

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: B10

Frontiers in urban ecosystem services knowledge and practice

Hosts:

	Name	Organisation	E-mail
Host (s):	Luis Inostroza	Mendel University in Brno	luis.inostroza@mendelu.cz
Co-host(s):	Daniele La Rosa	University of Catania	dlarosa@darci.unict.it

Abstract:

What contribution can ecosystem services science provide in addressing the challenges of the 21st-century urban ecosystem? Urban ecosystems are of a special kind, where human agency shapes patterns and processes more strongly than in any other type of ecosystem, therefore making the co-production of ecosystem services explicit. At least 3 axes of complexity intersect in the urban co-production of ecosystem services. 1) The interlink between natural, built and social capital determining the delivery of fundamental ecosystem services, which is both highly complex and non-linear; 2) The implicit complex spatiality where interactions of matter, energy and information take place at very short distances but at the same time belonging to a worldwide net of fluxes and teleconnections that transfer ecological asymmetries between world centres and peripheries. We are witnessing a double-sided urban inequality, where the benefits people receive from urban ecosystems are becoming increasingly uneven, within the same city (endogenous inequality) and among cities across the world (exogenous inequality) and 3) The fact that urban ecosystem services assessments must deal with the paradoxes imposed by the minimum area size necessary for ES to be co-produced and spatial distribution, where not only the size of the service-providing areas matters but also its spatial distribution arrangement within the urban fabric. 4) Knowledge and information generated by urban ecosystems science keep facing some resistance and inertia to be daily used to deliver decisions on the asset of ecosystems in contemporary urban contexts. Despite a vast development of ecosystem services science and applications, their actual added value in decision making process is limited in some political and social domains, i.e spatial planning and urban policies for instance.

Goals and objectives of the session:

This session aims to explore the following questions, drawing on the current state of the art in ecosystem services science, identifying emergent topics and methods, and outlining a way forward for research. Theoretical, methodological, and applied contributions on current frontiers of urban ecosystem services knowledge and practice are welcome, addressing the following research questions.

- How robust is our understanding of the non-linear relationships between natural, built, and social capital underpinning urban ecosystem services delivery?
- What kind of reconceptualisations are needed for a better understanding of this non-linearity?

- How can urban ecosystem services analysis be better placed within the capital's interactions paradigm, reconnecting this branch of research with systems ecology?
- How adequate are existing methods, models and indicators used in ecosystem services science at other landscape scales, while being applied to urban ecosystems?
- How relevant, well-informed or misleading is people's perception of urban ecosystem services?
- How can we better analyse the share of urban ecosystem services between those locally materialised and those that are exported or transferred elsewhere?
- How can we operationalise the minimum area size and the spatial distribution of ecosystem services in urban areas?
- How effective is urban ecosystem services science to deliver planning decision to improve the overall condition of current urban contexts?
- What are the bottlenecks hindering the application of ecosystem services knowledge in urban ecosystems?

Planned output / Deliverables:

The possibility of developing a joint paper among the session's presenters will be discussed.

Session format:

Open Session, primarily based on call for papers with the possibility of using a blended approach that combines chosen speaker profiles with selected papers.

The session will follow a structured format designed to facilitate a high-level discussion over 1.5 hours, incorporating up to four to five papers.

It will commence with a framing keynote of five minutes.

This will be followed by a moderated panel discussion featuring four to five speakers who will delve into high-level topics, possibly structured by subject (such as policy, finance, business, or innovation), with each speaker having approximately eight to ten minutes to share their insights.

The session will conclude with a five-minute summary, encapsulating the critical points of the discussion.

