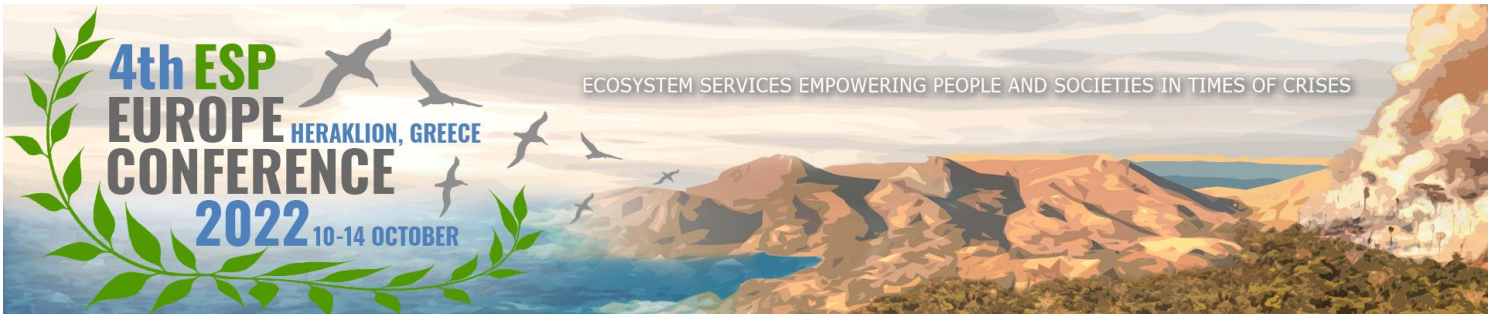

BOOK OF ABSTRACTS

I. SESSION DESCRIPTION

ID: T17a

Ecosystem condition accounting: overcoming operational challenges

Hosts:

	Title	Name	Organisation	E-mail
Host:		Javier Babi Almenar	Joint Research Centre (external consultant)	javier.babi-almenar@ext.ec.europa.eu
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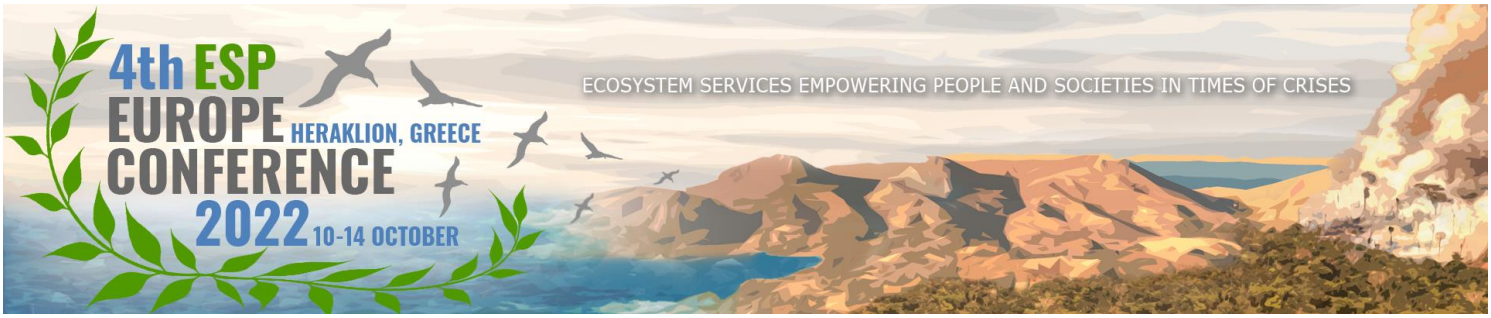
		Maria Luisa PARACCHINI	Joint Research Centre	Maria-Luisa.PARACCHINI@ec.europa.eu
		Chiara CORTINOVIS	Humboldt-Universität zu Berlin	chiara.cortinovis@hu-berlin.de
		Anna ADDAMO	Joint Research Centre	anna.addamo@ec.europa.eu
		Balint CZUCZ	Joint Research Centre	Balint.CZUCZ@ec.europa.eu
Co-host(s):		Davide GENELETTI	University of Trento	davide.geneletti@unitn.it
		Marton KISS	Centre for Ecological Research - Hungarian Academy of Sciences	kiss.marton@ecolres.hu
		Benjamin BURKHARD	University of Hannover	burkhard@phygeo.uni-hannover.de

Abstract:

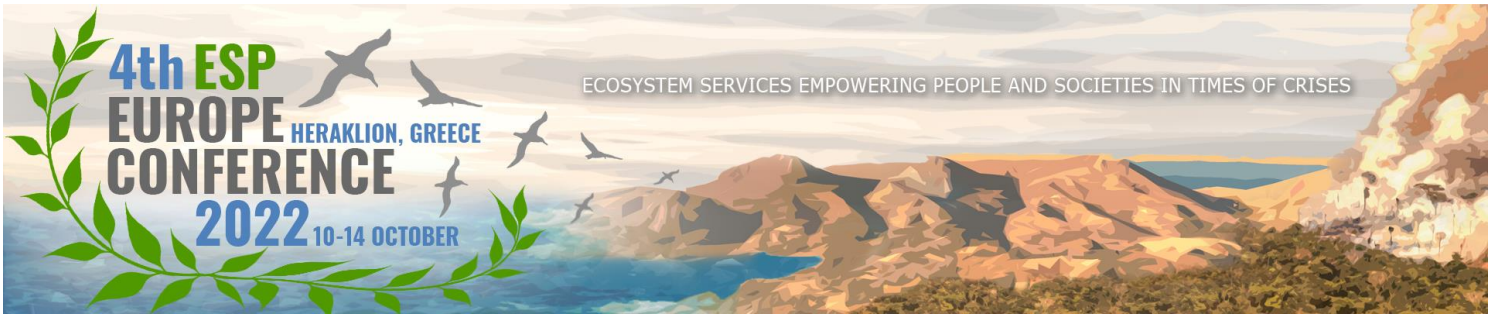
The recent adoption of the statistical framework for the System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) by the United Nations (United Nations, 2021) represents a key step forward in recognizing the role of ecosystems as contributors to our economy and well-being. SEEA-EA integrates ecosystem extent, ecosystem condition, ecosystem service flows, monetary ecosystem assets, and thematic ecosystem accounts. Many countries see these accounts as an instrument of extraordinary potential for policy support. This system is currently tested in many pilot exercises and will soon be applied in national ecosystem accounting systems. Hence, to ensure that ecosystem accounts as a policy instrument are up to expectations, any potential operational issue of SEEA-EA needs to be explored and addressed adequately during the testing phase.



