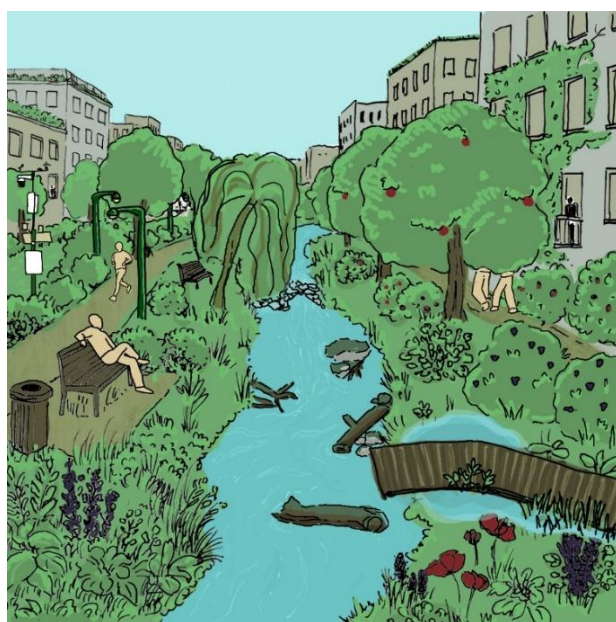


BETTER IMPLEMENTATION OF NATURE-BASED SOLUTIONS IN URBAN STREAM RESTORATION

Policy Brief

Benefits of nature-based solutions in urban stream restoration



Over decades, urban streams have been managed single purposed as wastewater drainage or flood protection.

Sustainable urban waterway planning and urban stream restoration must aim for multifunctionality and thus enhance ecosystem functioning, biodiversity, climate adaptation and quality of life for residents.

Nature-based solutions (NBS) are suitable methods to restore or manage urban stream ecosystems because they serve both human well-being and ecosystem functioning. These methods are based on natural processes rather than technical infrastructure.

Barriers and challenges

Urban stream restoration with nature-based approaches is technically feasible but structurally constrained by fragmented ownership, institutional misalignment, financial instability, and competing land uses. Topics and problems were raised by partners from local municipalities, practitioners and scientists from varying field related to urbanism, ecology, social science and engineering. The main problems hindering the implementation of NBS in urban stream restoration were collaboratively identified by the interdisciplinary and international ReBioClim consortium as well as in stakeholder interviews that were conducted in the pilot areas of Dresden (DE), Jablonec nad Nisou (CZ), Poznań (PL) and Senica (SK).

- Low acceptance of measures by people
- Low level of integration of different perspectives
- Lack of multifunctionality
- Limited space for restoration
- Low level of transparency and communication between stakeholder groups
- Low water quality and quantity
- Lack of Funding
- Formulation of suitable ecological restoration goals in urban stream settings

Actions to take for better implementation of NBS in urban stream restoration

*Increase the **acceptability** of measures by people*

- Raise awareness through targeted campaigns, engaging media, and evidence-based communication of the benefits of NBS
- Foster early and continuous stakeholder involvement using diverse, inclusive participation formats beyond legal minimum
- Integrate NBS into school curricula and develop educational materials for long-term public understanding
- Showcase success through pilot projects and visible demonstrations that highlight ecological and social co-benefits
- Empower scientists, educators, NGOs, and media to collaborate in building trust and driving behavioral change

*Facilitate **integration** of different perspectives*

- Form interdisciplinary working groups involving scientists, planners, managers, and citizens throughout the planning process
- Use decision support tools to guide strategic, context-specific restoration planning and prioritize high-potential sites
- Foster collaboration between local authorities, experts, NGOs, and communities to build shared understanding and trust
- Promote inclusive participation and knowledge exchange across generations and sectors to harmonize diverse goals
- Establish tailored tools and methods for cross-sector collaboration through real-world testing in living labs