Related to ESP Working Group:

[BWG 10 – Urban systems](#)

II. SESSION PROGRAM

Room: Lounge

Date of session: Tuesday, 19 May 2026

Time of session: 14:00 – 15:30

Timetable speakers:

Time	First name	Surname	Organization	Title of presentation
14:00-14:05	Luis	Inostroza	Mendel University in Brno	Introduction to the session
14:10-14:20	Nadja	Kabisch	Leibniz University Hannover	Integrating urban nature and its biodiversity into the 15-minute city concept
14:20-14:30	André	Mascarenhas		Urban biodiversity and its relation to ecosystem services: A review for Germany
14:30-14:40	Javier Babi	Almenar		From brownfield to green space: modelling of tree growth and ecosystem services with the

				DynaTree Model in "La Goccia" – Milan (Italy).
14:40-14:50	Negin	Bani Khalifi	Agricultural University of Athens	From Trees to Traffic: Empirical Evidence of Air-Quality Regulating Ecosystem Services Across Green-Grey Interfaces in a European Mediterranean Megacity
14:50-15:00	Jiří	Schneider	Mendel University in Brno	Hidden but Functional: Ecosystem Services of Spontaneous Urban Greenery across European Cities
15:00-15:10	Jiří	Louda	Jan Evangelista Purkyně University in Ústí nad Labem	Do People Want Natural Streams in Cities? Evidence from Urban River Restoration in Central Europe
15:10-15:20	Ehsan	Pashanejad	Concordia University	Who Owns Urban Nature? Land ownership as structural driver of ecosystem service provision and connectivity across Canadian cities
15:20-15:30	Harald	Zepp	Ruhr University Bochum	Sense and Nonsense of Monetizing Ecosystem Services in Small Areas: A Real-World Example from Bochum, Germany

III. ABSTRACTS

The first author is the presenting author unless indicated otherwise

1. Integrating urban nature and its biodiversity into the 15-minutecity concept

First author(s): Nadja Kabisch

Other author(s): Monika Egerer

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Urbanization and biodiversity loss are critical challenges globally, with urban expansion increasingly threatening natural habitats. The "15-minute city" concept proposes sustainable urban development by allowing residents to access key amenities within a 15-minute walk or bike ride, though it traditionally focuses on human-centric needs such as mobility and infrastructure. In this talk, we present our ideas on how the 15-min city concept can be harmonized with the preservation of biodiversity. We propose four strategic approaches for integrating nature within the 15-minute city framework:

1. Short Routes for Animals: Highlighting the necessity for animals, like humans, to have accessible habitats, we advocate for a network of small, connected green spaces to support species such as wild bees and hedgehogs.
 2. Small Spaces, Big Impact: Emphasizing the cumulative ecological benefits of numerous small green areas, including community gardens, in enhancing both human and ecological networks.
 3. Valuing Diversity: Promoting varied plant species and structural diversity—such as wildflower verges and dead wood—to bolster biological diversity and simultaneously enrich human social and leisure experiences.
 4. Technological and Community Engagement: Utilizing technology and citizen science to monitor biodiversity, address environmental stress, and integrate ecological goals into urban planning.
- We acknowledge challenges such as urban density, spatial constraints, and financial limitations, which necessitate innovative solutions. Proactive engagement involving local communities, consideration of

local ecosystems, and the implementation of initiatives like habitat islands and citizen actions are recommended as initial steps. These should be coupled with monitoring to evaluate quality of life and biodiversity outcomes.

Keywords: 15-min city concept, Biodiversity, multi-species approach

2. Urban biodiversity and its relation to ecosystem services: A review for Germany

First author(s): André Mascarenhas

Other author(s): Tanja Straka, Sonja Knapp, Monika Egerer, Josef Kaiser, Thilo Wellmann, Tabea Hähnel, Jannis Glahe, Belinda Rhein

Affiliation: ILPÖ - Institute of Landscape Planning and Ecology University of Stuttgart