In this session, we focus on SEEA-EA ecosystem condition accounts. Specifically, we will hold discussions about operational challenges and associated issues faced in all ecosystem types. Ecosystem condition accounts give a simple, yet realistic overview of the "state" of ecosystem assets using few carefully selected key variables. They are strongly interrelated with ecosystem extent accounts, together both accounts represent the stocks influencing ecosystem service flows accounts. Ecosystem condition and its reference levels are strongly rooted in the concepts of ecosystem integrity, stability, and resilience. Despite the theoretical robustness of the framework, its implementation still presents challenges. Among existing challenges, below we introduce four of them for orienting purposes. The session is also open to any other challenge and associated issue identified by the presenters or attendees.

1. Ecosystem extent and condition accounts are very interrelated, and a clear differentiation might not be straightforward. How to ensure that the characteristics used to distinguish and delineate ecosystem(sub) types, i.e. ecosystem extent accounts, do not interfere with the characteristics used for reporting conditions, which may lead to accounting artefacts?
2. The appropriate level of interrelation between ecosystem condition accounts and ecosystem services accounts is not always clearly defined. Ecosystem conditions influence the capacity to provide ecosystem services. To what extent characteristics selected as variables for ecosystem condition should (and can) inform ecosystem services flows? How does this influence selection of ecosystem condition variables? How to balance linkages between both accounts without excessively constraining their independence and underlying concepts?
3. The identification of appropriate (upper and lower) reference levels for some condition variables is challenging. Ecosystem condition rooting concepts do not fully work for anthropogenic ecosystems, to which the concept of restoration is not commonly attached either. How to operationalise definition of reference levels in anthropogenic ecosystems? How reference levels can help to define feasible restoration targets? Besides anthropogenic ecosystems, how to ensure that the selection and the "development" of condition variables helps reducing the difficulties in identifying appropriate reference levels?
4. Ecosystem condition accounts should inform economy-related policies, but they also have a great value for other policies, especially those impacting on the management of ecosystems. Which could be the added-value in building more robust and less ad-hoc territorial sustainability assessments? Which policies could benefit from ecosystem condition accounts? How to design them to support a wide range of policy-making processes?

This session follows a mixed format: a standard session followed by a world café. In the first part, we welcome contributions from speakers working on ecosystem condition accounts (at



a conceptual or applied level) and dealing with operational challenges, including those illustrated above and others identified by the presenters. These contributions will be the starting point for the "world café", exploring the challenges through open discussions in small table groups in which the topics will rotate, maximising the feedback collected from attendees.

Goals and objectives of the session:

This session aims to discuss operational challenges for building ecosystem condition accounts under the SEEA-EA framework in European contexts. The session is focused on ecosystem condition accounts of any ecosystem type and developed at any spatial level, i.e., local, regional, national, international.

The session will discuss operational challenges and potential solutions using two approaches:

1. learning from recent/on-going case studies and conceptual works presented during the session;
2. several open discussions in small groups about an operational challenge or a set of related specific issues, which can use the works presented as a starting point to facilitate the beginning of the dialogue.

For the first ("standard") part of the session (oral presentations), we will prioritise case studies of ecosystem condition accounts, but we are also open to innovative conceptual works offering solutions to some of the existing implementation/operational challenges. We especially welcome case studies developing ecosystem condition accounts for more than one ecosystem type in the same area of scope. Operational issues are more evident when more than one ecosystem type is studied, especially when accounts are developed in a geographically exhaustive way. We also highly welcome case studies on ecosystem accounts of anthropogenic ecosystem types (i.e., agroecosystem and urban ecosystems) since additional issues are anticipated for them.

Planned output / Deliverables:

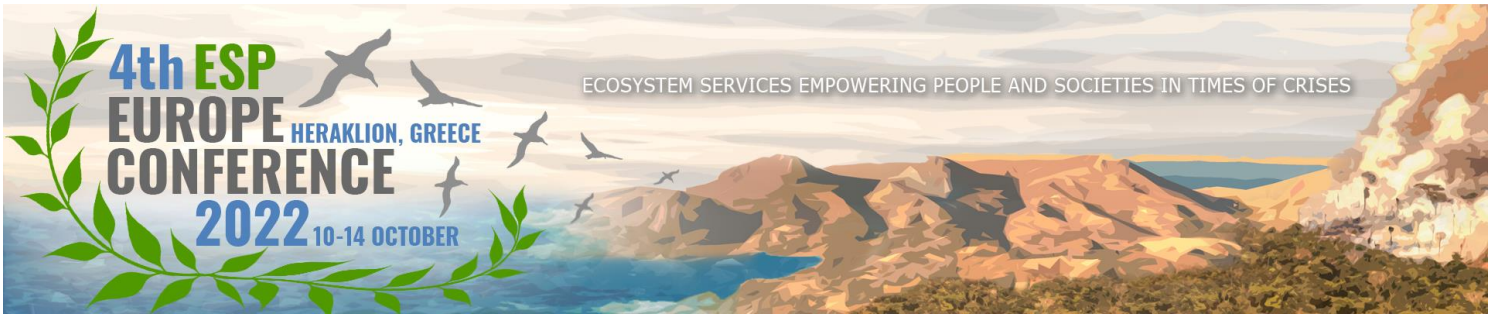
A series of papers in a special issue or a perspective paper on ecosystem condition challenges and emerging solutions, depending on the material available from the session.

In addition, a policy brief to be integrated in a broader technical report from the Joint Research Centre of the European Commission is expected to be prepared out of the session.

