BOOK OF ABSTRACTS

This Book of Abstracts provides a comprehensive overview of the session content and is structured into three main sections:

I. Session Description – an introduction to each session, including its objectives and expected outputs
II. Session Program – a detailed schedule for each session, including speakers and timing
III. List of Abstracts – a complete compilation of all accepted abstracts

I. SESSION DESCRIPTION

ID: T3

Indicators in transition: embedding ecosystem services and nature based solution targets in recent policy frameworks

Hosts:

	Name	Organisation	E-mail
Host (s):	Alexander van Oudenhoven	Leiden University	a.p.e.van.oudenhoven@cml.leidenuniv.nl
	Mart Verwijmeren	RIVM	mart.verwijmeren@rivm.nl
Co-host(s):	Ágnes Vári	HUNREN Centre for Ecological Research	agnes.vari.sec@gmail.com
	Joana Seguin	Leibniz University Hannover	seguin@phygeo.uni-hannover.de
	Marcelle Lock	RIVM	marcelle.lock@rivm.nl
	Kate Farley	UKCEH	katfar@ceh.ac.uk
	Danial Owen	UKCEH	danowe@ceh.ac.uk
	David Fletcher	UKCEH	dfletcher@ceh.ac.uk
Other organiser(s):	Roxanne Lorilla	Harokopio University of Athens	rslorilla@gmail.com

Abstract:
As global and European policy landscapes evolve - shaped by the Kunming-Montreal Global Biodiversity Framework (GBF), the Nature Restoration Regulation (NRR), the EU Green Deal, and other initiatives - the need for robust, policy-relevant, and scalable indicators for ecosystem services (ES) has never been more pressing. Such indicators are essential to guide biodiversity governance, support Nature-based Solutions (NbS), and harmonize ecological integrity with human well-being.

During this session we will combine a world Café with invited talks to explore how policy frameworks can be effectively translated into actionable indicators that capture the multifaceted ecological, socio-economic, and cultural dimensions of ES. Participants will discuss the challenges of aligning indicators across scientific disciplines and policy contexts, avoiding “single-figure science,” and ensuring metrics that resonate with both policymakers and diverse stakeholders.

The session will include two main parts:

- An interactive World Café to discuss strategies for selecting ecosystem indicators that capture broad end-state benefits, with a particular focus on identifying and using shared language to align with diverse policy agendas and research tools to strengthen the science-policy interface.
- A selection of short presentations/speed talks to highlight advances and ongoing challenges in indicator development and implementation with a key focus on:
    - Aligning diverse indicator/policy frameworks to avoid duplication or fragmentation, supporting coherent and comprehensive governance.
    - Analysing fit for purpose for (re-)used indicators (credibility and salience of indicators)
    - Ensuring the policy uptake and legitimacy of ES indicators in rapidly shifting political landscapes.
    - Distilling lessons learnt from past experiences in indicator uptake to inform current and future policy frameworks.
    - Co-developing ES indicators capable of addressing cross-sectoral and nexus-related challenges.
    - Identifying and bridging gaps in data (particularly in social and cultural dimensions) and linking local-specific indicators to global reporting needs.

The session will also examine how current indicators influence policy cycles, monitor GBF targets, and support NbS while exploring opportunities for more integrated approaches. Participants will reflect on lessons learned from past experiences to inform the development of indicators that are scientifically robust, policy-relevant, and practically applicable.

Join us in a vital discussion as we collaboratively identify, develop, and refine indicators that will guide us towards a people- and nature-positive future.

Goals and objectives of the session:

- Identify and discuss indicators suitable for monitoring the Kunming-Montreal Global Biodiversity Framework (GBF) targets, as well as Nature-based Solutions (NbS).
- Discuss methods for selecting indicators that capture broad end-state benefits, are policy-relevant, and use a shared language across ecosystem services, tools, and policy frameworks.
- Explore the future of the Thematic Working Group III on indicators, particularly in relation to global targets, GEOBON, and NbS.

Planned output / Deliverables:

We intend to discuss a set of indicators and reasons why they have been included in the set.

Expected deliverables include:
Synthesized recommendations (set of principles) for developing comprehensive ecosystem services indicators across ecosystem services linked to policy goals.
Policy communication recommendations: Practical advice for translating complex ecosystem services concepts into appealing policy-relevant language.

Session format:

The first part will feature invited talks combined with a World Café-style discussion, whereas the second part (order to be determined) is open to submissions. Based on the submissions received, we may use speed talks instead of longer presentations to encourage interaction and exchange, ensuring 25–30 minutes are reserved for the closing discussion of the second part.