Reserve space for restoration and create multifunctionality

- Expand grants and simplify legal procedures for nature-based urban stream restoration
- Reform laws to enable faster, affordable equitable land acquisition for river corridors
- Shift from single-purpose flood control to multifunctional water management integrating ecological and social benefits
- Integrate flood control and restoration into municipal planning with spatial reservations
- Support landowners with incentives, compensation, and mediation to enable restoration
- Foster interdisciplinary collaboration and restructure management to prioritize long-term resilience and co-benefits

*Intensify **transparency and communication** between stakeholder groups*

- Strengthen institutional collaboration and communication to ensure effective water and catchment management
- Clarify the technical terminology and tasks to avoid uncertainty regarding responsibilities
- Involve landowners into the planning process from the beginning
- Consultation with academia experts and professional associations prior to project implementation
- Ministries should define and communicate urban restoration goals, responsibilities and financially support the implementation of NBS

Recommendations for Stakeholder groups

Local Governments

- **Secure and protect spatial corridors:** Integrate restoration needs into urban planning early, reserving space for stream daylighting and naturalised sections
- **Streamline administrative procedures:** Reduce multi-level approval delays, clarify the boundary between maintenance and restoration, and provide simplified permitting for small-scale interventions
- **Stabilize funding mechanisms:** Establish multi-year municipal budgets and co-financing structures, leveraging EU programmes or national environmental funds for long-term project continuity
- **Foster political commitment:** Embed restoration priorities into strategic municipal agendas, linking ecological, recreational, and climate adaptation benefits
- **Encourage cross-departmental coordination:** Create interdepartmental teams for water management, urban planning, and infrastructure to reduce siloed decision-making

River Basin Authorities

- **Adopt co-leadership roles:** Actively participate in restoration projects, providing technical guidance and sharing responsibilities with municipalities
- **Balance risk with ecological ambition:** Revise conservative engineering mandates to allow for innovative, ecologically sensitive designs while maintaining safety standards
- **Facilitate land and infrastructure negotiations:** Support municipalities in resolving fragmented ownership and utility conflicts through mediation or regulatory guidance
- **Provide clear regulatory frameworks:** Harmonise water-law and nature-protection requirements to reduce procedural uncertainty

NGOs and Public Engagement

- **Raise awareness and build support:** Conduct educational campaigns highlighting multiple benefits of urban stream restoration (flood mitigation, recreation, biodiversity)
- **Foster community participation:** Involve residents, schools, and volunteers in small-scale interventions, monitoring, or maintenance projects to build legitimacy and local ownership
- **Promote storytelling and demonstration projects:** Showcase successful restorations to generate political and social support, ensuring lessons learned are widely shared

Project Designers/ Consultants

- **Adopt interdisciplinary planning approaches:** Integrate hydrology, ecology, landscape architecture, and urban design from early project stages
- **Tailor designs to local constraints:** Adapt concepts to urban density, land fragmentation, buried infrastructure, and socio-cultural context
- **Use pilot projects strategically:** Implement small, rapid interventions to demonstrate feasibility and generate institutional learning before scaling up
- **Incorporate multi-benefit solutions:** Design projects that combine ecological, recreational, flood-protection, and climate-resilience goals

Future success depends on consolidating enabling factors into stable governance structures and taking action for sustainable urban stream restoration with nature-based solutions.

Mechanisms for Enabling Change

- **Funding instruments:** Establish stable multi-year funding streams at municipal, regional, or national level; leverage EU programmes (e.g., LIFE, Horizon Europe)
- **Legislative adjustments:** Update water management laws to explicitly support renaturation, define responsibilities, and simplify permitting
- **Institutional coordination platforms:** Create joint steering committees or project offices to align municipalities, river authorities, and utilities
- **Knowledge sharing and capacity building:** Develop guidelines, training modules, and digital platforms to disseminate best practices and technical expertise
- **Community and stakeholder engagement frameworks:** Use structured participation, digital mapping, and co-benefit approaches to reduce opposition and build support

Colophon

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