Session format:

Other (Mixed Session: Standard Session + World Café)

Voluntary contributions accepted:



Yes, I allow any abstract to be submitted to my session for review

Related to ESP Working Group/National Network:

Thematic Working Groups: TWG 17 – ES Accounting & Greening the economy

II. SESSION PROGRAM

Date of session: Wednesday 12 October
Time of session: 11:30–13:30 & 16:00–18:00

Timetable speakers

Time	First name	Surname	Organization	Title of presentation
11:30–11:33	Hosts and Co-Hosts		–	Short Introduction to the Session
11:33–11:45	Balint	Czucz et al.	European Commission – Joint Reseach Centre	The development of ecosystem condition indicators as a knowledge co-production process
11:45–12:00	Marius	Bellingen et al.	Federal Statistical Office Germany	Ecosystem Condition Accounting in Germany – Implementation and Operational Challenges
12:00–12:15	Joachim	Topper et al.	Norwegian Institute for Nature Research	A large-scale assessment of ecological condition in Norwegian mountain and forest ecosystems
12:15–12:30	Adrian	Garcia-Bruzón	Rey Juan Carlos University	Accounting for the condition of forest ecosystems in Spain
12:30–12:45	Miglena	Zhiyanski et al.	Forest Research Institute – Bulgarian Academy of Sciences	Pilot carbon account in forest territories – case-study of “Belovo”, Bulgaria
12:45–13:00	Francesco	Sica et al.	University of Trento	Reviewing condition indicators for urban ecosystem accounting
13:00–13:15	Erica	Bruno et al.	University of Trento	Assessing ecosystem conditions of vacant lots to preserve them from land take: the case study of Northern Milan intermunicipal area
13:15–13:30	Ralf-Uwe	Syrbe et al.	Leibniz Institute of Ecological Urban and Regional Development	Global climate regulation by ecosystems in Germany: the ecosystem condition parameter "carbon stock" and the ecosystem service „greenhouse gas

Time	First name	Surname	Organization	Title of presentation
				sequestration“ as national monitoring indicators
16:00–16:15	Philip	Roche et al.	UMR RECOVER, INRAE	Adjustment of ecosystem services capacity matrix scores according to local ecosystem condition
16:15–16:30	Benedetto	Rugani	Luxembourg Institute of Science and Technology	SEEA-EA and Life Cycle Assessment (LCA): outlook on benefits and challenges of their methodological integration
16:30–16:45	Graciela M.	Rusch	Norwegian Institute for Nature Research	State-and-Transition models: Insights to ecosystem condition assessments
16:45–17:00	Javier	Babi Almenar et al.	European Commission – Joint Reseach Centre	Operational challenges in EU ecosystem condition accounts: the case of urban, agricultural and marine ecosystems
17:00–18:00			ROUND-TABLE (World Café)	

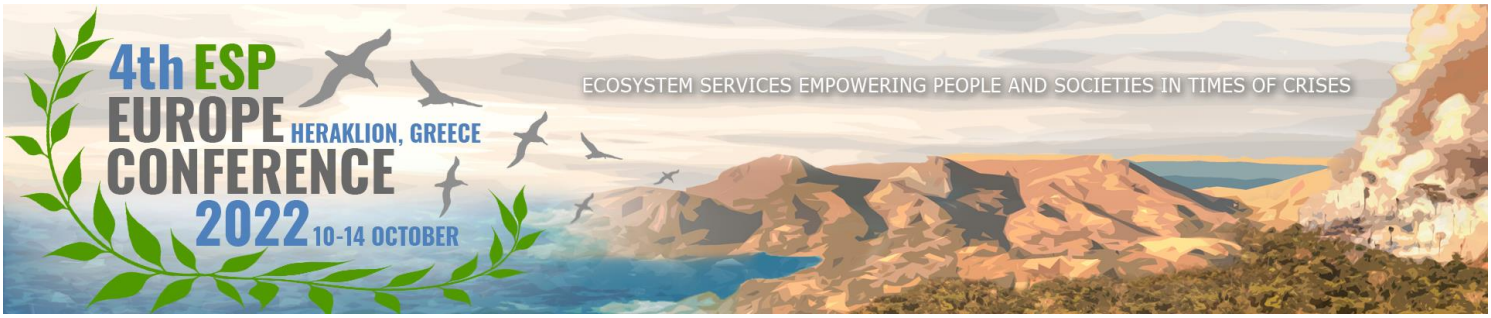
III. ABSTRACTS

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

1. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

The development of ecosystem condition indicators as a knowledge co-production process



Presenting author: Balint Czucz

Other author(s): Heather Keith, Joachim Maes, Amanda Driver, Bethanna Jackson, Emily Nicholson, Márton Kiss, Carl Obst

Affiliation: European Commission, Joint Research Centre (JRC), Ispra, Italy

Contact: balint.czucz@ec.europa.eu

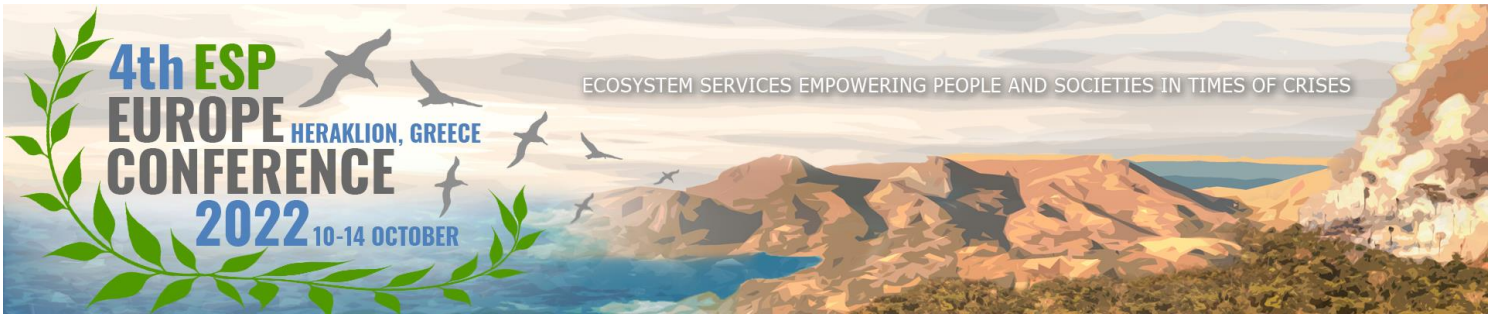
The process of developing a set of indicators by a multidisciplinary team of experts for a particular policy purpose is a relatively little studied knowledge co-production process. The stepwise identification and concretisation of indicators can be likened to "engineering design", where the construction of new knowledge is mandated by pre-specified knowledge needs, and is framed by more or less explicit "product specifications" expressed as indicator selection criteria. The compilation of SEEA EA ecosystem condition accounts for a particular ecosystem type in a specific region is such an indicator development process. In this case SEEA EA lays out the "knowledge needs", which are then filled by an expert team based on their understanding of the studied ecosystem type, the policy expectations ("product specifications"), and the available data sources. In this presentation we will outline the main steps of such an indicator development process, and link them to the 12 indicator selection criteria proposed for SEEA EA ecosystem condition accounts by the authors of the SEEA EA chapter on ecosystem condition (see Czúcz et al. 2021: https://doi.org/h6ff). A better understanding of the knowledge co-production underlying the development of SEEA EA indicator sets can lead to more inclusive and reflexive, better structured and documented workflows. This can support the creation of more comprehensive and harmonised sets of condition indicators, both aligned with their original top-down mandates and accepted by the relevant stakeholder & peer communities, which is ultimately necessary to cope with the rapidly evolving sustainability challenges presented by the Anthropocene.