Related to ESP Working Group:

TWG 3 – ES Indicators

II. SESSION PROGRAM

Room: C2
Date of session: Thursday 21, May 2026
Time of session: 09:00 – 12:30

Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
09:00-09:15	Karsten	Grunewald	Leibniz Institute of Ecological Urban and Regional Development (IOER)	The status of national ecosystem service indicators in Germany and their implementation in policy approaches
09:15-09:30	Frits	Bos	CPB Netherlands Bureau for Economic Policy Analysis	How informative are indicators for biodiversity in policy evaluation?
09:30–09:45	Agnes	Vari	HUN-REN Centre for Ecological Research	Evaluating ecosystem service indicators from Canadian landscapes to global reporting frameworks.
09:45-10:00	Bep	Schrammeijer	Athena Institute, Vrije Universiteit Amsterdam	Knowledge Governance for living landscapes
10:00 -10:15	Kamaljit K	Sangha	Charles Darwin University, Australia	A nature-based solutions assessment framework integrating indigenous biocultural and ecosystem services perspectives: An Australian example
10:15-10:30	Chia-Wei	Chang	National Taiwan University	From Theory to Strategy: Applying the IUCN Global Standard to Policy Frameworks and Cross-sector Implementation
11:00 – 12:30	Mart	Verwijmeren	RIVM, UKCEH	World café; Making plural ecosystem service indicators policy-relevant through identifying shared language.

III. LIST OF ABSTRACTS

The first author is the presenting author unless indicated otherwise

1. The status of national ecosystem service indicators in Germany and their implementation in policy approache

First author: Karsten Grunewald
Other author(s): Ralf-Uwe Syrbe
Affiliation: Leibniz Institute of Ecological Urban and Regional Development (IOER), Dresden, Germany
Contact: k.grunewald@ioer.de

Triggered by the EU Biodiversity Strategy 2020 and the MAES process (Mapping and Assessment of Ecosystem Services), national ecosystem service indicators have been developed in recent years. A few of these have gained political relevance and are being monitored. In addition to national biodiversity strategies, the statistical SEEA-EA system (System of Environmental-Economic Accounting—Ecosystem

Accounting), which requires EU countries to report on ecosystem services in accordance with this UN-standard, is now particularly important.
The short presentation will highlight the development process in Germany over the last decade. Which indicators are suitable for guiding biodiversity governance at national level, support Nature-based Solutions (NbS), and harmonize ecological integrity with human well-being? While the German MAES report is only available in English and received little public attention, some ecosystem service indicators, such as "Accessibility of green spaces suitable for recreation in cities" have been included in strategic policy documents (German Sustainability Strategy, National Biodiversity Strategy, etc.).

Keywords: Accounting, Biodiversity, Ecosystem assessment, Monitoring, Strategie

2. How informative are indicators for biodiversity in policy evaluation?

First author: Frits Bos
Other author(s): Tijl Hendrich, Herman Vollebergh
Affiliation: CPB Netherlands Bureau for Economic Policy Analysis
Contact: f.bos@cpb.nl

In all kinds of reports and statistics, indicators are provided on the amount and development of biodiversity and the impact of policy on biodiversity. Many different types of indicators are used with all kinds of different measurement units. For policy makers it is often unclear how informative these indicators are: what do they measure and what are blind spots, hidden assumptions and key-features? What are their merits and limitations for different types of use? And what criteria can be used to assess this? These questions will be addressed starting from the indicators in a set of Dutch case studies, e.g. environmental impact assessment, social cost-benefit analysis (ecosystem services & biodiversity points), TEEB-study, report by financial institution and official statistics on natural capital and biodiversity.

Keywords: Ecosystem services, indicators, biodiversity, social cost-benefit analysis

3. Evaluating ecosystem service indicators from Canadian landscapes to global reporting frameworks

First author: Agnes Vari
Other author(s): Flavio Affinito, Jacqueline Hamilton, Elena M. Bennett
Affiliation: HUN-REN Centre for Ecological Research
Contact: agnes.vari.sec@gmail.com

An effective monitoring scheme is essential for tracking efforts towards reaching global biodiversity targets, sustainability goals, and provision of ecosystem services. Specifically, for monitoring ecosystem services, we need indicators that cover multiple aspects/cascade levels, at multiple scales and that are sufficiently well fitting.
Several global frameworks exist that require monitoring of ecosystem services and elements of social-ecological systems (e.g. SEEA EA, GBF, SDG). The indicators they suggest are often re-used across frameworks, for example, several SDG indicators have been linked to multiple GBF targets. While re-using indicators seems a time and energy efficient solution, indicators are thus often not well suited to represent the actual target.
We develop a rough 'scale of fit' to measure the goodness of indicator fit (i.e. validity) and compare three sets of indicators for selected ecosystem services. We compare indicators from case study sites in Canada and indicators from global environmental agreements. We use the Essential Ecosystem Services Variable (EESV) classes to show limited fit and limited coverage across aspects/cascade levels. We show that both the local as well as the global indicators are limited in covering multiple aspects and that global indicators have limited fit to describe ecosystem services, whereas local indicators are much better fitting (more relevant to the actual ecosystem services).

