of ES may lead to ecosystem degradation, especially when management aims to maximise the use of one service at the expense of others. The concept of "ecosystem condition" covers those characteristics of ecosystems that enable ecosystems to provide a broad range of services to the society. In Hungary mapping and assessment of the ecosystems and their services (MAES-HU) has started in 2016 in the framework of a project entitled „Strategic Investigations on the long-term preservation and development of natural heritage of Community Importance and on the implementation of the EU Biodiversity Strategy 2020 objective", led by the Hungarian Ministry of Agriculture. Thirteen ES were chosen that will be evaluated at four different levels of the cascade model, starting with ecosystem condition at the first level.In MAES-HU three main ecosystem condition indicators were defined at the beginning, which were considered relevant for more or less all ES: "naturalness", "soil fertility" and "landscape diversity". For naturalness, different approaches are planned to be applied (e.g. biodiversity- and land use intensity-based indicators) for each major ecosystem type. As the work progresses it is becoming apparent that some of these indicators can be directly included in the ES assessment (e.g. soil fertility) while in the case of others (e.g. naturalness), the effects of condition on most ES are less direct or less known. Besides these general condition indicators, other EC indicators are chosen or developed, specifically relevant to the particular ES. Following the EU MAES recommendations the work is based on existing national and European databases, however data quality and availability are important issues.

Keywords: ecosystem condition, Hungary, ecosystem services, ecosystem service mapping, national assessment

15. Type of submission: **Abstract**

T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services
for Policy and Decision Making in EU Member States

Operationalizing socio-cultural methods of mapping and assessment of ecosystem services and their contribution to cross-cutting policy and societal questions

First author: Mario Torralba

Other author(s): Erling Andersen, Nora Fagerholm, Anton Stahl Olafsson, Tobias Plieninger, Fernando Santos

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Socio-cultural methods for mapping and assessing ecosystem services (ES) address the importance, preferences, needs or demands expressed by people (i.e. individual and groups) towards nature. Social methods for mapping and assessing ecosystem services are increasingly gaining attention by academics and policy makers; and a wide variety of methods for socio-cultural assessment has proven effective in capturing perceptions, values, attitudes, and beliefs and, thus, can provide meaningful insights regarding nature's contributions to human well-being and transformations to sustainability. In particular, socio-cultural methods facilitate the understanding of the relevance of ecosystem services for different stakeholders, allowing cultural sensitivity and recognition of trade-offs in ecosystem service assessment. There is still, however, the recurrent misconception that these methods provide results of difficult interpretation and that they rely on arbitrary indicators. These argumentations limit socio-cultural methods from being mainstreamed as a formalized methodological framework for decision support in crosscutting policy and societal questions. Here we provide an overview of the main socio-cultural methods for mapping and assessment of ecosystem services and different examples on how to apply them for different purposes and at different scales. Based on a global set of published studies using both quantitative and qualitative approaches, we classify socio-cultural methods in relation to how they engage individuals or groups to collect their perceptions and values; and distill the main links of each different method to a wide range of policy instruments and decision contexts. Ultimately, we aim to derive recommendations that guide the application of socio-cultural and the operationalization of these in ecosystem service assessments and public policies oriented toward sustainability.(We acknowledge funding

16. Type of submission: **Abstract**

Ecosystem services in European legislation: contribution of the Marine Strategy Framework Directive to the Biodiversity Strategy 2020

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The European Marine Strategy Framework The European Marine Strategy Framework Directive (MSFD) "establishes a framework for community action in the field of marine environmental policy", promoting the preservation and protection of marine waters in European member states. It requires that by 2020 member states achieve the Good Environmental Status (GES), which is defined as: "the environmental status of marine waters where these provide ecologically diverse and dynamic oceans and seas which are clean, healthy and productive within their intrinsic conditions, and the use of the marine environment is at a level that is sustainable, thus safeguarding the potential for uses and activities by current and future generations." This definition implies that ecosystem services should be taken into consideration, although these are not explicitly mentioned. On the other hand, Action 5 of the EU Biodiversity Strategy to 2020 calls Member States to map and assess the state of ecosystems and their services in their national territory. In this study, we explore the contribution of the Spanish Programme of Measures developed under the framework of the MSFD to the performance of ecosystem services and therefore, to the implementation of the EU Biodiversity Strategy 2020. This assessment was carried out applying expert-judgement. This pragmatic approach enabled to confirm the positive contribution of the MSFD to the Biodiversity Strategy 2020. However, the later preferably requires the use of a more quantitative analysis, which we may be yet far from achieving.

17. Type of submission: **Abstract**

Mapping and Assessment of Ecosystems and their Services (MAES): guidance and integration in policy

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Target 2 of the European Union's (EU) Biodiversity Strategy to 2020 aims to maintain and enhance ecosystem services in Europe. To this end, the European Commission is developing a knowledge base on ecosystems and ecosystem services. Action 5 of the Strategy sets the basis for this knowledge base. It requires that the EU Member States, together with the European Commission, map and assess the state of ecosystems and their services in their national territory by 2014 and to assess the economic value of such services. Member States are also required to promote the integration of these values into accounting and reporting systems at national and EU level by 2020.This paper updates on the guidance developed under the MAES initiative, in particular on ecosystem condition. Furthermore, we show specific examples of how mapping and assessment of ecosystem condition and ecosystem services can or has been integrated in policymaking at different spatial scales. Case studies include pollination, and the implementation of green infrastructure at regional and urban scales. These case studies share an ad hoc approach to mapping and assessment. A deeper integration of ecosystems and their services in various policies would benefit from regularly updated data on the spatial distribution of ecosystems, ecosystem condition and ecosystem services. This is the objective of ecosystem accounts, an important next phase of Action 5. By making use of maps that display ecosystem service potential and demand we show how biophysical mapping of pollination can be organized into pollination account.

18. Type of submission: **Abstract**

T. Thematic Working Group sessions: T4a Mapping and Assessment of Ecosystems and their Services for Policy and Decision Making in EU Member States

From expert-based assessments to UAV-born images: a tiered framework for semi-natural grassland ecosystem services

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Semi-natural grasslands harbour high biodiversity and play a key role in the supply of ecosystem services. However, abandonment, changes in traditional management practices and agricultural intensification constitute a major threat to these grasslands worldwide and these practices have led to declines in species diversity. In order to assess the multi-functionality of semi-natural grasslands in a spatially explicit manner, we present three methods for semi-natural grasslands ecosystem services mapping and assessment, integrated in a multitier framework. First, we define policy and research questions related to semi-natural grassland management and conservation. Second, we identify available datasets at the country-wide scale. Third, we integrate policy and research questions, data and methods at the relevant levels of the tiered framework. Three methods are defined and tested in Estonia, conveying a gradually increasing level of complexity and data needs: (I) Expert-based matrix, (II) surrogate indicators, (III) UAV multi-spectral imagery. We discuss challenges and opportunities that arise along the process.

Keywords: matrix, surrogate indicators, multispectral, data, maps