Keywords: indicator development, selection criteria, knowledge co-creation, transdisciplinary, governance, sustainability policy, ecosystem accounts

2. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Ecosystem Condition Accounting in Germany – Implementation and Operational Challenges



Presenting author: Marius Bellingen

Other author(s): Simon Schürz,

Affiliation: Federal Statistical Office Germany, Germany

Contact: simon.schuerz@destatis.de

The Federal Statistical Office of Germany is currently working on setting up comprehensive Ecosystem Condition Accounts. The work builds on the already published national Extent Accounts that distinguish up to 74 national ecosystem classes. Following the SEEA-EA framework, we draw up an Ecosystem Condition Typology (ECT) for each of these ecosystem classes including variables and indicators for abiotic, biotic and landscape characteristics.

A multitude of data sources, mainly earth observation data and in-situ monitoring, is used to calculate variables locally and nationally. These data sources are harmonized and aggregated to accounting areas using a standardized and automated approach. Where possible, condition indicators, i.e. ecosystem variables set against reference values, are derived. In order to find appropriate and local reference values using various methods depending on the ecosystem type. Examples include the use of arguably pristine local references for forest condition, thresholds from the EU Marine Strategy Water Framework Directive and historical references for marine ecosystems and expert-based references for anthropogenic ecosystems.

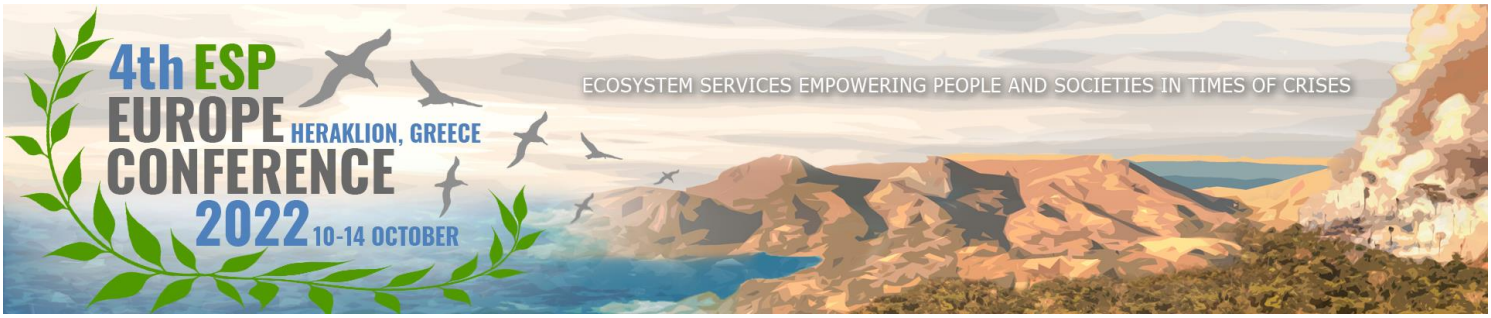
In this paper, we first present a comprehensive ecosystem condition typology and methods of finding reference values when setting up the German Ecosystem Condition Accounts. Operational challenges, such as different spatial and temporal resolution of input data, data validity, aggregation rules and the feasibility of referencing as well as potential solutions are discussed.

Keywords: SEEA-EA, Condition Account, Reference values, Implementation, Aggregation

3. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

A large-scale assessment of ecological condition in Norwegian mountain and forest ecosystems



Presenting author: Joachim Töpper

Other author(s): Erik Framstad, Simon Jakobsson

Affiliation: Norwegian Institute for Nature Research, Bergen, Norway, Norway

Contact: joachim.topper@nina.no

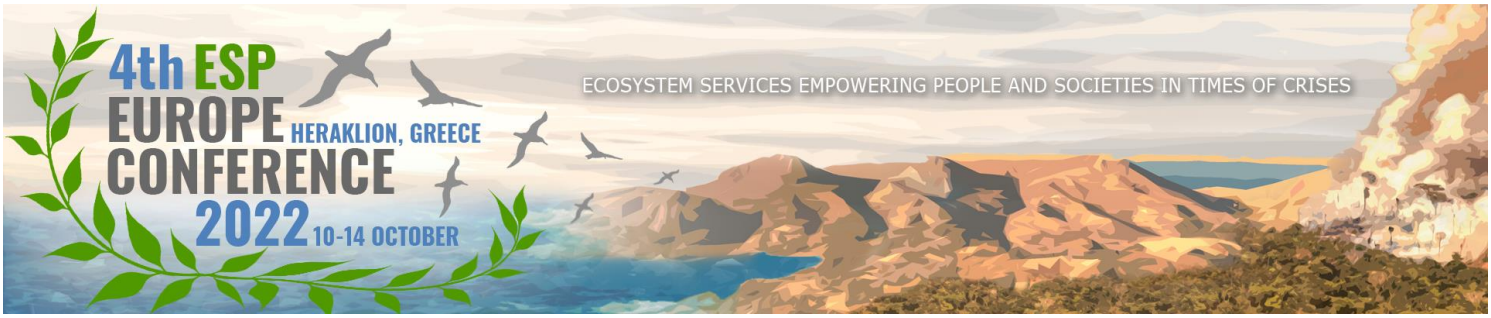
Monitoring and assessing ecological condition is critical for informing sustainable nature and area management. In 2021, we performed the first national assessment of ecological condition in forest and mountain ecosystems in Norway applying the Index-Based Ecological Condition Assessment framework (IBECA). Together, these two ecosystem types cover approximately 2/3 of Norway's mainland surface. Our analyses are based on 19 and 13 indicators for mountains and forests, respectively – spanning data on species, communities, remote sensing, and infrastructure – aggregated into indices for functional ecosystem characteristics, ecosystem pressures, and the overall ecological condition. The indicator data were required to i) be area-representative, ii) address some functional characteristic of an ecosystem, iii) be sensitive to one of the five major environmental pressures, and iv) be comparable to a quantifiable reference condition. Our results indicate good ecological condition for Norwegian mountain ecosystems with an index just above the threshold to reduced condition. However, keystone organisms like small rodents and mammal predators scored very low due to strongly reduced population levels. For forests, our assessment shows strongly reduced ecological condition, mainly due to low population levels of carnivores and functionally important plant species, little woody debris, and high levels of human area use. Our assessments indicate that the largest pressures on Norwegian mountain ecosystems to date relate to population management and land use, while climate change still scores just above the threshold for reduced ecological condition. Due to continued climate warming, infrastructure development, and conflict around mammal predators we expect a negative future trend for these pressures and consequently for the overall ecological condition in Norwegian mountains and forests.

