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Restoring the Pekre Stream in Maribor, Slovenia

Coordinating national, municipal, and European efforts for flood protection, green infrastructure, and community well-being

The Pekre Stream initiative transforms a once flood-prone stream into a symbol of urban green renewal. By integrating national flood protection, city park planning, and European pilot actions based on Nature-based Solutions, Maribor enhances climate resilience while creating healthier, more attractive urban spaces.

Key Learnings

- **Blended funding delivers stronger outcomes**: Combining national, municipal, and European sources allowed for comprehensive results – from flood protection to urban green infrastructure and pilot innovations.
- **Municipal leadership ensures coherence**: The City of Maribor acted as an important coordinator, aligning different phases, engaging stakeholders, and keeping the long-term vision of stream revitalisation on track.
- **Nature-based Solutions provide a common foundation**: Across all phases, Nature-based Solutions play a central role – from riverbed restoration and riparian planting to green infrastructure and urban cooling measures. Implementing the Nature-based Solutions followed a coherent framework that guided all project phases and partners involved.
- **Integrated planning creates multiple benefits**: Linking grey, such as required engineered flood protection, and green infrastructure, like trees, with soft measures generates environmental, social, and climate gains – improved flood safety, reduced heat stress, better air quality, and new recreational opportunities for residents. Soft measures include community engagement, collaborative actions, and awareness campaigns.

About the region

Maribor, Slovenia's second-largest city with more than 120,000 inhabitants, sits in northeastern Slovenia on the banks of the Drava River near the Austrian border. Strategically located between the Pohorje mountain range and wine-growing hills, the city is transitioning from its industrial past towards sustainable urban development and the rehabilitation of degraded areas.

Climate Hazards

Extreme Heat, Flooding

Sector

Water management, Biodiversity protection

Key system

Ecosystem and Nature Based Solutions,

Water Management

Figure 1: Location of Maribor. Image Credit: Climates to travel.

Climate Threats

Maribor's continental climate, with hot summers, cold winters, and strong seasonal variability, shapes the city's challenges. The average annual temperature is around 10.5 °C, with approximately 890 mm of precipitation per year. The most significant risks are extreme heat in the built environment and flooding linked to heavy rains, particularly affecting tributaries of the Drava River, such as the Pekre Stream. In winter, heating practices and temperature inversions worsen air quality. Climate change intensifies these hazards, increasing the frequency of heatwaves and extreme rainfall, and putting additional pressure on urban resilience.

Renaturalising the Pekre stream: a participatory multifunctional green vision

The City of Maribor has been the key coordinator and vision-holder for implementing the integrated restoration, combining flood protection, ecological restoration, landscape development and community engagement, of the Pekre Stream corridor in three steps, which are part of one coherent process. To address climate risks and improve the quality of urban life, Maribor restored the Pekre stream by combining a series of independent projects, tackling different governance levels (from the EU to the municipal level). This means that coordinated implementation of independently funded projects, with each project addressing a different aspect but complementary to the Pekre Stream restoration. This initiative is part of Maribor's broader efforts to transform the city after the decline of its industrial base, which once centred on textile, mechanical, and chemical industries. As the city continues to shift from its industrial roots towards sustainability, the restoration of the Pekre Stream aligns with its goals of urban renewal, environmental rehabilitation, and enhancing public spaces. It started with national investment in flood

protection, which was then upgraded with a municipal plan for a multifunctional park and completed with innovative elements from a European Project.

Step 1: National investment in flood protection

First, the Slovenian Water Agency undertook some significant work on the Pekre stream section, including reshaping the riverbed, stabilising banks with nature-based materials, planting riparian vegetation, and creating conditions for habitat restoration. A newly constructed dry retention basin at the Pekre Stream captures flood peaks, which temporarily stores excess rainwater or runoff during heavy rains. This state-level investment improved flood safety for nearby neighbourhoods and established the ecological foundation for further development. The works were completed in early 2025, as part of the project Reducing Flood Risk in the Drava Basin – Ptuj Drava Area.

Step 2: Municipal upgrade – Park Pekrski potok

The project transforms approximately 2.3 km of the stream corridor into a multifunctional green park that integrates ecological restoration, recreation, and landscape values. Then, building on the state investment in flood protection, the City of Maribor launched the project Park Pekrski potok.

Information about the project is being shared with the public through promotional materials, highlighting the benefits and features of the development for local residents (see Figure 2).

Figure 2: Promotion of the initiative in the local language. Image Credit: Daniel Rebolj.

The City of Maribor prepared the Park Pekrski potok project through a coordinated process involving spatial planners, environmental experts, and local stakeholders. The city led the preparation of investment and design documentation, aligning it with the city's Sustainable Urban Strategy and spatial plans. The Maribor City Council formally approved the project while securing financing.

Step 3: European pilot and community engagement – UPSURGE

A European project on urban regeneration (UPSURGE) complemented the larger infrastructural and municipal efforts for the overall Pekre stream restoration with innovation and soft measures, such as community engagement, joint design activities, awareness campaigns, and monitoring activities. On a 500 m demonstration section, the Regional Development Agency for Podravje – Maribor and other partners introduced biofiltration concepts – meaning natural elements that use vegetation, soil, and microorganisms to filter water and air – and planted 216 trees. Those trees have high air purification capacity, to improve air quality, and reduce noise. Microclimate monitoring stations enable continuous monitoring. In addition

to this modest investment, participatory approaches involved local residents in collaboratively designing small green areas, selecting plots for greening, joining planting activities, and responding to surveys on environmental quality. Those surveys provided direct feedback from residents about their perception of air quality, greenery, and overall well-being in the area. This information helped project partners to assess how people experience environmental change, to validate monitoring data on air and microclimate conditions, and to adapt future greening measures to local needs. The surveys also encouraged residents to reflect on their environment and strengthened their sense of participation in the project.

