



BOOK OF ABSTRACT

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I. SESSION PROGRAM

ID: T4b

Less is more or the more the better? Dealing with simplification and uncertainties in ES mapping

Hosts:

	Title	Name	Organisation
Host:	Ms.	Ignacio Palomo	Basque Centre for Climate Change
Co-host:		Louise Willemen Benjamin Burkhard Evangelia Drakou	

Abstract:

Ecosystem services (ES) science and application need mapping practices that are robust, stakeholder-relevant, and transparent. During this session, we will specifically focus on the elements of the ES mapping process that deal with the conceptual and technical aspects of simplification and uncertainties, within different phases of the ES mapping process. Several of these simplification challenges or bottlenecks were identified by the ES Mapping Thematic Working Group members as a result of the last ESP Conference in Antwerp (Palomo et al, 2018). How should ES map makers and users deal with the limitations of ES maps and the non-neutrality – as in all types of maps and graphical representations – of the information they contain?

In order to overcome the over-simplification bottleneck and help to reduce uncertainty, combinations of different data and methods such as field observations, satellite images, participatory mapping, indicator-based mapping or complex modelling have been suggested. Mapping the ecological, socio-cultural and economic values of ES and integrating these dimensions in a transdisciplinary manner can reduce common over-simplifications. Moreover, illustrating how ES are co-produced in complex social-ecological systems in ES maps can contribute to assessing the links between ES and sustainability. Ideally, to reduce the over-simplification bottleneck and to better communicate with practice and policy, a



portfolio of maps should be presented. This could include maps of ES potential, use and demand, maps that integrate different ES value-dimensions, maps that make explicit system-complexities (ES bundles, trade-offs and synergies) or interactive maps that increase the level of detail shown (and information contained) at different scales of visualization. We invite participants to share their experiences and results in overcoming simplification and uncertainty problems encountered during the ES mapping process.

Goals and objectives of the session:

In this session, we aim to discuss on how to make better choices in the ES mapping process regarding the challenges of simplification and uncertainties such as those referring to multiple dimensions of value (economic, ecological, socio-cultural), different elements of the ES delivery chain, the co-production of ES and the communication of uncertainty in ES maps. This session aims at co-learning in an open and informal atmosphere. The session will not just target the ES mapping community as audience, but also ES map-users who would like to get more insight in what it takes to map ES.

Planned output / Deliverables:

Document with an overview of successful strategies of dealing with simplification and uncertainty throughout the ES mapping process. Article(s) in the ESP-related open access data journal OneEcosystem.

Voluntary contributions accepted:

Yes, I allow voluntary contributions to be submitted to my session for review

Related to ESP Working Group/National Network:

[Thematic Working Groups T4 – Mapping ES](#)



II. SESSION PROGRAM

Date of session: Thursday, 18 October 2018

Time of session: 14:30 – 18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
14:30–14:45	Maria	Rühringer	University of Twente	Use and user requirements of ecosystem service maps – Analysing decision makers’ needs within the context of Target 2 (Action 5) of the EU Biodiversity Strategy for 2020
14:45–15:00	Béla	Kuslits	Hungarian Academy of Sciences	Quality Control in participatory MAES processes
15:00–15:15	Jocelyn	Esquivel	University of Concepción	Integrated assessment of regulation, provision and cultural ecosystem services in different landscape scenarios in south-central Chile
15:15–15:30	Felix	Neuendorf	Leibniz Universität Hannover	Do complex ecosystem services models provide better advice? An exploration of outputs from different models and implications for landscape planning
15:30–15:45	Anna	Cord	Helmholtz Centre for Environmental Research – UFZ	Challenges and opportunities for mapping ecosystem services using satellite remote sensing data
15:45–16:00	Ana	Genua	University of	Mapping of ecosystem services:



Time	First name	Surname	Organization	Title of presentation
		Olmedo	Aveiro	constraints, challenges, and lessons learned
16:45–18:00			Joint discussion	Less is more or the more the better? Dealing with simplification and uncertainties in ES mapping

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: T4b Less is more or the more the better Dealing with simplification and uncertainties in ES mapping

Challenges and opportunities for mapping ecosystem services using satellite remote sensing data

First author: Anna Cord

Other author(s): Kate Brauman, Rebecca Chaplin–Kramer, Andreas Huth, Guy Ziv, Ralf Seppelt
Affiliation, Country: Department of Computational Landscape Ecology, Helmholtz Centre for Environmental Research – UFZ, Germany

Managing ecosystem services in the context of global sustainability policies requires reliable mapping and monitoring mechanisms. Satellite remote sensing enables spatially continuous, regular, and repeatable observations over large areas and has become an indispensable tool for global monitoring of natural and anthropogenic patterns, processes, and trends. While satellite remote sensing hence offers great promise to support the mapping of ecosystem services by filling data gaps, significant challenges remain in quantifying connections between remotely sensed information, ecosystem functions, ecosystem services, and human well-being benefits. Recent conceptual developments (Cord et al. 2017, Priorities to Advance Monitoring of Ecosystem Services Using Earth Observation, Trends in Ecology & Evolution) showed how satellite remote sensing together with socioeconomic information and model-based analysis can support assessments of ecosystem service supply, demand, and benefit. Building on this



recent conceptual framework and on the corresponding guidelines for research priority setting, this presentation focuses on two major questions: (i) How can the common bottlenecks in ecosystem services mapping (Palomo et al. 2018, Practical solutions for bottlenecks in ecosystem services mapping, One Ecosystem) be partly addressed by using satellite remote sensing data? and (ii) Which bottlenecks play an important role in remote sensing-based mapping approaches (in particular Over-simplification, Map-maker map-user communication, Nomenclatures and ontologies as well as Technical difficulties)?