Keywords: Ecological condition, ecological indicators, condition assessment, forests, mountains,

4. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Accounting for the condition of forest ecosystems in Spain



Presenting author: Adrián García Bruzón

Other author(s): Fernando Santos Martín, Patricia Arrogante Funes

Affiliation: Rey Juan Carlos University,

Contact: adrian.bruzon@urjc.es

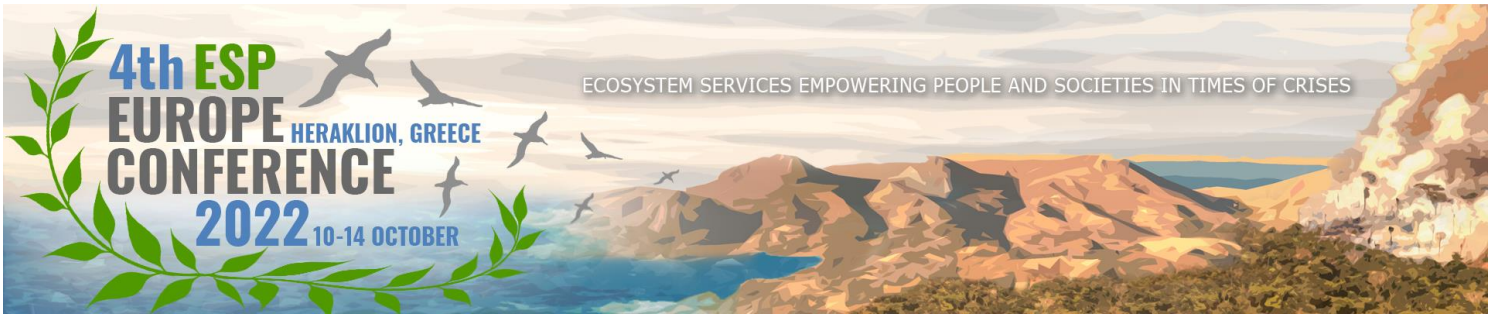
Forest ecosystems are a critical component of the natural capital at an international level. However, forest degradation contributes significantly to the ongoing loss of biodiversity and increasing effects of climate change in many parts of the world at alarming rates. Following the System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) framework endorsed by the United Nations Statistical Commission, in this study, we have mapped the condition of forest ecosystems at the national level in Spain between 2000 and 2015. Ecosystem condition is defined in the SEEA-EA as the quality of an ecosystem measured in terms of abiotic, biotic and landscape characteristics. We developed .an automatic computed application method to provide condition accounts based on four steps: (i) Definition of forest ecosystem classification; (ii) Selection of variables using the ecosystem condition typology: physical, chemical, compositional, structural, functional and landscape characteristics; (iii) Definition of references levels: lower reference level (collapse) and upper reference level (high ecosystem integrity); (iv) Aggregation into one single condition index (rescaling between 0 and 1). Results illustrate the status and trends of individual conditions indicators and aggregated index values in an explicit spatial manner. In general, the condition status of forest ecosystems in Spain experienced a slight increase in the last two decades, from 0.56 in 2000 to 0.58 in 2015, especially mentioning an improvement in Alpine forest ecosystems and Insular (Canary Islands). This new forest condition account at the national level can have multiple applications for policy and decision-making in effective evidence-based nature conservation, ecosystem services management and restoration areas selection.

Keywords: Forest ecosystem, biophysical condition, ecosystem accounting, SEEA-EA, Spain

5. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Pilot carbon account in forest territories – case-study of “Belovo”, Bulgaria



