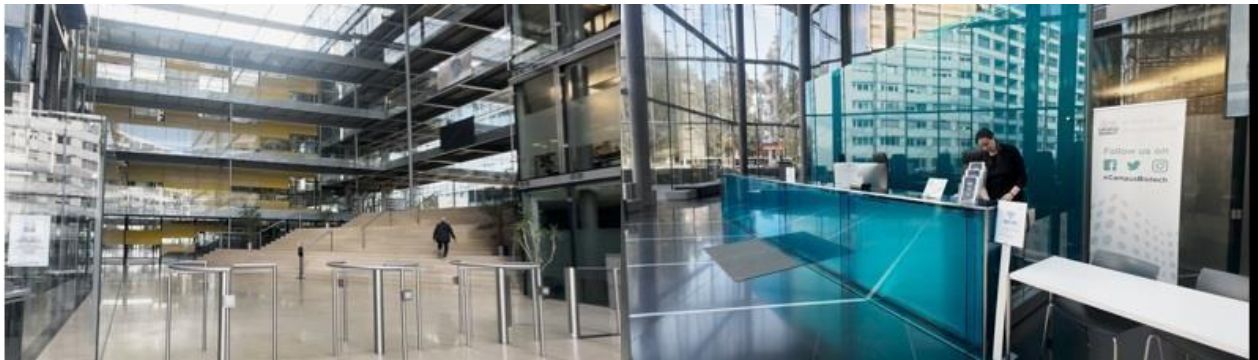


Science- Policy- Practice Interface

Co-Designing **Blue-Green
Infrastructure** for Urban
Biodiversity and
Transformation

INSIGHTS FROM
SWISS RESEARCH
INSTITUTES AND
INTERNATIONAL
GENEVA



The workshop was held at the Campus Biotech, University of Geneva, 2025

Rationale

In view of the rapid changes occurring in urban areas, the development of innovative, collaboratively designed ideas and approaches for facilitating sustainable urban transformation is a top priority (Shao and Min 2025; Frantzeskaki et al. 2024).

To contribute to this effort, a participatory roundtable was held in Geneva on 3rd of April 2025, organized by Eawag and WSL as part of the SNF-funded project *GreenCityNet* with the support of the Geneva UN Charter Centre for Excellence of the University of Geneva and Fondation Braillard Architectes.

The roundtable between researchers and policy actors from the local to international levels aimed at fostering dialogue on urban biodiversity integration. This report presents the main findings from the workshop.



Main messages

The participatory roundtable provided a valuable opportunity for researchers to present their findings and gain insights into the framing of policies and initiatives from both international organizations and local administrations. At the same time, it enabled policy actors to engage with cutting-edge research on urban biodiversity integration and to establish meaningful connections with the scientific community.

Four key priorities emerged to enhance the conceptualization and implementation of Blue-green infrastructures (BGI) as Nature based solutions (NbS) in urban settings:

- The need to de-fragmenting communication and collaboration across sectors, disciplines, and governance levels;
- The need to promoting innovative concepts and planning approaches that rethink human-nature interactions in cities;
- The need to empowering interface actors—those who bridge science, policy, and practice—to integrate biodiversity into urban policies and strategies.
- The need to framing NbS through co-benefits and securing political will, by clearly communicating the social, economic, and environmental value of BGI and NbS.

Together, these priorities form a foundation for transforming cities as resilient, inclusive, and nature-positive spaces, grounded in collaboration, ecological design, and systemic integration.





The urban transformation aimed at supporting biodiversity – essential for maintaining ecosystem services vital to humankind – entails the preservation, enhancement, restoration, and connection of natural and semi-natural habitats across human-dominated urban landscapes. (Donati et al. 2025; McFadden et al. 2023; Donati et al. 2022).

In this context, a key concept has emerged: Nature-based Solutions (NbS). NbS are defined as actions that protect, sustainably manage, and restore natural or modified ecosystems to address societal challenges—such as climate change, disaster risk, or biodiversity loss—while simultaneously providing human well-being and biodiversity benefits (IUCN, 2016). In urban contexts, NbS are often operationalized through BGI.

BGI refers to an integrated network of natural, semi-natural, and anthropogenic landscape elements designed to deliver multiple environmental, social, and economic benefits. These include blue components—such as for example, rivers, lakes, and wetlands—and green spaces—such as parks, gardens, and forests among others—that together enhance ecosystem services, urban resilience, and biodiversity across urban–rural gradients (European Commission, 2013).

