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Rehabilitating urban rivers and restoring waterways ecosystems

Natural waterways and rivers are dynamic systems and unique assets that provide important social, environmental, and economic value to cities. Urbanization, industry, and climate change challenge waterway management, prompting cities to focus on flood zones and stream restoration for ecological health and risk reduction. As cities grow, rivers are often modified, affecting their quality, flow, and ecosystems. These changes, along with fluctuating rainfall and extreme weather, demand innovative strategies for resilient urban waterways. Restoration efforts by local governments and conservation groups are increasingly part of **integrated flood risk management and urban resilience plans.**

National governments recognise the importance of river and watershed management

In **Europe**, river and waterway restoration aids the European Green Deal by fostering climate neutrality and biodiversity. The EU Strategy on Adaptation to Climate Change (2021) promotes Nature-based Solutions for flood, drought, and heat risk management, while the **Do no Significant harm (DNSH) principle** under the EU Taxonomy Regulation ensures investments benefit water protection and climate resilience. Combined with the EU Water Resiliency Strategy, Water Framework, and **Floods**, and **Habitats Directives,** these policies integrate river restoration into urban resilience and sustainable development.

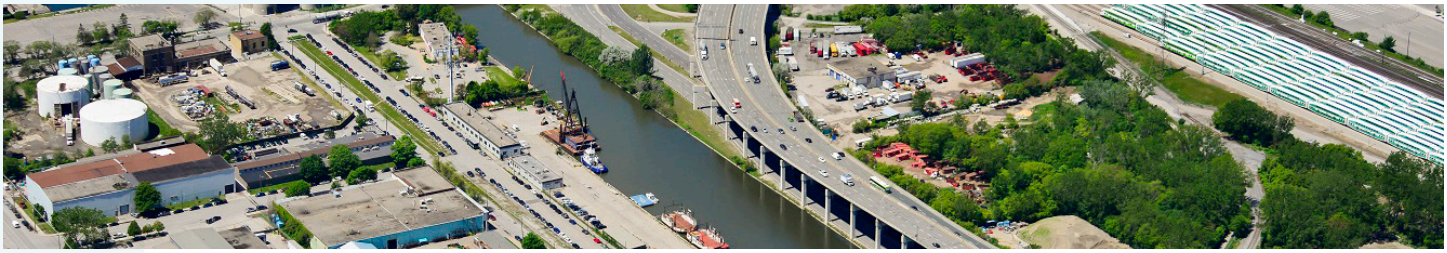
In the **United States**, urban river restoration is driven by the need to adapt to climate extremes, improve water quality, and create resilience for communities. Federal policies, such as the **Clean Water Act** and the National Climate Resilience Framework, provide guidance on watershed management. The Environmental Protection Agency (EPA), the National Oceanic and Atmospheric Administration (NOAA), and Army Corps of Engineers also guide or support green infrastructure and revitalization for flood control, habitat restoration, and equitable development.

In **Canada**, river rehabilitation and watershed protection are supported by diverse federal frameworks and programs, provincial watershed initiatives, and collaborations with Indigenous communities that integrate **Traditional Ecological Knowledge (TEK)** into planning and monitoring.

The new Canada Water Agency provides funding through Freshwater Ecosystem Initiatives according to Canada's Freshwater Action Plan—a key federal program for managing, restoring, and protecting Canada's freshwater resources. These efforts show Canada's commitment to ecosystem-based adaptation and reconciliation through water stewardship.

CANADA - Don River Restoration: multi-agency collaboration and long-term actions in the Toronto Region

The **Great Lakes-St. Lawrence River system**, containing 21% of global freshwater and supplying over 40 million people with drinking water, has a long history of conservation and restoration efforts and plays a key role in the regional economy.[1] Toronto's waterfront once featured diverse habitats such as bluffs, beaches, marshes, and estuaries. Industrialization along the Don River significantly altered the river's structure and watershed ecosystems. Toronto and Region was named an Area of Concern under the Canada-US Great Lakes Water Quality Agreement in 1987, prompting several interagency efforts to address local environmental issues affecting the wider Great Lakes system.



Source: https://trca.ca/conservation/infrastructure-projects/don-mouth-naturalization-port-lands-flood-protection-project/

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For example, the Toronto Waterfront Aquatic Habitat Restoration Strategy was established in 2003 to guide restoration along the Toronto waterfront, provide practical aquatic habitat restoration guidance, and a strong framework for inter-agency cooperation. The Toronto and Region Remedial Action Plan (RAP) includes the **Don Mouth Naturalization and Port Lands Flood Protection and Enabling Infrastructure Initiative,** a CAN $1.25 billion (approximately € 767 million) effort to reconnect the **Don River** to Lake Ontario via over 1,000 metres of naturalized channel. This project coordinates strategies for terrestrial and aquatic restoration and supports the goals of partners and stakeholders as part of broader efforts to restore the **Don River watershed**.