Keywords: Assessment, Earth observation, Monitoring, Uncertainty

2. Type of submission: Abstract

T. Thematic Working Group sessions: T4b Less is more or the more the better Dealing with simplification and uncertainties in ES mapping

Integrated assessment of regulation, provision and cultural ecosystem services in different landscape scenarios in south-central Chile

First author: Jocelyn Esquivel, Cristian Echeverría

Other author(s): Mauricio Aguayo

Affiliation, Country: University of Concepción, Chile

Integrated assessment of ecosystem services (ES) can help improve the efficiency of landscape planning. Evaluate trade-off and synergies between ES and its spatial relationship with biodiversity, can contribute to the planning of the territory in order to maintain, improve and recover the provision of ES needed for human wellbeing. This acquires relevance in extremely modified landscapes, where the provision of essential ES has been impaired. The objective of this research was to conduct an integrated assessment of ES and ecological integrity in changed landscapes in south-central Chile, under various scenarios of landscape management. According to the National Plan of territorial order in Chile, the main goal is to reach a sustainable development of the territory and its natural resources, reducing the negative effects on environment and human wellbeing. We mapped proxies for the provision of water flow regulation (WFR-ES), wood provision of exotic plantations (WP-ES) and aesthetic value (AV-ES), previously identified as essential in this landscape. The integrated analysis was evaluated under different territorial management scenarios: i) current scenario, ii) conservative scenario that maximizes ecological integrity, iii) productive scenario and iv) intermediate scenario, between conservation efforts and productive development. According to the results, under the



current scenario there was a synergy between WFR-ES and SV-ES, a trade-off between WFR-ES, AV-ES and WP-ES, where the provision of WFR-ES and AV-ES varied from 25 to 50% and WP-ES reached 75%. In the productive scenario WR-ES and AV-ES varied among 0-25% and WP-ES reached 89%. In the conservationist scenario WFR-ES and AV-ES varied from 50 to 75% and WP-ES reached only 25%. In the intermediate scenario WFR-ES and AV-ES varied from 50 to 75% and WP-ES reaches 60%. This last scenario has positive relation between human wellbeing and productive development, with an improve in WFR-ES, recognize as a critical ES in the landscape.

Keywords: ecosystem services, landscape planning, Integrated assessment, territorial management scenarios

3. Type of submission: Abstract

T. Thematic Working Group sessions: T4b Less is more or the more the better Dealing with simplification and uncertainties in ES mapping

Mapping of ecosystem services: constraints, challenges, and lessons learned

First author: Ana Genua Olmedo

Other author(s): Mariana Morgado, Ana I. Sousa, Antonio J A Nogueira, Ana I. Lillebø, Heliana Teixeira

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The mapping of ecosystem services (ES) is a high valuable instrument for landscape planning, capable of communicating complex information in space and time (e.g. prospective scenarios). For ES mapping the habitat types listed in Annex I of the Habitats Directive or the EUNIS habitats classification are commonly used, but it poses constraints and challenges. One of the constraints when mapping ES associated to habitats is the fact that the value of the ES is not completely represented. The challenge comes when accounting the contribution of ES from mobile biotic groups. The habitats' potential to supply ES will change depending on the associated mobile biotic groups (e.g. birds, mammals, fish). Here we present a sensitivity analysis to measure the differences when we map ES associated to: 1) the habitats where ES occur; 2) the habitats and the mobile biotic groups that co-occur; and 3) the habitats and mobile biotic groups that co-occur, but including the ecology of the biotic groups, namely throughout their life cycle. We produced heat maps based on a previous ES expert valuation for each of these three conditions. Spatial datasets from Ria de Aveiro concerning habitats distribution and presence/absence of mobile biota data were used for the maps production.



Results highlight the importance of considering both the connectivity of habitats and the mobile biota when mapping ES. The capacity of ecosystems to provide ES increased when mobile biota were considered as it would be expected, but the rank importance of habitats for providing services varied if the ecology of those biotic groups was further considered. Thus, the association of ES to habitats and to the mobile biota provides a more realistic accountability of ES, which favorably impacts the final decision of environmental resource management.