Blended financing and coordinated governance

The Pekre Stream initiative illustrates how to effectively combine local, national, and European funding. The Slovenian Water Agency ensured the flood protection backbone, the municipality designed and prepared an investment in green and recreational infrastructure, and the EU project provided additional value with innovation and participation. Importantly, the City of Maribor acts as the central coordinator, linking different stakeholders, aligning project phases, and ensuring the long-term vision remains coherent. Each level brought its own financing mechanism and expertise, but it was the municipality that held the steering role.

Expected impacts

Figure 3 showcases the before-and-after transformation of the restored Pekre Stream surroundings. Even though not all phases are completed, impacts are already visible. On the social side, the area now offers more accessible and attractive public spaces for recreation, sports, and socialising, benefiting one of the most densely populated parts of Maribor. Environmentally, the river corridor has been restored, boosting biodiversity, enhancing vegetation. Additionally, the restoration has reduced flood risks, improved air quality, and enhanced urban cooling through tree planting and water-sensitive design, which helps to build local climate resilience.

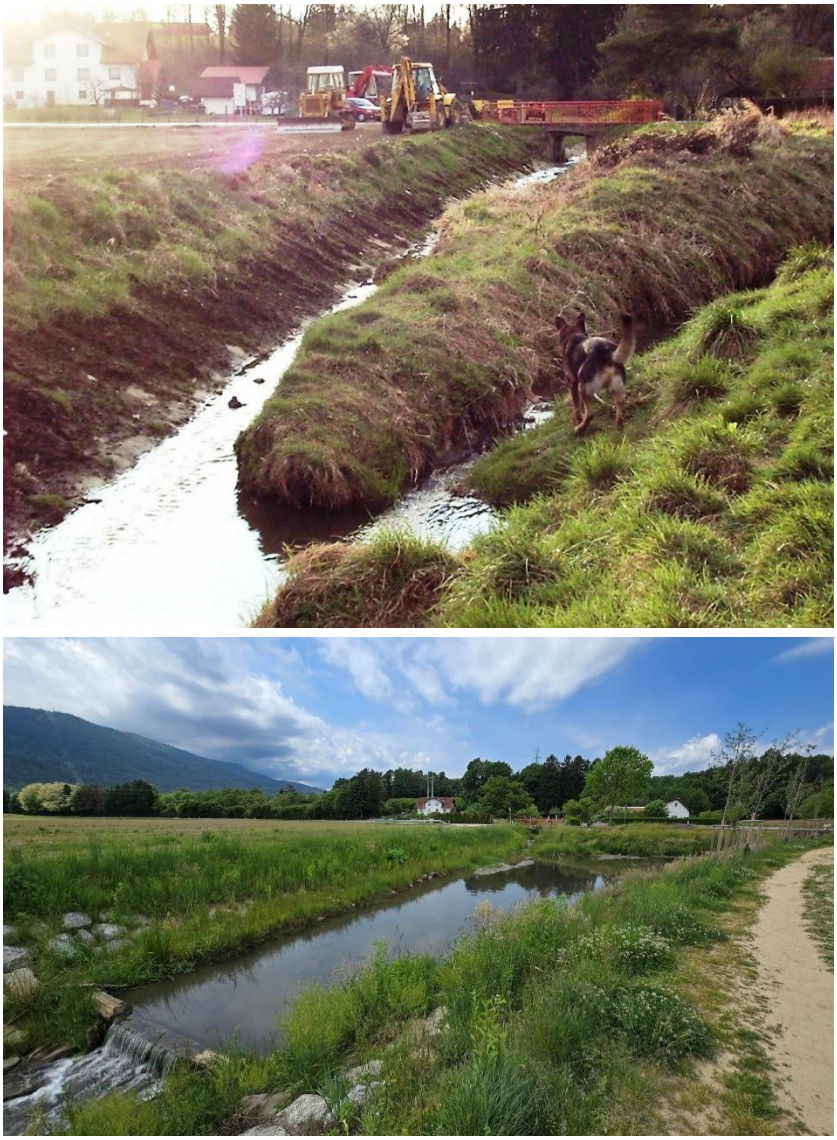

Figure 3: The Pekre Stream restoration during (top) and after (bottom) implementation. Image Credit: Daniel Rebolj.

Opportunities for replicability

The Pekre Stream restoration demonstrates how municipalities can leverage different funding levels to achieve integrated outcomes. The key lesson is that successful adaptation requires phased implementation, coordinated governance, and the ability to combine hard infrastructure with green and participatory measures. The leadership role of the City of Maribor, ensuring alignment and continuity across projects, can inspire other European cities.

Summary

The Pekre Stream initiative in Maribor transforms a previously neglected and flood-prone area into a multifunctional urban green space. The revitalisation brings together European, national and city actors and is financed in a coordinated, complementary way, following an integrated approach that blends flood protection, ecological restoration, landscape development, and community engagement. Nature-based solutions play a key role throughout, supporting environmental recovery and boosting urban resilience. Maribor's leadership ensures alignment across projects, engaging stakeholders and keeping the long-term vision on track. This experience shows that integrated planning, inclusion of local perspectives, and combining funding from different sources can lead to resilient, socially inclusive, and sustainable urban transformation.

Further information

The work presented in this adaptation story is part of the UPSURGE project.

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- DRSV: Reducing Flood Risk in the Drava Basin – Ptuj Drava Area
- MOM: Park Pekrski potok, DIIP (March 2025)

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