Source: *https://tommythompsonpark.ca/about/#restoration*

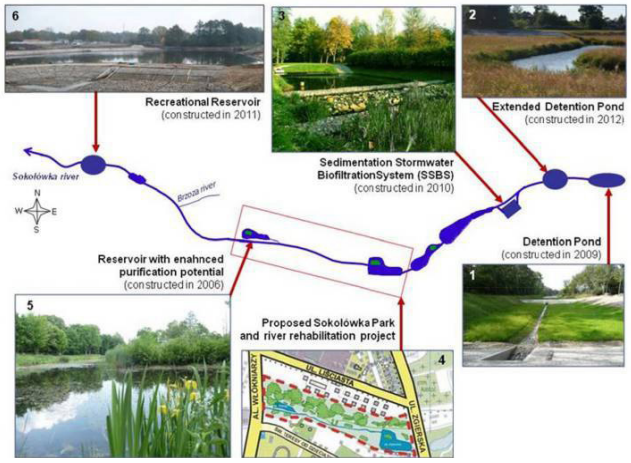
Port Lands Flood Protection (PLFP) project will naturalize the Don River's mouth, including the Keating Channel, and deliver flood protection for 240 hectares of Toronto's eastern waterfront.

Guided by robust environmental assessments and science-driven approaches, projects involve stakeholders via predictable and transparent consultation processes[2] , sharing a wealth of information. The Toronto and Region Conservation Authority (TRCA) Watershed and Ecosystems Reporting Hub provides interactive data on Toronto region watersheds and waterfronts. It shows current environmental conditions by theme, details key indicators of watershed health, tracks changes over time, and reports TRCA's progress towards its goals. The Toronto and Region Remedial Action Plan also reports that its TRCA was awarded the 2025 New Sustainable Cities and Human Settlements Award for Global Model Ecological Restoration and Protection, for its outstanding work at Tommy Thompson Park. The Park sits on land built from excavation debris, demolished structures, and harbour dredging. Thanks to TRCA's partnerships in restoration, science-based stewardship, and public engagement, it has become a leading urban ecological success in North America.

EUROPE - Blue-Green Network for river restoration set a successful example in Łódź, Poland Łódź, one of Poland's largest cities (population 645,000), lies in the central lowlands. With most streams canalized and extensive urbanization, the city faces major water management issues, including surface runoff and frequent flooding during storms. Combined sewer systems often overwhelm treatment capacity, leading to river pollution.

There are 18 small streams flowing through Łódź that collect stormwater from a 290 km2 area; the Sokolowka River flows across the northern territory receiving water from some 50 stormwater outlets.[3] The middle and lower sections of the river valley have maintained patches of meadows, wetlands, and forests. The Sokołówka river restoration project used a Blue-Green Network of hydrological rehabilitation measures implemented through a series of projects.[4] [5]

To improve urban water management, the watershed increased aquifer-based retention reservoirs, restoring some sites and creating new ones. Detailed baseline data guided the design of three storm water reservoirs (built in 2006, 2009, and 2010) and a patented sedimentation bio-filtration system (completed in 2011). This first success led to broader plans for rehabilitating the Sokołówka river and developing its river park.



Source: Research Gate: Tools for strategic planning and management of urban water. I. Wagner and A. Januchta-Szostak. December 2014.

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Despite new reservoirs, additional measures were needed to enhance stormwater retention in the system. Local developers also took interest in the Sokołówka valley; one company-built retention wells so all storm water stayed within their development. Other grassroots efforts to support rivers and green spaces appeared in parts of the city. Some NGOs became interested in the services that green and blue infrastructure can offer such as **alternative sustainable transportation routes** (cycle paths) and **green backyards**.

Since 2013, the **City of Łódź** has implemented a comprehensive water management system, comprising sectoral policies and monitoring results.[6] The **Sokołówka River Park plan** (approved in 2016) created new paths and recreational areas. In 2020, work began to link three Sokołówka Valley parks with trails and educational features. Ongoing efforts include river rehabilitation, pond cleaning, improved stormwater purification, and upgrades to facilities such as paths, playgrounds, toilets, and a restaurant.