Keywords: ecosystem services spatialization; habitats; mobile biota; sensitivity analysis; ecosystem management

4. Type of submission: Abstract

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Quality Control in participatory MAES processes

First author: Béla Kuslits

Other author(s): Eszter Tanács, Ildikó Arany, Ágnes Vári, Réka Aszalós

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

Mapping and assessment of ecosystem services (MAES) is a complex, multi-step process where both qualitative and quantitative methodologies are applied often involving stakeholders who have a range of different perspectives. This is a challenging situation from the methodological point of view as the quality of the final product is not easily assessable due to the diversity of possible problems. If the quality of results is not sufficient, users may make decisions that cause unintended harm to nature or society by overexploitation of resources or too simplistic regulation of important social-ecological interactions. Based on lessons learned in multiple MAES processes we have developed a framework that helps to avoid causing unintended harm to social-ecological systems (SES) and also to produce results that are accurate enough to support decision making. In our framework, we identify two main types of errors (1) accuracy errors, when input data sources or data collection methods are not precise enough compared to the requirements of future decision-making and (2) scope errors, when one part of the SES is ignored, thus even exceptionally precise data handling results in misleading consequences. Our proposed framework intends to quantify the quality of the results in order to help the practical use of ecosystem service assessments and to support future methodology development efforts.



We illustrate our proposed framework on the case of Bükk National Park in Hungary, one of the protected areas involved in the Eco Karst project, where a MAES process has been implemented in 2018 to inform local participatory decision-making fora. Most important factors limiting the accuracy of our results were data availability, the age of datasets and challenges in reaching stakeholders. With a conservative approach towards the interpretation of the maps, their quality was sufficient to support scenario building for the region.

Keywords: quality assurance, decision making, error types

5. Type of submission: **Abstract**

T. Thematic Working Group sessions: T4b Less is more or the more the better Dealing with simplification and uncertainties in ES mapping

Do complex ecosystem services models provide better advice? An exploration of outputs from different models and implications for landscape planning

First author: Felix Neuendorf

Other author(s): Christina von Haaren, Christian Albert, Edwin Haas

Affiliation, Country: Leibniz Universität Hannover, Germany

With an increasing number of ecosystem services assessment models available, landscape planners increasingly find themselves confronted with the need to select the best-fit model for the specific case of application. Usual considerations include practical relevance, data and resources availability, and personal experience in applying the models. This contribution explores the results and the implications of applying different ecosystem models to estimate CO₂ emission and retention potentials in a case study in Hannover, Germany. The two assessment models included a simple matrix approach as usually applied in landscape planning, and the more complex Landscape DNDC model. Our results showed substantial differences between the outputs of both models. For example, only 7 percent of the areas had been assigned to the same valuation class. For the rest of the areas there have been deviations of at least one class or in extreme cases also gaps in the assessment (peaty soils). We find that substantial differences between model outputs could lead to diverging recommendations given to decision-makers. We therefore recommend to take the issue of model uncertainty seriously, and to develop and test ways for assessing and appropriately communicating inherent limitations and uncertainties of ecosystem services models to diverse audiences. Solving this



communication challenge will be crucial to provide ‘good’ advice, and to sustain trust in scientific expertise among the wider public.

Keywords: landscape planning, ecosystem services, uncertainty, communication

6. Type of submission: Abstract

[T. Thematic Working Group sessions: T4b Less is more or the more the better Dealing with simplification and uncertainties in ES mapping](#)

Use and user requirements of ecosystem service maps – Analysing decision makers’ needs within the context of Target 2 (Action 5) of the EU Biodiversity Strategy for 2020

First author: Maria Rühringer

Other author(s): Corné P.J.M. van Elzakker, Evangelia G. Drakou

Affiliation, Country: University of Twente, ITC Faculty of Geo-Information Science and Earth Observation, The Netherlands

Mapping ecosystem services presents a key component of the EU Biodiversity Strategy for 2020. Ecosystem service maps aim to support decision- and policy-making by functioning as a bridge between science producing and decision-makers using those maps. Yet, past analysis showed, that the uptake of the provided information by the end-user is very low, which, amongst others, is caused by uncertainty produced by missing assessment of the users’ needs and map-makers’ intentions. This highlighted the need of exploring the use and user requirements of ecosystem service maps. This presentation is a practical application of exploratory user research, with the intention of deriving user profiles, use scenarios and recommendations for map design, which aim to increase the usability of ecosystem service maps in the decision-making process. To achieve this goal, we applied mixed user research methods such as interviews and thinking-aloud to identify usability issues of existing maps. In doing so, both the end-users’ and the map-makers’ perspectives were taken into consideration, as both play a key role in the map communication process. To derive and compare scale-specific requirements, we assessed their aims and intentions at EU-level and national- and sub-national level, with the example of Greece as a case study. The analysis revealed usability issues related to uncertainty caused by different ecosystem service definitions and mapping approaches, as well as missing awareness of the potential users and uses of ecosystem service maps. Furthermore, mismatches between the map-makers’ intended map use purpose and the use intention by the end-user were



identified. Based on those findings user profiles, use scenarios and recommendations for future mapping were derived for each administrative level. This output aims to reduce uncertainty within the map-making process and underlines the importance of focussing on user requirements to increase the uptake of the produced maps by the end-users.

Keywords: Ecosystem service maps, user requirements, user-centred design