

HOW ARE SPONGE CITIES TRANSFORMING WATER MANAGEMENT?

Our monthly science question: a series that demystifies complex subjects with simple, effective answers.

IN
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WHAT IS A SPONGE CITY?

A sponge city is designed to manage stormwater by allowing precipitation to infiltrate the ground. In other words, urban areas are transformed, so they are no longer vast impermeable surfaces, think of all the asphalt covering our cities, but instead function like a sponge, capable of absorbing heavy rainfall without causing damage. The concept can be applied to “sponge parks,” “sponge streets,” or “sponge parking lots.”

BENEATH THE PAVEMENT, THE BEACH

Professor Sophie Duchesne, a specialist in hydrology and urban infrastructure at INRS, studies water management challenges faced by municipalities. When it comes to sponge cities, she emphasizes that the goal is not to eliminate all paved surfaces, but rather to rethink them so that rainwater can be directed toward appropriate areas. Practical solutions include installing permeable streets that absorb water, or channeling rainfall into planting beds, gardens, or urban parks.

CREATING A SUPPORTIVE ECOSYSTEM

Green spaces specifically designed to handle heavy rainfall are commonly referred to as “bioretention systems.” By carefully selecting plant species such as perennials, shrubs, and trees that can tolerate both heavy watering and prolonged dry periods these systems help retain and absorb a portion of stormwater, while also promoting its “evapotranspiration,” or transfer back into the atmosphere. As an added benefit, residents can enjoy these green spaces, which also help mitigate urban heat islands during the summer. These are known as the “co-benefits” of such measures.

FROM THEORY TO PRACTICE

The good news is that sponge cities are not just theoretical. Across Québec, a number of initiatives are already underway: rain gardens, resilient parks, curbside green infrastructure, and permeable parking surfaces have been implemented in recent years. In addition, Professor Duchesne works closely with public organizations, notably as the holder of the Municipal Chair in Sustainable Water Management supported by the Fédération québécoise des municipalités. She points out that sponge infrastructure can be introduced gradually, for example during routine infrastructure work.

Finally, in November 2025, the City of Laval inaugurated Canada’s first residential street made with permeable asphalt—a pilot project that could inspire municipalities across the country.