Keywords: indicator validity, indicator fit, monitoring ecosystem services

4. Governance for living landscapes

First author: Bep Schrammeijer

Other author(s): Francesca Morselli, Anna Teijero-Fokkema, Lieselot Vandenbussche

Affiliation: Athena Institute, Vrije Universiteit Amsterdam

Contact: e.a.schrammeijer@vu.nl

As reflected in the Kunmig-Montreal Global Biodiversity Framework there is general agreement regarding an urgent need to protect our landscapes to restore biodiversity, enhance ecosystem services and maintain the sustainable production of food (targets 10 & 11). To do this knowledge is needed to guide action (target 21) and I would like to explore and discuss several challenges related to utilising knowledge to address these targets. I will draw on insights from several inter- and transdisciplinary research projects related to biodiversity and ecosystem service monitoring, perspectives on landscape management, and knowledge governance for integrated policy measures.

These projects all zoom in on the peat meadows of western Netherlands where multiple challenges related to biodiversity loss, water quality and quantity, greenhouse gas emissions, climate change impacts, land subsidence and (un)sustainable agriculture culminate. In these projects we encountered challenges related to translating scientific or local knowledge into insights and indicators that are useful for policymaking, as well as for on-ground land management practice. For example, scientific knowledge is often so specific and nuanced that it is difficult to translate into clear practical instructions for landscape management or into generic policy measures that fit into current governance structures. In addition, governance structures tend to rely on accountability structures that require quantified and monetarised indicators of impacts. As a result, many ecosystem functions and services, especially cultural ecosystem services, tend to be overlooked, underestimated or simplified in policy frameworks. In addition, it is especially difficult to address multiple ecosystem functions or services simultaneously and therefore possible trade-offs and conflicting social norms and values are often disregarded in relevant indicators and in policy measures.

Keywords: knowledge governance, biodiversity monitoring, perceptions of landscape management, integrated policy measures

5. A nature-based solutions assessment framework integrating indigenous biocultural and ecosystem services perspectives: An Australian example

First author: Kamaljit K Sangha
Affiliation: Charles Darwin University, Australia
Contact: Kamaljit.Sangha@cdu.edu.au

Assessing ecosystem services (ES) indicators has become vital to measuring the condition of ecosystems and their benefits, and informing policy and businesses for appropriate conservation and investment decisions. However, the ES indicators depending on ecosystem type, and the tools and measures developed to date mostly consider ecological attributes with little relevance to Indigenous Peoples and Local Communities (IPLC) contexts. Here, together with Australian Indigenous community participants, we assess and co-develop an integrated set of
ecological and socio-cultural indicators, and associated assessment tools. We reviewed relevant global literature
and conducted focus group meetings with three Indigenous groups, representing Traditional (Land) Owners, senior community members and rangers in northern Australia. Our literature review identified 30 ES indicators
and associated assessment tools, addressing provisioning, regulating, biodiversity and cultural services, primarily across the forest, agriculture, wetland and grassland ecosystems. Largely, biodiversity and regulating services encompassed ecological indicators rather than provisioning and cultural services. Notably, the IPLC context was not captured within the reviewed literature on indicator frameworks. The results from focus group discussions with Indigenous participants addressed this gap, describing 16 appropriate indicators (and associated measurement tools) for assessing Indigenous people's socio-cultural, ecological and economic experiences and aspirations. The proposed bottom-up, integrated biophysical and bio-cultural indicator framework empowers local communities and is useful for informing practitioners and emerging incentivising/Payment for ES schemes. Our conceptual framework is generic to adapt to any local context, and offers potential application in evolving Nature-based Solutions markets

and for informing socio-economic, natural resource use management, and policy-related IPLC contexts in Australia and globally.

***Keywords*:** Indigenous peoples and local communities (IPLC), Integrated ecological and socio, cultural indicators framework, Nature-based Solutions (NbS), Nature repair market, Northern Australia

6. From Theory to Strategy: Applying the IUCN Global Standard to Policy Frameworks and Cross-sector Implementation

First author: Chia-Wei Chang
***Other author(s)*:** Chi-Chang Liu, Chia-Fa Chi, Hsin-Chi Li
***Affiliation*:** National Science and Technology Center for Disaster Reduction; National Taiwan University
***Contact*:** joyce343777@gmail.com

The study aims to integrate the latest edition of the IUCN Global Standard for Nature-based Solutions (NbS) with Taiwan's rapidly evolving climate and biodiversity policy landscape by developing a framework to drive practical and cross-sector implementation. It draws on a survey of Taiwanese stakeholders at both central and local levels to assess NbS awareness, the perceived relevance of each criterion, key data and capacity gaps, and the willingness to apply NbS indicators within existing instruments such as watershed plans, protected area management, and community development initiatives. By analyzing constraints and bottlenecks in local planning procedures, the study clarifies how an NbS-centered framework can be aligned with prevailing institutional structures and project cycles.

Building on this empirical foundation, the presentation will demonstrate how the survey results can guide the refinement and contextualization of the indicator set, ensuring it remains ambitious yet feasible in practice. The study will further examine the decision cycles of key policy instruments and propose concrete entry points for embedding NbS into national and local frameworks. Finally, it will highlight how the 8-criteria framework can serve as a shared reference for generating synergies between policies, thereby supporting cross-sector coordination, monitoring, and adaptive learning.

***Keywords*:** Nature-based Solutions, policy mainstreaming, standards, cross-disciplinary strategy