Presenting author: Miglena Zhiyanski

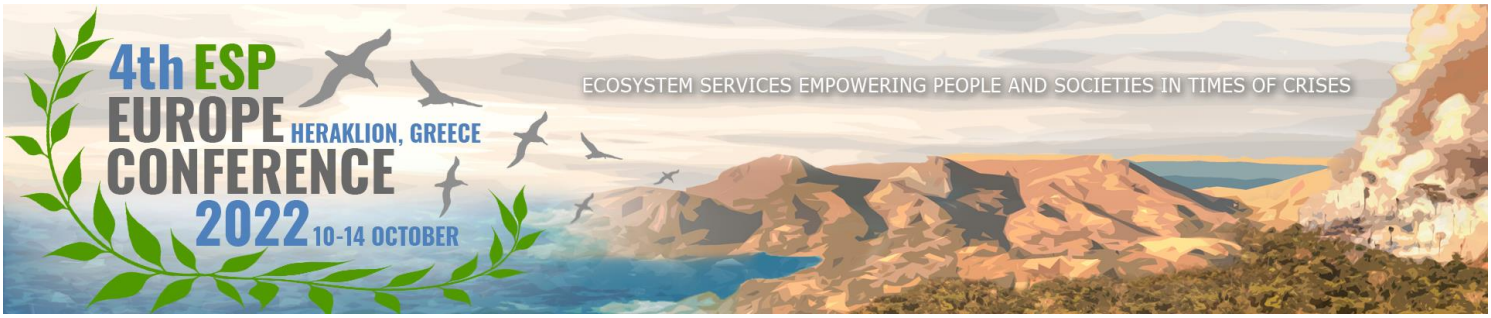
Other author(s): Lora Stoeva,

Affiliation: Forest Research Institute – Bulgarian Academy of Sciences, Bulgaria

Contact: zhiyanski@abv.bg

The System of Environmental-Economic Accounting (SEEA) is a framework and standard for organizing and presenting statistical data for the environment and its link to the economy. Four thematic accounts are considered in the context of natural capital accounting – biological diversity, climate change, ocean, urban territories. The information for thematic accounts provides a basis for assessment of the ecosystems' condition and valuation of ecosystem services. The present research provides results of the pilot study on carbon account in forest territories as a part of the climate account. The main goal of the study is to provide data on carbon stock changes in the forest ecosystems, which is of particular policy interest in view of the mitigation potential of these ecosystems in reducing greenhouse gas emissions. In addition, the pilot study aims to address, first, the consistency of data availability, in terms of spatially-explicit data on forest resources and land cover change and, second, to assess the relevance of combining different data sources and information in the process of mapping and accounting the carbon stock changes in the living biomass of the forest territories. The main indicator applied is the net balance of carbon in ecosystems within the region of State Forest Enterprise "Belovo" (NP Rila, Bulgaria). The study area covers 346.4 km2. The Stock Difference method is used, according to the 2006 IPCC Guidelines, covering the time period 2005-2015. This method is recognized by the SEEA – EEA. The pilot study accounts only for carbon changes in the living biomass of the forest ecosystems, due to the lack of relevant data to be used in assessing the changes in the carbon stock in the other pools. Two approaches are considered -using aggregated data from forest stands' dendrometrical descriptions within the forest management plans of SFE Belovo and National Park Rila and forestry reporting forms – RF2, RF3. The mean carbon stock of forests in the case-study region in 2005 is estimated at 60.8 tC/ha, while in 2015 it increases to 68.0 tC/ha. The mean value of carbon sequestration is 1.25 tC/ha per year. With respect to the carbon account, the opening stock of biomass is 1759.737 ktC, the net carbon balance is 218.028 ktC, and the closing stock 1977.765 ktC. The general challenges in terms of consistency are outlined and different ways to solve them are discussed.

Keywords: climate change SEEA – EA, accounting for carbon, forests, local scale



6. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Reviewing condition indicators for urban ecosystem accounting

Presenting author: Francesco Sica

Other author(s): Chiara Cortinovis, Davide Geneletti

Affiliation: Department of Civil, Environmental and Mechanical Engineering, University of Trento, Italy, Italy

Contact: francesco.sica@unitn.it

The transition from the ecosystems conditions account to the ecosystem services assessment is not always of obvious and simple identification. Especially when we need to identify the most suitable variables of conditions for accounting the urban ecosystem services.

Despite a growing literature on the identification of condition indicators for different ecosystem types, relatively few studies focus on urban ecosystems.

To analyze more deeply the functional linkage between ecosystem condition account and the assessment of ecosystem services in urban settings, this research aims at addressing the following questions:

- What are the most suitable indicators to assess and quantify urban ecosystem conditions?
- To what extent the indicators proposed to assess the conditions of other ecosystem types can be applied also to urban ecosystems?
- How can condition indicators be connected to the capacity of urban ecosystems to provide ecosystem services?

To address these questions, we undertook a systematic review of the scientific literature. A first set of 371 papers published between the years 2012 and 2022 was analyzed, extracting information about the indicators connected to the conditions of different ecosystem types that are present in urban areas (including forests, freshwaters, and agricultural patches). Based on the review, we obtained 223 condition indicators linked to 20 relevant ecosystem services for 5 ecosystem types. For each of the 5 ecosystems identified, we built “EC & ES accounting tables”. The tables summarize the condition indicators that can be adopted for the accounting

of urban ecosystem services. We conclude by discussing suitable application scales of the condition indicators, and possible uses in supporting different types of policy questions related to urban planning processes.

Keywords: Ecosystem conditions; Urban accounting; Indicators set

7. Type of submission: Abstract

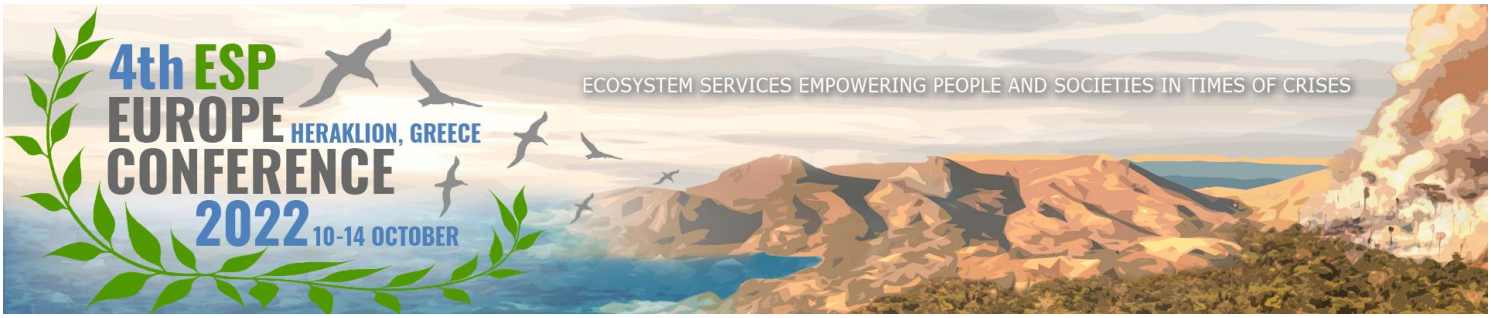
T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Assessing ecosystem conditions of vacant lots to preserve them from land take: the case study of Northern Milan intermunicipal area

Presenting author: Erica Bruno
Other author(s): Enzo Falco, Davide Geneletti
Affiliation: University of Trento, Italy
Contact: erica.bruno@unitn.it

In recent decades, the rapid and uncontrolled urbanisation of metropolitan areas has led to an urban landscape characterised by a mix of land uses interlinked with a variety of abandoned interstitial spaces left open to the colonisation of nature. Such undeveloped vacant lots are more vulnerable to land consumption since they don't require treatment, such as demolition or remediation, for their conversion in built-up areas. However, the sealing of vacant lots implies a significant loss of biodiversity and ecosystem services. Therefore, these interstices must be recognised and valued as important assets of green infrastructure and not merely as inactive or "awaiting development" spaces that do not contribute to the efficiency of urban dynamics. Assessments regarding the ecosystem conditions and services provided by this asset can be crucial in informing planning authorities and supporting them in making decisions in a land-use reduction perspective.

Considering the case-study of the intermunicipal area of Northern Milan, the goal of this research is twofold. On the one hand, we want to define the ecosystem condition of vacant lots since it is the first step, together with the assessment of extent, for developing an ecosystem accounting framework. On the other, we want to understand how the knowledge of ecosystem condition could be useful to support land-use decisions improving intermunicipal cooperation. The methodology includes the definition of a set of indicators and



the analysis of urban plans to compare the obtained condition value of each vacant lot with its future use as defined by land-use plans.

Keywords: ecosystem condition, vacant lots, land take, intermunicipal planning, ecosystem services.

8. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

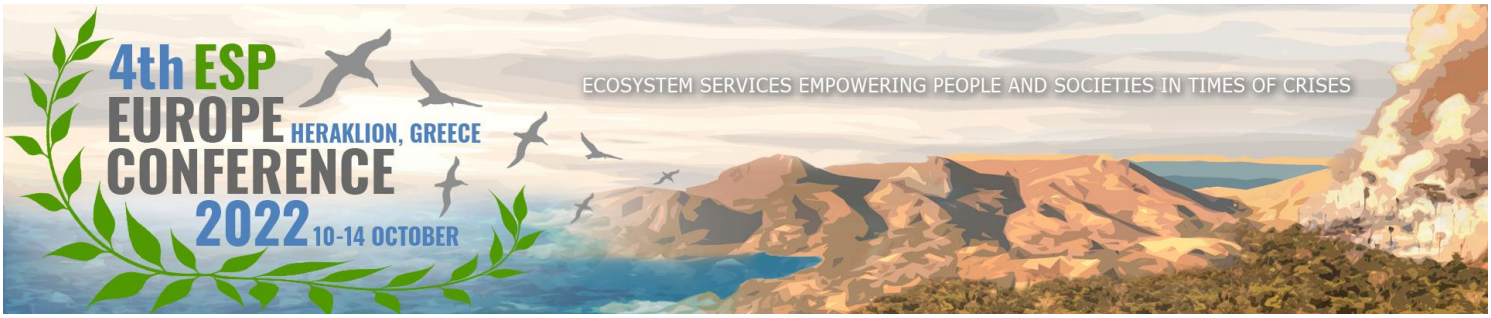
Global climate regulation by ecosystems in Germany: the ecosystem condition parameter "carbon stock" and the ecosystem service „greenhouse gas sequestration“ as national monitoring indicators

Presenting author: Ralf-Uwe Syrbe
Other author(s): Steffen Schwarz, Karsten Grunewald
Affiliation: Leibniz Institute of Ecological Urban and Regional Development (IOER), Germany
Contact: r.syrbe@ioer.de

The effects of a changing climate are becoming increasingly clear and dangerous, thus limiting carbon emissions is necessary worldwide. Important strategies are the conservation of natural carbon reservoirs and a land use structure allowing storage of greenhouse gases.

Soils are the largest carbon reservoirs in Germany. But also, biomass contains considerable carbon amounts. The ecosystem condition indicator "carbon stock in ecosystems" is designed for assessing the amount of carbon sequestered and to show the potential risk of release. Based on regularly available land use data and the most recent national soil map, the indicator allows regular monitoring and is in accordance with the national greenhouse gas inventory.

Carbon in soils and plants can be released through natural and anthropogenic processes but living plants also store atmospheric carbon in their biomass. Carbon dioxide is not the only greenhouse gas (GHG), but it is the most important one. To estimate these yearly sequestration resp. emission rates of land use and landscape change, an ecosystem service indicator „greenhouse gas sequestration“ has been developed, calculated and mapped in a high resolution. The resulting maps allow finding hotspots of carbon flow from or into the ecosystems.



Ecosystems in Germany contain 4.7 billion tonnes of carbon. The biggest part of 0.9 bill. t C is in Bavaria as the largest federal state, since the highest peatland proportion has Lower Saxony with 0.3 bill t carbon. All German ecosystems sequester yearly 28.9 million t CO2-equivalents, most of them again in Bavaria with 11.7 million t. This figure is the difference of some larger ones such as 69 million t sequestration in forests and 33 million t emissions from agriculture. Both sides can contribute to improving the national climate gas balance.

Keywords: carbon dioxide, organic soils, mineral soils, IPCC

9. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Adjustment of ecosystem services capacity matrix scores according to local ecosystem condition

Presenting author: Philip Roche
Other author(s): Sylvie Campagne,
Affiliation: UMR RECOVER, INRAE, France,
Contact: philip.roche@inrae.fr

One of the most direct determinants of ES capacity is the nature and condition of land cover. The relationship between land cover and ecosystem service biocapacity can be quite easily accounted for using the ecosystem service capacity matrix approach. This approach is flexible and efficient, but has the disadvantage that it does not incorporate spatial variability in scores, nor variability according to ecosystem condition. We recently proposed a methodology to evaluate plans, projects and programmes on ES. The land use change and cover impacts associated with these do not only involve land use changes, but also change in ecosystem condition that cannot be accounted for using a standard ES capacity matrix. Accordingly, it is important to consider also the dependence of ecosystem services on ecosystem condition.

We propose here a reflection and a quick method for modulating the values of ecosystem services according to ecosystem condition. We classified the ES into five groups with differing relationships to two groups of condition indicators: first, the structural condition, which concerns the vigour and quantity of ecosystems, and second, the biological condition, which concerns the species, functional and spatial diversity of ecosystems. This approach, coupled with low and high capacity ES matrix values, makes it possible to modulate the capacity scores

of the ES according to the local state of the ecosystems. We applied this method to cases of infrastructure projects in order to evaluate their impact on ES capacity.

Keywords: Ecosystem condition, Capacity matrix, ES assessment, EIA

10. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

SEEA-EA and Life Cycle Assessment (LCA): outlook on benefits and challenges of their methodological integration

Presenting author: Benedetto RUGANI
Other author(s): ,
Affiliation: Luxembourg Institute of Science and Technology (LIST), Luxembourg
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Human well-being depends on several ecological goods and services provided by nature and derived from renewable and non-renewable natural resources. All this represents what it is intended for Natural Capital (NC), i.e., stock of elements and resource flows resulting from ecosystems, which people may derive from their functioning in the form of ecosystem services (ES). Thus, ES can be interpreted as the "outputs" of NC, and their quantification in models of socio-economic system should be considered crucial to acquire knowledge on the sustainable management and use of NC.

In this context the Life Cycle Assessment (LCA) method can play an unprecedented role, as it allows to quantitatively model the interactions (pressures, impacts, short to long-term effects, …) between the technosphere of the socio-economic systems that demand ES, and the NC sphere supplying those ES. Nevertheless, LCA does not comprehensively consider all the elements of NC, such as several ES of maintenance and regulation type (air purification, climate regulation, pollination, ...) as well as the cultural services. Furthermore, there is no consensus in LCA on how to define Natural Capital Accounting (NCA) and how to integrate NCA into decision-making either at the level of product, organisation, territory, or whole economic sector(s) where LCA is applied.