Although the various benefits of nature to humans in urban areas are increasingly known, the role of biodiversity in the provision of ecosystem services (ES) remains unclear. This knowledge is critical to understand how biodiversity and human well-being could be harmonised, especially in urban areas where people's contact with nature can be limited. Furthermore, green areas are often planned considering essentially human needs, while neglecting biodiversity considerations. We argue that insufficient knowledge on the relationships between biodiversity and ES is a major challenge for mainstreaming biodiversity into urban planning and design. To address this knowledge gap, we assessed the state of knowledge about the relationships between biodiversity and ES in urban areas, through a review of scientific and grey literature, and a content analysis of planning documents, using Germany as a case study (where a large majority of the population is urban). We addressed questions such as how relationships between biodiversity and ES are defined in the literature, how well different aspects of biodiversity (such as functional diversity) and different ES categories are represented in the literature, or which indicators are used to define biodiversity-ES relationships. The research was conducted as part of the German Biodiversity Assessment ("Faktencheck Artenvielfalt"), the most comprehensive biodiversity assessment conducted in Germany so far. Our review showed that empirical evidence on the relationships between biodiversity and ES in urban areas in Germany is scarce. Furthermore, as most studies have been conducted in larger cities with more than 250,000 inhabitants, knowledge about small and medium-sized cities is even more limited. We discuss the existing knowledge gaps, wider implications of the findings, and provide recommendations for research and policy to better support biodiversity-ES relationships in urban areas, and hence urban planning and design.

Keywords: Biodiversity, Ecosystem services, Nature's contributions to people, Nature-based solutions, Urban areas, Germany

3. From brownfield to green space: modelling of tree growth and ecosystem services with the DynaTree Model in "La Goccia" – Milan (Italy)

First author(s): Javier Babí Almenar

Other author(s): Davide Stucchi, Renato Casagrandi

Affiliation: Politecnico di Milano

Trees are key components of urban ecosystems, providing essential ecosystem services (ES). Yet, they are subject to chronic stress from pollution, heat islands, drought, and limited rooting space. Planning effective urban forestry actions, e.g., restoration, replanting, requires quantifying tree growth, associated changes in tree morphology, and future changes in the supply of ES as a consequence of specific decisions and expected future socio-environmental drivers (e.g. climate change). We present an updated version of DynaTree, a dynamic, mechanistic, individual-based model designed to simulate urban tree growth and ES supply under varying socio-ecological-technological conditions. Operating on hourly and daily timesteps, it simulates long-term development of both existing and newly planted trees. The modular framework quantifies a suite of ES, including carbon sequestration, air filtration, runoff regulation, local climate moderation, and phytoremediation of soil pollutants. We apply the model to "La Goccia" in Milan, Italy—a former industrial brownfield with spontaneous woodland that is planned for integration as a major green space within the future Politecnico di Milano campus in northern Milan. This case study uniquely allows exploration of legacy vegetation, soil conditions, and planting strategies within an urban regeneration project. Simulations test combined climate, planting, and management scenarios to project tree growth and ES trajectories. Our study illustrates the value of dynamic mechanistic models such as DynaTree for informing the planning, design, and management of specific urban forestry actions in a more realistic form than land-use-based models.

Keywords: urban ecosystem services; urban forest; ecological modelling; dynamic models; urban brownfields

4. From Trees to Traffic: Empirical Evidence of Air-Quality Regulating Ecosystem Services Across Green–Grey Interfaces in a European Mediterranean Megacity

First author(s): Negin Bani Khalifi

Other author(s): Kleio Platymesi, Stavros Vlachos, Thomas Bartzanas, Dafni Despoina Avgoustaki

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Urban green infrastructure (GI) is increasingly promoted as a nature-based solution for mitigating air pollution and enhancing human well-being in cities. However, the effectiveness of GI in delivering air-quality regulating ecosystem services remains insufficiently quantified at fine spatial and temporal scales, particularly in European Mediterranean megacities characterized by compact urban morphology, intense solar radiation, and persistently high traffic emissions. This lack of fine-scale empirical evidence constrains the calibration and validation of urban ecosystem service models used in planning and policy contexts.

To address this, a two-week summer field campaign was conducted in Athens, Greece, focusing on carbon dioxide (CO₂) and nitrogen dioxide (NO₂) as key indicators of traffic related urban air pollution. Measurements were made across two contrasting urban environments: a densely vegetated park (Syggrou Grove Park) and a traffic dominated arterial corridor (Athens National Road). Pollutant concentrations, along with concurrent air temperature and relative humidity, were recorded using portable accuracy instruments, including an Aeroqual S-Series 500 analyzer and a TSI VelociCalc 8720 meter. A paired-site sampling design was implemented, with measurements collected at four fixed times daily (08:00, 13:00, 18:00, 22:00) to capture diurnal patterns as well as weekday–weekend variability. Results reveal pronounced and consistent CO₂ and NO₂ gradients between green and grey sites, with traffic corridors exhibiting up to double the pollutant concentrations observed within the park. Rush hour peaks and reduced weekend levels confirm road traffic as the dominant emission source, while urban vegetation substantially moderates both the magnitude and temporal variability of pollutant concentrations.