However, the success of NbS and BGI implementation depends not only on ensuring ecologically connected habitats, but also on targeted collaborations and communication relative to their governance. Effective planning requires coordinated efforts across scientific disciplines, sectors, governance levels, encompassing broad stakeholder groups to embed these solutions as foundational elements for sustainable urban development.

The international participatory roundtable held on April 3, 2025, at Campus Biotech, University of Geneva, offered an explorative platform for exchanging perspectives on urban biodiversity and transformation. The participatory roundtable gathered stakeholders from diverse sectors: the scientific community (Eawag, WSL, University of Geneva); the intermediaries working at the science-policy interface (Geneva Science-Policy Interface – GSPI); architecture and urban planning actors (Fondation Braillard Architectes, UrbaPlan); cantonal and municipal administrations (e.g., City of Nyon, City of Lausanne); and international organizations (IUCN, UNDP, UNEP and UNECE).

From the presentations and exchanges between speakers and participants, four priorities emerged in order to facilitate human–nature interactions in urban contexts.

1. Bridging the Gaps: Enhancing Collaboration and Strengthening Interfaces for Effective Blue-Green Infrastructure

Effective planning and implementation of blue-green infrastructure (BGI) require targeted communication and coordination across sectors, disciplines, and governance levels. Participants strongly emphasized the need to overcome translational challenges—including differences in terminology, spatial and temporal scales, conceptual frameworks, and institutional priorities—between the spheres of science, policy, and practice. These challenges highlight the importance of developing a common language and shared understanding among scientists, policy actors, international organizations, and actors at local, regional, and national levels.

Evidence suggests that collaboration in urban environments can be more challenging than in rural settings, underscoring the urgency of fostering stronger

connections among actors and institutions (Donati, 2025). The success of BGI hinges on inclusive, well-aligned efforts across this complex landscape.

A key solution discussed involves empowering individuals who operate across sectoral and administrative boundaries—often referred to as boundary spanners, knowledge brokers, or intermediaries. These interface actors play a pivotal role in bridging research, policy, and practice by facilitating communication, translating knowledge, and aligning goals across different levels of governance. Individuals embedded in local agencies while simultaneously connected to international organizations or NGOs offer particularly promising potential for integrated BGI management. Wearing cross-scale and cross-sector hats helps bridging local and global perspectives within a single role (Lawrence, 2021). Together, these efforts can de-fragment urban governance, advance biodiversity integration, and create resilient, inclusive, and nature-positive cities.

2. Rethinking Urban Design and Governance: Toward Systemic Integration of Nature-Based Solutions

Urban design and planning must evolve beyond the traditional view of nature as a secondary or decorative element within human-dominated environments. Scientific analyses of biodiversity have often focused on land use and species data, yet the physical and institutional constraints of urban areas frequently limit opportunities for integrating nature. As a result, BGI is too often relegated to leftover spaces—inserted wherever possible—rather than being woven into the city fabric from the outset.

To address this, a paradigm shift is needed: instead of fitting nature into the city, we should begin to rethink the city as emerging from nature. This "inverse" approach envisions the urban landscape as a biodiversity-rich matrix into which human infrastructure—such as streets, housing, and public facilities—is carefully integrated. This reorientation allows planners and communities to design future urban scenarios with flexibility and adaptive thinking, aiming to optimize ecological and social potential while critically asking what infrastructure is needed, where, why, by whom, and how.

However, transforming this vision into reality requires overcoming systemic fragmentation in urban governance. NbS—which encompass BGI,—must be treated not as optional enhancements but as core elements of urban planning. To achieve this, NbS need to be embedded across the full urban development cycle, from design and financing to

implementation, monitoring, and maintenance.

This systemic integration is often hindered by institutional silos, short-term financial horizons, and weak coordination mechanisms across sectors and levels of governance. Tackling these barriers demands inclusive governance models that engage diverse stakeholders and innovative financing approaches aligned with long-term sustainability goals. Standardized frameworks, global guidelines, and indicators can further support cities in designing, implementing, and evaluating NbS with measurable outcomes for people and ecosystems alike.

Crucially, highlighting the multiple co-benefits of NbS—such as enhanced climate resilience, improved public health, social cohesion, and biodiversity restoration—is key to securing political will and public support. Ensuring that these solutions are equitable, effective, and sustainable also requires robust systems for monitoring, learning, and adaptation.

