

Nature-based Solutions for Water Resilience in Thriving European Urban Areas

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FIGURE 1

Methodological framework for identifying and analysing NbS for urban water management across European cities.

FIGURE 2

Distribution of green and blue NbS actions for urban water management by typology and implementation frequency.

Traditional engineering solutions are proving increasingly inadequate in the face of water-related challenges driven by climate change, urbanisation, and social inequalities. In this context, Nature-based Solutions (NbS) emerge as integrated and multifunctional alternatives that enhance ecosystem resilience while addressing key urban water issues. This study identifies and categorises NbS applied in 77 projects across 46 European cities, evaluating 216 specific actions at different spatial scales. Through content analysis, these actions were grouped according to their ecological functions and contributions to urban water management. Findings reveal four categories of blue infrastructure and three of green infrastructure as particularly impactful. Blue infrastructures include the regeneration of natural and semi-natural water bodies, river and coastal ecosystem management, and multi-species wetlands for ecological

restoration. These contributed significantly to flood mitigation, stormwater management and aquifer recharge. Green infrastructures focused on pollutant reduction, expansion of permeable green areas, and hybrid systems integrating sustainable urban drainage, promoting decentralised water retention and quality improvement. The Mediterranean region, where water scarcity and extreme weather events are intensifying, showed the highest frequency of NbS implementation, underscoring their potential as a strategic response for climate adaptation. This research highlights how NbS contributes to transitioning towards water-sensitive cities, offering environmental, social and economic co-benefits. A broader adoption of such nature-inspired strategies is essential for strengthening urban water resilience and achieving sustainability goals across Europe.