By combining temporal resolution with a paired site design, this study provides robust empirical quantification of air-quality regulating ecosystem services delivered by GI. The dataset offers direct input for calibrating urban ecosystem service models, and supports integrating green infrastructure into evidence based urban planning for climate mitigation and public health protection.

Keywords: Green infrastructure, Urban ecosystem services, Air-quality regulation, Traffic emissions, Mediterranean cities

5. Hidden but Functional: Ecosystem Services of Spontaneous Urban Greenery across European Cities

First author(s): Jiří Schneider


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Spontaneous and marginal urban greenery—including ruderal vegetation, informal green spaces, derelict land, and self-colonising plant communities—constitutes a widespread yet underrepresented component of urban ecosystems across Europe. Despite its prevalence, this form of urban greenery remains weakly integrated into urban ecosystem services (ES) assessments and planning practice. In this study we synthesise current knowledge on the mapping of spontaneous urban greenery and the ecosystem services it provides, with a focus on implications for urban planning and climate resilience.

We conducted a systematic review of 30 highly relevant peer-reviewed studies addressing the spatial identification, ecological characteristics, and ES assessment of informal urban green spaces. The results show that spontaneous greenery delivers a broad range of ecosystem services comparable to, and in some cases exceeding, those of formally managed urban green spaces. Key services include biodiversity support, microclimate regulation, carbon storage, pollinator habitat provision, and contributions to urban thermal and ecological resilience. Evidence consistently indicates high species richness in spontaneous vegetation, particularly within railway corridors, brownfields, post-industrial areas, and vacant lots.



Mapping approaches range from detailed field surveys to GIS-based spatial analyses and remote sensing techniques. However, methodological challenges persist in capturing small-scale, transient, and heterogeneous green spaces. Across studies, spontaneous greenery is largely absent from official urban green infrastructure inventories and planning frameworks, which limits its consideration in decision-making. We argue that recognising and systematically mapping spontaneous urban greenery is key to advancing urban ecosystem services assessments and supporting ecosystem-oriented approaches to urban resilience and climate adaptation.

Keywords: urban ecosystem services, spontaneous vegetation, informal green spaces, urban resilience, green infrastructure

6. Do People Want Natural Streams in Cities? Evidence from Urban River Restoration in Central Europe

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Urban streams have been profoundly altered by long-term urbanization. Many natural watercourses have been regulated, straightened, converted into concrete channels, or routed underground. As a result, they have largely lost their natural character and the ecosystem services they once provided.

Growing biodiversity loss, climate change impacts, and the increasing emphasis on adaptation—especially through nature-based solutions—have renewed interest in reversing these modifications and restoring urban streams. Although restoration projects have become more common in recent years, their successful implementation is complex and requires interdisciplinary cooperation. Beyond natural, technical, and spatial constraints, restoration must address financial limitations, conflicting stakeholder interests, private land ownership, and the need to integrate nature-based measures with technical or hybrid solutions. Equally important is accounting for the needs and preferences of local residents, whose acceptance can strongly influence project outcomes.

This study introduces a methodology based on a questionnaire survey using a discrete choice experiment to systematically capture residents' preferences and incorporate them into inclusive stream restoration design. The approach was applied in four Central European cities—Jablonec nad Nisou (CZ), Senica (SK), Poznań (PL), and Dresden (DE). It identifies preferences not only for individual nature-based restoration measures but also for combinations of measures representing different approaches to river renaturalization.

The results indicate a strong and consistent public preference for natural, meandering streams with accessible banks and diverse vegetation. Across all cities, respondents clearly rejected concrete channels and limited access to water. At the same time, the analysis revealed meaningful differences between cities and population segments. For example, in Jablonec nad Nisou, a small but internally consistent group of respondents (12%) preferred the current concrete channel without nature-based elements.

