

BOOK OF ABSTRACTS

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I. SESSION DESCRIPTION

ID: O8b

Applications of ecosystem services assessment in different contexts

Hosts:

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II. SESSION PROGRAM

Date of session: Thursday, 10 June 2021

Time of session: 13:30 – 15:01

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
13:30 13:43	Anastasia	Kostantinova	Peoples Friendship University of Russia (RUDN)	Urban green spaces as providers of cultural ecosystem services: case study of three Russian megacities
13:43 13:56	Anna	Schlattmann	Leibniz University Hannover	Ecological sustainability of water distribution in the Danube basin – impacts of agricultural water use on biodiversity
13:56 14:09	Desislava	Hristova	Bulgarian Academy of Science	Modelling flood control for the needs of ecosystem accounts in Bulgaria
14:09 14:22	Hila	Sagie	Israel Institute of Technology	The adoption and application of ecosystem services as a conceptual framework for landscape management and planning on the national level, the case of Israel

Time	First name	Surname	Organization	Title of presentation
14:22 14:35	Johanna	Schumacher	Klaipeda University	Assessment of ecosystem services across the land and sea interface: approach and application in Baltic case studies
14:35 14:48	Andrea Larissa	Boesing	Senckenberg Biodiversity and Climate Research Institute	Ecosystem services at risk: integrating spatiotemporal dynamics of supply and demand to promote long-term provision
14:48 15:01	David Neil	Bird	Joanneum Research Forschungsgesellschaft mbH	Downscaling of daily Land Surface Temperature (LST) to fine scale (30m x 30m) using a variation of the DisTrad approach that mixes MODIS LST and LANDSAT NDVI data at different spatial frequencies

III. ABSTRACTS

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

1. Type of submission: Abstracts

O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts

Urban green spaces as providers of cultural ecosystem services: case study of three Russian megacities

Presenting author(s): Anastasia Konstantinova

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The study presents the results of the research of cultural ecosystem services (CES) provided by urban green areas situated in three Russian megacities: Moscow, Saint Petersburg and Rostov-on-Don. The pilot social survey using questionnaire method of citizens' was conducted in autumn period 2020 in nine different types of urban green spaces (UGS): public and historical parks, botanical garden, urban forest. The survey revealed the main



characteristics of the research areas such as accessibility of the park, the frequency and purpose of park visits, the preferences in recreation activities and ecosystem services and disservices provided, as well as the willingness of visitors to participate in improving the territory. In order to confirm the preferences in recreation activities and the obtained benefits from park visits the content analyses of more than 500 000 reviews and comments at Google.com and Yandex.ru was used. The structure of the UGS was assessed using QGIS and dividing the recreational opportunities and capacity provided by ecosystems and by man-made infrastructure. The results showed the most popular ecosystem services and their correlation with the UGS infrastructure. It was identified that the most popular benefits were related to aesthetic values, mental health, and citizens' perceptions of regulating ecosystem services (air quality regulation, noise reduction, heat reduction). However, recreational activities (walking, outdoor sports, passive and active entertainment) were not assessed as essential reason for parks visits. This finding highlighted the importance of additional UGS infrastructure, that meets current social needs and indicated the lack of strategical design and planning thinking.

Keywords: cultural ecosystem services, urban green spaces, social survey, park infrastructure

2. Type of submission: Abstracts

[O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts](#)

Ecological sustainability of water distribution in the Danube basin – impacts of agricultural water use on biodiversity

Presenting author(s): Anna Schlattmann

Other author(s): Kremena, Burkhard, Elisabeth Probst, Estanislao Pujades, Christina von Haaren, Wolfram Mauser

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Continuous agricultural intensification severely threatens water ecosystems, their services and biodiversity of agricultural landscapes. Increased irrigation drains streams, lakes, floodplains and wetlands beyond their carrying capacity. International legislation and agendas such as the Sustainable Development Goals (SDGs) promote sustainability standards for quantitative water use that guarantee a minimum water supply for ecosystems in order to ensure their functionality and to maintain their biodiversity. Still, some countries strive for intensifying their