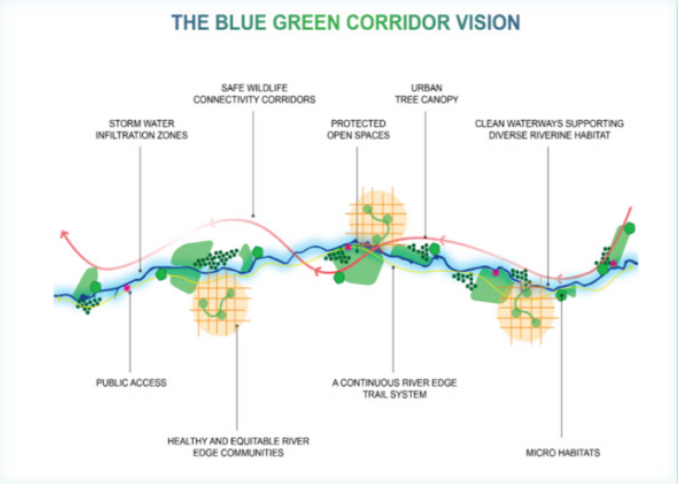
USA - Chicago-Calumet River: Conservation groups lead the way for Blue-Green solutions

The 156-mile Chicago-Calumet River system runs through downtown, parks, forests, and neighbourhoods, playing a key role in the region's history, industry, and environmental progress, serving as a vital resource for the region. Friends of the Chicago River are leading efforts to advocate and develop plans for implementing a blue-green approach, and Urban Rivers pilots' innovative approaches to support the restoration of the river system.

The Friends' recent Conservation and Recovery Plan outlines a strategic road map to realize a blue-green corridor, including a vision document and three action plans covering **wildlife, people, and water.** The blue-green corridor approach integrates waterway and land decisions, acknowledging that healthy ecosystems benefit people. A successful corridor connects neighbourhoods, green infrastructure, trails, open spaces, recreation areas, and wildlife habitats.

The planning process involved: reviewing progress; researching waterways management methods and case studies; consulting stakeholders and experts for input on future initiatives; identifying strategic investment opportunities and defining implementation steps to achieve the vision. In collaboration with several organisations, they recently developed a series of interactive tools and guidance for more strategic and collaborative watershed-wide investments in multi-beneficial Nature-based Solutions.

Bubbly Creek (South Fork of the South Branch of the Chicago River) was historically one of the most polluted sections of the Chicago River. In 2022, Urban Rivers partnered with Shedd Aquarium, and the Chicago Park District to introduce floating wetlands to improve the section's water quality and demonstrate the city's ability to revitalize something that was once written off. Hundreds of volunteers installed 3,000 square feet of gardens and planted over 3,000 native plants for the garden modules.[7]



Source: https://chicagoriver.org/issues/planning/blue-green-corridor

The new floating islands offer wetland habitats for wildlife, with native plants providing food and shelter for insects, birds, and aquatic species, which help filter pollutants, **improving local water quality**[8]. These gardens improve an industrialized waterway and support South Side Chicago communities facing environmental issues. Locals established these spaces for residents to learn, enjoy nature, and connect with the **Chicago River. In 2023,**

Free Kayak Days were launched, letting over 300 people explore the river by kayak with lessons from Urban Rivers staff.

Wild Mile Chicago is under development as a mile-long floating park on the North Branch Canal of the Chicago River. It is installed in modules and features floating gardens, walkways, and kayak docks, serving as a public park, open museum, botanical garden, kayaking spot, community classroom, and

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Source: https://www.instagram.com/visioneerstv/reel/DQ7S_7njiDc/

Key takeaways

1. River restoration and watershed rehabilitation reduce flood risks and provide health, social, and economic benefits, strengthening city resilience.
2. As rehabilitation practices continue to develop, there is an ongoing need to formalize best practices, systematically gather data on costs and benefits, and determine requirements for long-term management.
3. Successful projects use ecological and data-driven planning and monitoring, cross-sector collaboration, community involvement, including Indigenous peoples, visible reporting platforms and incorporate approaches for long-term maintenance.

Sources:

1. https://www.ontario.ca/page/protecting-great-lakes
2. https://trca.ca/conservation/infrastructure-projects/don-mouth-naturalization-port-lands-flood-protection-project/don-mouth-environmental-assessment/
3. **Accessed through Research Gate: Tools for strategic planning and management of urban water. I. Wagner and A. Januchta-Szostak. December 2014.**
4. **EU SWITCH project (GOCE 018530), EHREK (LIFE08 ENV/PL/000517), Blue-Green Network (City of Łódź)**
5. http://www.ecohydrology-ihp.org/demosites/view/57
6. **Accessed through Research Gate: Tools for strategic planning and management of urban water. I. Wagner and A. Januchta-Szostak. December 2014**
7. https://urbanrivers.org/bubbly-creek
8. Application of floating wetlands for the improvement of degraded urban waters: Findings from three multi-year pilot-scale installations - ScienceDirect; "The Effectiveness of an Artificial Floating Wetland to Remove Nutrient" by Eric W. Peterson, Phil Nicodemus et al.

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