The System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) is the most sophisticated method nowadays available to attempt incorporate ES knowledge explicitly

into economic accounting. This contribution aims to produce a systematic literature review-based roadmap for both managers of NC and LCA users and practitioners by detailing the extent to which, and under what methodological paradigm, a SEEA-EA based NCA can benefit from LCA concepts, procedures, and tools, and how LCA in turn can expand its scope by covering the ES assessment gaps through the experience of SEEA-EA modelling.

Keywords: Economic sector, ecosystem Service(s), life cycle assessment (LCA), natural capital, state-of-the-art

11. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

State-and-Transition models: Insights to ecosystem condition assessments

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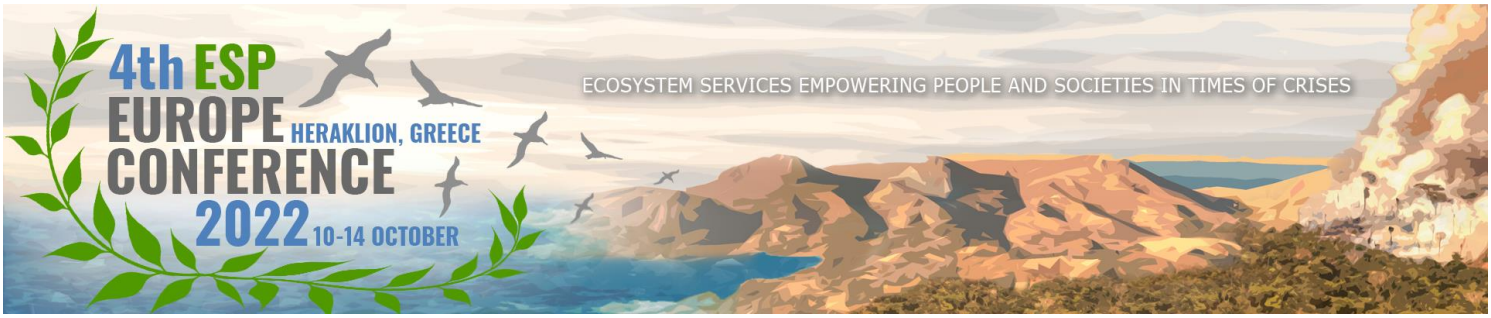
State-and-Transition models are ecological models based on non-equilibrium theory that have been developed as a reference to the sustainable management of ecosystems. In their applied form, they help set criteria to establish reference states (i.e. in a non-managed situation), thresholds representing critical changes in ecosystem properties and function, and to identify the ecological drivers of changes. STM models built as Bayesian Belief Networks, help incorporate uncertainty. This contribution presents the principles of STMs highlighting the definition of ecological reference states, state variables, and ecological drivers. I present examples of STM applications, including those illustrating the linkage between state variables and ecosystem services delivered at each state condition with the aim to contribute to the body of evidence to support the choice of indicators of ecosystem condition within the framework of the SEEA – EA and other ecosystem accounting applications.

Keywords: ecosystem condition, state-and-transition models, reference state, thresholds



12. Type of submission: Abstract

T. Thematic Working Group sessions: T17a Ecosystem condition accounting: overcoming operational challenges

Operational challenges in EU ecosystem condition accounts: the case of urban, agricultural and marine ecosystems

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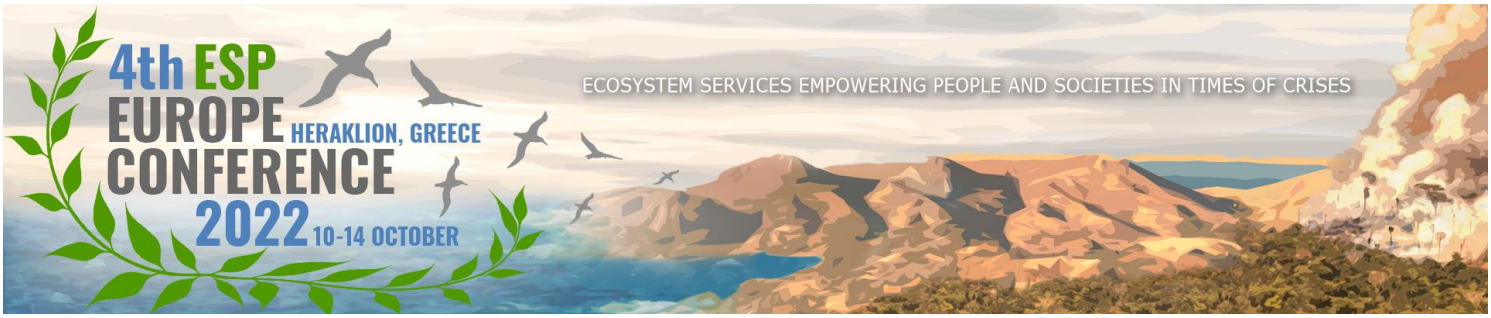
Following the amendment to the EU Regulation on environmental economic accounts, it is expected that the compilation of ecosystem conditions accounts by Member States would be a requirement in the near future. These accounts will follow the statistical framework for the System of Environmental Economic Accounting – Ecosystem Accounting (SEEA-EA) of the United Nations. However, potential operational issues of SEEA-EA, including those of specific groups of ecosystems should be solved before its practical implementation. Our presentation introduces operational challenges for anthropogenic ecosystems (urban ecosystems and agroecosystems) and marine ecosystems identified during the development of the upcoming EU Methodology. The latter is a guidance developed by the European Commission to map and assess the condition of all ecosystem types in the EU, including those not protected under EU Nature Directives. It provides an initial basis for the identification of good condition per ecosystem type, supporting restoration actions. Anthropogenic and marine ecosystems are illustrative cases of ecosystem types that do not always fulfil assumptions valid for other ecosystems, which are useful to highlight ecosystem specific issues of SEEA-EA implementation at national and EU levels. In fact, the EU Methodology represents a first attempt to translate the concept of restoration in a harmonised method applicable to all ecosystem types, requiring to deal with a great number of challenges. For example, the difficulty of identifying suitable reference levels for anthropogenic ecosystems, or the need to guarantee the self-regenerative capacity of ecosystems, or the problem of keeping pressures originating/impacting the ecosystems into account. Some of these challenges are shared with other ecosystem types and lines will be drawn to them. Potential solutions investigated will be also introduced. Both challenges and potential solutions will contribute as inputs for the open round table discussions anticipated in the second part of this session.



Keywords: ecosystem condition, operational challenges, reference levels, anthropogenic ecosystems; marine ecosystems