agricultural irrigation, aiming to raise productivity and revenues. Resulting levels of water exploitation critically approach politically defined limits. The present study examines the case of the Danube basin in Europe applying the Ecological Sustainability Assessment of Water (ESAW) – a GIS-based spatial tool for the assessment of quantitative water use sustainability in river basins, that is applicable worldwide. The evaluation is based on international standards for sustainable water use and is implemented in two model components on sub-basin and local level. The tool is executed for the vegetation periods 2015–2018 with high-resolution hydro-agroecological data from the PROMET-model, hydrogeological model data based on the OpenGeoSys code and further open source land use data. The ESAW-tool identifies sub-basins and periods that are “Hot Spots” of unsustainable water use. In midsummer between 60 % and almost 80% of the sub-basins cannot meet the sustainability criteria. On local level, the tool identifies river sections where water flow is below the required ecological minimum and areas where the health of groundwater dependent ecosystems would be threatened from water abstractions for agricultural purposes. Thus, the assessment results can support political decision-makers to identify scoping areas that would allow increased agricultural irrigation without ecological damage and to prioritize areas that would require adapted water management in order to maintain ecosystem services and biodiversity.

Keywords: sustainability assessment, water distribution, biodiversity, SDGs, ecosystem services

3. Type of submission: Abstracts

[O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts](#)

Modelling flood control for the needs of ecosystem accounts in Bulgaria

Presenting author(s): Desislava Hristova

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Flood control is considered as one of the main regulating ecosystem services (ES) by System of Environmental Economic Accounting–Experimental Ecosystem Accounting (SEEA–EEA). Both assessment and accounts of flood regulation need various data which is usually not available through direct measurement. GIS-based modelling could provide the much-needed



information for different aspects of the water cycle that could be used as indicators for flood control ES. There is a great variety of models and modelling approaches that deal with water regulation and each of them has its own specifics. The main purpose of this work is to identify the most appropriate models for a generation of flood control indicators and how they can be integrated for the needs of the ecosystem accounting. It is part of the MAIA (Mapping and Assessment for Integrated ecosystem Accounting) project which aims to promote natural capital accounting in EU. In order to establish the relevant flood accounting data as indicators at the national level, as well as the adequate models, we follow these steps: a selection of papers on modeling from MAIA's paper review, identification of the relevant indicators and models, statistical analysis with RStudio, a test of the prominent model in a case study area (Malki Iskar river catchment). Preliminary results show SWAT and KINEROS hydrological models as the most suitable. The modelling of the flood regulation service in these models depends on the components of the natural processes – land cover, soil cover, slope, water storage, infiltration, and climate data. The models compile these components and determine homogeneous mapping units (HRUs), which are classified based on their characteristics to define the service providing area (SPA) for flood control. The identification of the SPAs is of crucial importance for the calculation of the actual flow and further development of the flood control accounts.

Keywords: Statistical analysis, SWAT, KINEROS, Flood control account, SPA

4. Type of submission: Abstracts

[O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts](#)

The adoption and application of ecosystem services as a conceptual framework for landscape management and planning on the national level, the case of Israel

Presenting author(s): Hila Sagie

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The ES concept has fundamentally changed the global discourse on nature conservation and landscape management. Recent studies have begun to focus on understanding how the



concept emerged, evolved, and spread in its various forms and interpretations, and to report on practitioners' perspectives on the concept. However, there are large knowledge gaps regarding pathways towards its adoption by landscape management and planning bodies and there are few studies (if any) reviewing the evolution and adoption of the ES concept at the national level (rather than the international level). Since there have been efforts to apply the ES framework in Israel (including a national ES assessment), there is an opportunity to advance our knowledge through Israel's experience. The goals are to explore the arrival and diffusion of the ES conceptual framework into the Israeli environmental management discourse, and its contemporary and potential future impact on spatial planning and management. We conducted 30 in-depth interviews with environmental scientists/managers/practitioners/planners central to the application of the ES framework in Israel, complemented with an analysis of documents and websites of the organizations, governmental ministries, and agencies. Among the more salient findings, we show how organizations were receptive or resistant to adopting the concept based on their a-priori values vis-à-vis nature and humans' role in managing it, and whether they found a political advantage, or a practical tool for planning, in using it. Also important was the role of individuals, who either adopted or rejected the concept and then strongly advocated for their perspective into their organization's agenda. The most successful implementations were by bodies that managed to incorporate ES valuation methods to their planning strategies, such as the forest agency. This national 'conceptual biography' provides an excellent illustration for how new scientific ideas enter the environmental discourse and how they are implemented according to national-organizational-individual context.