Together, this dual shift in mindset and governance practice opens the door to reimagining cities as nature-positive, inclusive, and resilient systems, where people are integrated into thriving ecological networks, rather than the other way around.

3. Framing Urban Nature-Based Solutions Through Ecosystem Services and Co-Benefits

A third key idea emphasized the importance of framing urban nature-based solutions (NbS) through the lens of ecosystem services and co-benefits. Rather than relying solely on evidence-based guidelines or sector-specific indicators, this approach seeks to influence political and institutional support by showcasing the multiple benefits of green infrastructure.

The World Health Organization (2011) endorsed the concept of co-benefits, noting that they are sometimes referred to as 'collateral advantage' or 'multiple benefits'. Co-benefits—such as improved public health, enhanced climate resilience, increased property values, and pollution reduction—demonstrate the added value of implementing BGI in urban planning. Green spaces, as one example of BGI, help illustrate how NbS can deliver outcomes that cut across sectors, fostering collaboration between national and local governments as well as between public and private actors.

This framing also offers an alternative governance logic: by viewing green infrastructure not merely as an environmental intervention, but as a catalyst for broader social, economic, and institutional change, it becomes easier to justify investment and long-term support. Additional framing actions in terms of resilience and disaster risk reduction further aligns with global sustainability agendas and provides strong entry points for multi-sectoral cooperation.

Synthesis Statement

Reimagining urban development through the lens of biodiversity, the roundtable concluded that successful BGI requires strong cross-sector collaboration, innovative ecological design, and the integration of NbS into mainstream governance and policy frameworks.



The city of Geneva, 2025

4. Building Political Will: Securing Buy-In for BGI and NBS

A fifth point emphasized the critical role of political support in advancing BGI and NbS. As participants discussed recurring challenges, it became clear that long-term success depends not only on sound planning and design, but also on securing the commitment of key decision-makers and stakeholders at all levels.

High-level political endorsement is essential for mobilizing the financial resources, institutional backing, and public trust needed to implement and sustain nature-positive urban transformations. To this end, showcasing the co-benefits of BGI and NbS—such as improved health, climate resilience, social cohesion, and increased property values—was identified as a powerful strategy to build both political and community support.

By demonstrating that nature-based approaches deliver measurable value across sectors, advocates can strengthen the case for integrating NbS into core urban policies and investment frameworks. Ultimately, political will and leadership are foundational to embedding NbS into mainstream urban development agendas and ensuring the continuity of transformative action.

References

Donati, G. F. A., J. Bolliger, A. Psomas, M. Maurer, & P. M. Bach. (2022). Reconciling cities with nature: Identifying local Blue-Green Infrastructure interventions for regional biodiversity enhancement. *Journal of Environmental Management*, 316, 115254. <https://doi.org/10.1016/j.jenvman.2022.115254>

Donati, G. F. A., F. Van den Brandeler, M. Fischer, F. Molné, N. Schenk, J. Grünholz, & J. Bolliger. (2025). Biodiversity conservation in human-dominated landscapes: Towards collaborative management of blue-green systems. *Conservation Letters*, 18, e13079. <https://doi.org/10.1111/conl.13079>

European Commission. (2013). *Building a Green Infrastructure for Europe*. Publications Office of the European Union: Luxembourg. https://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructure_broc.pdf

Frantzeskaki, N., Childers, D. L., Pickett, S., Hoover, F. A., Anderson, P., Barau, A., Ginsberg, J., Grove, M., Lodder, M., Lugo, A. E., McPhearson, T., Muñoz-Erickson, T. A., Quartier, M., Schepers, S., Sharifi, A., & van de Sijpe, K. (2024). A transformative shift in urban ecology

toward a more active and relevant future for the field and for cities. *Ambio*, 53(6), 871–889.

<https://doi.org/10.1007/s13280-024-01992-y>

IUCN. (2016). *Defining Nature-based Solutions*. International Union for Conservation of Nature. https://www.iucn.org/sites/default/files/content/documents/iucn_definition_nbs_2020.pdf

Lawrence, R. J. (2021). *Creating Built Environments: Bridging Knowledge and Practice Divides*. Routledge: London and New York.