These findings demonstrate the value of incorporating residents' preferences into co-design processes for urban stream restoration. Identifying groups that favor the existing state also enables more targeted communication strategies to address their concerns. The study further presents additional insights, including preferences for specific restoration measures and perceptions of the benefits of urban stream revitalization across the studied cities.

Keywords: River restoration, residents' preferences, discrete choice experiment, co-design, communication strategies

7. Who Owns Urban Nature? Land ownership as structural driver of ecosystem service provision and connectivity across Canadian cities


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Land ownership is a fundamental yet under-examined structural driver of ecosystem service (ES) provision, distribution, and connectivity, particularly in urban environments where land is highly contested



among multiple actors, agencies, and economic priorities. While land ownership has been recognized as influencing the distribution of ES benefits, its role in shaping landscape structure and ecological connectivity—and thereby the capacity of urban landscapes to generate, sustain, and spatially connect ES and biodiversity—remains under-theorized in urban planning and sustainability research. In this study, we present a pragmatic and integrative approach that explicitly treats land ownership as a structural dimension of urban ecosystem service systems, operating through its influence on urban form, density, and spatial configuration. Focusing on three major Canadian cities—Vancouver, Montreal, and Quebec City—we examine how ownership regimes shape landscape structure and connectivity, and how these structural patterns, in turn, influence ecosystem service capacity under growing climate and development pressures. Using a combination of land-use and land-cover data, census-based socio-economic indicators, and satellite remote sensing, we quantify urban fabric and density along gradients of built and green infrastructure. Key indicators include built-up intensity (Normalized Difference Built-up Index), urban green structure metrics (tree canopy cover, green cover fraction, NDVI), selected socio-economic variables, and spatially explicit estimates of urban ecosystem services (e.g., cooling, carbon storage, and flood mitigation) derived from ES models. Preliminary results highlight that land ownership is not merely a legal classification but a functional determinant of urban landscape structure, connectivity, and ecosystem service capacity. Incorporating ownership into urban ecosystem service assessments offers new insights for climate-resilient planning, equitable access to urban nature, and the design of nature-based solutions. We conclude by outlining implications for urban planning and a forward-looking research agenda that supports ownership-aware ecosystem service modeling and comparative urban studies.

Keywords: Land ownership, Urban ecosystem service, Landscape Structure, nature-based solution, connectivity

8. Sense and Nonsense of Monetizing Ecosystem Services in Small Areas: A Real-World Example from Bochum, Germany

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Ecosystem services (ES) monetary valuations have been used to highlight people's dependence on natural capital. Most valuation methods either treat goods and services from a non-spatial perspective, refer to nations as spatial units, or focus on selected land-use/land-cover (LULC) types or biomes/biotope types. The usefulness of such estimates is undisputed. Politicians and planners often demand monetary assessments even for small spatial units, to advocate for and justify measures to improve ES. However, when it comes to supporting decisions and actions to strengthen ES, monetary valuation of small spatial areas (cities, neighbourhoods), scientists face unresolved methodological challenges.

In this contribution, we use the 'EnhancES' toolbox (Zepp et al. 2025) to explore the implications of monetary valuation applied in a small neighbourhood located in Bochum, Germany. This is a real case study where ES of different planning scenarios had been previously assessed in biophysical terms. We discuss the extent to which it is appropriate to apply monetary valuations to small areas, such as neighbourhoods and districts.

Evaluating ecosystem services (ES) in monetary terms appears to make them comparable and encourages trade-offs, as it allows for the simple replacement of one ecosystem service with another. Transboundary spatial connectivity of ES flows add to the intricate matter, highlighting the need of integrative valuations to reach a broader understanding of ES and well-being.

Zepp H., Inostroza L., Bührs M., Gruenhagen L., Busch C., Dong N. (2025): EnhancES – An open source GIS-based toolbox for assessing, mapping and enhancing ecosystem services. *Ecosystem Services* 74, 101744. <https://doi.org/10.1016/j.ecoser.2025.101744>

Keywords: Ecosystem services (ES), Monetary valuation, Small spatial units, EnhancES toolbox, Trade-offs