Keywords: diffusion of environmental concepts, application of Ecosystem services, stakeholders' perspectives, spatial planning, environmental organizations

5. Type of submission: Abstracts

O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts

Assessment of ecosystem services across the land and sea interface: approach and application in Baltic case studies

Presenting author(s): Johanna Schumacher

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In the past decades, the ecosystem services concept has garnered increasing interest in both, science and policy. It has been included in various European water and nature policies, requiring member states to map and assess ecosystem services. Various tools and approaches have been developed in response to this demand. Yet, a strong focus on terrestrial systems can be observed and tools and approaches for marine systems are still lagging behind. Furthermore, joint assessments across land and sea are rare and have been conducted mostly on a global scale. Yet, EU water and nature policies are usually not restricted to one side of the shoreline and joint approaches for assessing ecosystem services across land and sea are needed, to support their implementation. To address this gap, we developed a set of ecosystem services and a spatial habitat typology based on CORINE land cover, coastal water typology and water bodies (according to the EU Water Framework Directive) and sediment characteristics (according to the EU Habitat directive) for a joint assessment of terrestrial, coastal and marine systems. Using the case study sites Schlei, Greifswald Bay, and Curonian lagoon as examples, we show an expert-based assessment of ecosystem service potentials across the land–sea interface. Additionally, we show an assessment of ecosystem service flows for a subset of ecosystem services in comparison with the potentials. Based on these assessments, differences and similarities of ecosystem service potentials and flows between land and sea, case studies and habitats and the parameters that influence them will be discussed. Furthermore, the transferability of our approach and its relevance for decision making and planning processes will be addressed.

Keywords: ecosystem service potential, ecosystem service flow, matrix–approach, land–sea interface

6. Type of submission: Abstracts

[O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts](#)

Ecosystem services at risk: integrating spatiotemporal dynamics of supply and demand to promote long–term provision

Presenting author(s): Andrea Larissa Boesing

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Ecosystem services (ES) provision is often constrained by the spatial arrangement and temporal dynamics of ES supply (S) and ES demand (D). Even though much advancement has been done linking ES provision to spatial patterns, spatiotemporal aspects are still lacking, despite being a crucial point in order to propose effective efforts for long-term ES sustainability. Here we introduce a novel conceptual framework integrating both spatial and temporal dynamics of S and D to forecast trends in ES provision through landscape management. Our framework allows to categorize ES spatiotemporal trends, including three undesired and risky trends on S/D ratio: steady undersupply (when S is decreasing along time and D exceeds it), cyclical highly variable undersupply (when S presents cyclical behavior through time – presenting a higher risk when D exceeds S), and stochastic undersupply (when unpredictable events might change either S or D, putting ES at risk). We propose that once an undesired S/D relationship trend is identified, we can incorporate specific landscape management strategies in order to increase flow between S and D areas and avoid ES extirpation. The effectiveness of such management strategies might depend on: i) the moment on time that landscape management is performed, ii) the level of threat of S/D, and iii) the evaluated ES. Finally, we highlight the importance of incorporating temporal trends of ES provision to recommend landscape mitigation strategies, ensuring its provision in the long-term.

Keywords: spatial, temporal, trends, flow, landscape management, landscape ecology

7. Type of submission: Abstracts

O. Open sessions: O8b – Applications of ecosystem services assessment in different contexts

Downscaling of daily Land Surface Temperature (LST) to fine scale (30m x 30m) using a variation of the DisTrad approach that mixes MODIS LST and LANDSAT NDVI data at different spatial frequencies

Presenting author(s): David Neil Bird

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Land Surface Temperature (LST), a remotely sensed estimate of temperature, is available free of charge, at 30m x 30m from LANDSAT every 16 days, and at 1000m x 1000m from MODIS four times daily. A problem in the data collection is the presence of clouds, which means that there may be very few useful LANDSAT based fine scale LST images for a specific site. However, the coarseness of the MODIS data makes it not very useful for studies of the impact of specific



ecosystem services (ES). A variation of the DisTrad downscaling method will be presented that mixes a high spatial frequency ES, vegetation, represented by the normalised differential vegetation index (NDVI) from LANDSAT with lower spatial frequency background LST from MODIS in different spatial bands (spatial spectral composition) to provide fine scale LST. The method has the potential to provide fine scale LST four times daily on any day of the year. As an auxiliary output of the method, the effectiveness of the ES at various daily temperatures can be demonstrated and the spatial “blurring” of the impact of ES can be estimated. Finally, with LST estimates distributed regularly throughout the year, one can create a transfer function to convert LST to air temperature if required. Examples will be shown from the ongoing REGREEN H2020 Project.

Keywords: urban heat estimation, land surface temperature, cooling by vegetation, spatial frequency analysis