<https://doi.org/10.4324/9781351201674>

McFadden, I., Sendek, A., Brosse, M., Bach, P., Baity-Jesi, M., Bolliger, J., Bollmann, K., Bockerhoff, E., Donati, G., Gebert, F., Ghosh, S., Ho, H.-C., Khaliq, I., Lever, J. J., Logar, I., Moor, H., Odermatt, D., Pellissier, L., de Queiroz, L. J., Rixen, C., Schuwirth, N., Shipley, J. R., Twining, C., Vitasse, Y., Vorburger, C., Wong, M., Zimmermann, N., Seehausen, O., Gossner, M., Matthews, B., Graham, C., Altermatt, F., & Narwani, A. (2023). Linking human impacts to community processes in terrestrial and freshwater ecosystems. *Ecology Letters*, 0(0), 1–16. <https://doi.org/10.1111/ele.14153>

Shao, J., & Min, B. (2025). Sustainable development strategies for Smart Cities: Review and development framework. *Cities*, 158, 105663.

<https://doi.org/10.1016/j.cities.2024.105663>

World Health Organization. (2011). *Health in the Green Economy: Health co-benefits of climate change mitigation – Transport sector*. World Health Organization: Geneva.

Acknowledgements

We extend our sincere gratitude to all participants who contributed to the half-day roundtable on “Science-Policy-Practice: Co-Designing Blue-Green Infrastructure for Urban Biodiversity and Transformation”. The roundtable brought together a distinguished group of twenty experts from leading Swiss research institutions and international organizations based in Geneva and beyond.

We would like to acknowledge the valuable contributions of our speakers and participants, including representatives from Eawag, WSL, the Geneva UN Charter for Center of Excellence of the University of Geneva, Brillard Architects Foundation, the UNDP, UNECE, UNEP, IUCN, the Geneva Science-Policy Interface and the cities of Nyon and Lausanne. This workshop would not have been possible without the logistical hosting by Campus Biotech of the University of Geneva.

Finally, this roundtable builds upon ongoing dialogues in Geneva to strengthen science-policy-practice collaboration, including previous initiatives by the UN system and academic partners. We hope this conversation will continue through future projects,

partnerships, and shared commitments to sustainable cities.

The report was drafted by Janine Bolliger and Tural Aliyev, with comments provided by the document's contributing authors (Manuel Fischer, Panos Mantziaras, Roderick Lawrence, Tomassi Pasqualino, Mialy Rann, Giulia Donati).

The design of the layout Tural Aliyev. Images: Sophie Barenne (Braillard Architects Foundation) and Tural Aliyev.

Authors

Roundtable organization committee

Tural Aliyev, Ph.D.
Postdoctoral Researcher, Eawag – Swiss Federal Institute of Aquatic Science and Technology;
Associate Researcher, University of Geneva

Manuel Fischer, Ph.D.
Department Leader, Department of Environmental Social Sciences, Eawag;
Associate Professor, University of Bern

Janine Bolliger, Ph.D.
Senior Scientist, Landscape Ecology Research Unit, Swiss Federal Institute for Forest, Snow and Landscape Research (WSL);
Lecturer for Urban Biogeography, University of Zurich

Alexandre Hedjazi, Ph.D.
Senior Lecturer and Researcher, Institute for Environmental Sciences (ISE), University of Geneva;
Co-Director, UNIGE Center of Excellence on Smart Sustainable Cities and Sustainable Urban Development

Panos Mantziaras, Ph.D.
Director, Braillard Architects Foundation, Geneva

Giulia Donati, Ph.D.
Postdoctoral Researcher, Department of Environmental Social Sciences, Eawag, and Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)

Rémi Willemin, Ph.D.
Postdoctoral Researcher, Eawag – Swiss Federal Institute of Aquatic Science and Technology

Roundtable speakers and participants

Roderick Lawrence, Ph.D. Honorary Professor, Geneva School of Social Sciences (G3S), Institute for Environmental Sciences (ISE), University of Geneva

Pasqualino Tomassi
Chair, IUCN Urban Alliance

Matteo Tarantino, Ph.D.
Lecturer and Researcher, University of Geneva and Catholic University of Milan

Mialy Rann
Policy Officer, Geneva Science-Policy Interface (GSPI), Geneva

Roundtable speakers from the UN Organizations

Mahir Aliyev, Regional Coordinator, Head of Eastern Europe and South Caucasus Subregion, UNEP – United Nations Environment Programme

Daniel Griswold, Forest and Bioeconomy section, UNECE – United Nations Economic Commission for Europe

Rajeev Issar, UNDP – United Nations Development Programme