

# Ecosystems are Filters:

## River Restoration as Urban Experimentation

Raúl Acosta

Urban river restoration has been paraded in the last few years as a strategy through which cities may gain green credentials alongside benefits like climate change mitigation and public health enhancement, as well as the promotion of tourism and commerce. As cities continue to grow in size and significance – especially in the Global South – green and blue areas, referring to plant and water ecosystems, are increasingly appreciated among city-dwellers and policymakers as nature-based solutions to urbanization problems. One of the key characteristics that is sought in blue and green infrastructures – that is, the uses of other-than-human lifeforms to support human-centred systems – is their capacity to filter out materials, sounds and sun rays. I contend that by enhancing fluvial ecosystems, which are relational life systems, the resulting filtering capacities may go beyond the intended utilitarian purposes and also filter outcome-based planning, thus opening up possibilities for fertile ecological chaos. Top-down urban design often envisions gentrification processes to produce highly desirable urban developments in order to attract affluent individuals and investment. Recent bottom-up initiatives, on the other hand, tend to prioritize ecosystems in order to spur healthier interspecies relations in the pursuit of ecological and social justice.



The case I use to exemplify this process is a linear park in Mexico City, named Ecoducto, which was set up along a 1.6 km stretch within the central reservation of a twelve-lane avenue. I consider this to be an instance of bottom-up subversive experimentation because it was launched by activists and civil society organizations who promoted its creation as a first step towards the restoration of the river that originally flowed where the avenue is situated today. The main group behind its conception, Cuatro al Cubo, is part of a new wave of activism in Mexico that combines expert knowledge with agendas for change. Specifically, Cuatro al Cubo promotes a type of urbanism that seeks

*Area of Ecoducto closed to the public where sewage is filtered as it waters the plants along the linear park.*

Photo: Raúl Acosta, January 2019.



*Ecoducto logo, depicting the sewage with the linear park above it.*

Photo: Raúl Acosta, January 2019.





← Tanks to process sewage and remove toxic material.

Photo: Raúl Acosta, January 2019.

↓ The linear park in sunshine.

Photo: Raúl Acosta, January 2019.



to reverse environmental deterioration – in particular by restoring urban rivers and fluvial ecosystems. As has been common in many cities around the world, the river in question – La Piedad – first became an open sewer and then was canalized (culverted) in order to build the avenue Viaducto Presidente Miguel Alemán. Crucial to Ecoducto is that the sewage that now flows below the avenue is part of the experiment, as some of it is redirected up to the surface to hydrate the linear park. For this to happen, a series of natural filters – that is, rocks, sand, plants and bacteria – are set up in order to clean the water then used to irrigate the 4,800 square metres of vegetation. This is a process that emulates wetlands, known as ‘Earth’s kidneys’ for their capacity to purify water.



*Scented flowers in the park.*

Photo: Raúl Acosta,  
January 2019.

As I walked through the park, I was surprised not to hear the traffic in the jam-packed thoroughfare around me. This was partly because the average speed in the city is not high and also because people do not honk their car horns as frequently as they used to. But crucially, the plants served to buffer the constant noise of traffic. I observed the contrast before going into the park and shortly after leaving it. I also noticed that I could breathe without feeling I was taking in the noxious gases that abound in Mexico City. On the contrary, scented plants like lavender helped make the experience more enjoyable. I even felt the air I inhaled was almost as fresh as that of Chapultepec, one of the city’s most densely treed parks. Ecoducto runs alongside two highly gentrified neighbourhoods, Escandón and Roma Sur, which means it is already situated in a relatively affluent setting for Mexico City. Nevertheless, the potential subversion of Ecoducto is not only about what it can signify in its locality, but in the city more widely. This has to do with its political dimension.



### Filter Bioinfrastructures

Waterways have been central to human civilization. Concerted efforts to control water flows for agriculture, production and consumption laid the groundwork for political systems throughout history. Wittfogel’s hydraulic hypothesis, for example, correlates large-scale irrigation systems with autocratic leadership in ancient states (Obertreis et al. 2016). More recently, water management has been related to an early form of the modern bureaucratic state in the Netherlands, where collaboration in water boards laid the foundation for consensus democracy (Hendriks 2010: 71). The restoration of urban waterscapes in our time, however, reflects novel forms of political transformation. This could be yearnings for improved governance models (Rademacher 2011), or opportunities for multispecies cooperation (Brierley 2020) and planning (Morgan 2019).



*One of the ponds in Ecoducto.*

Photo: Raúl Acosta, January 2019.

In using plants as filters of sewage, airborne toxins and of sounds, Ecoducto is an experiment to prove what river restoration could achieve. Furthermore, along its main path there are numerous informative signboards with illustrations of the plants that make up the park and the micro-organisms that abound in its miniature wetlands. The team in charge has sought to explain the complex interactions taking place here between materials and other-than-human lifeforms. They combine scientific information with references to cultural understandings of ecological relations among Indigenous peoples in the region. In this way, the experiment is also educational: advocating for a renewed appreciation of ancestral knowing together with scientific insights in the context of the megacity. Ecoducto is thus a living example of multispecies conviviality, or the interaction among species that is not merely coexistence but implies a mutual transformation, a “becoming-with” (Rigby 2018: 77).

Urban infrastructures are usually considered as the elements that provide a basis for human-centred structures or systems – like those dedicated to communication or transport – to operate, in both technical and utilitarian terms. They are the “material enablers for (primarily) human flourishing” (Kanoi et al. 2022). With the recent consideration of green and blue infrastructure – that is, of plant- and water-based ecosystems as infrastructures – communities of organisms are therefore also regarded in technical and utilitarian terms as offering services to humankind. However, if we consider green or blue infrastructures not in technical and utilitarian terms but rather as necessary elements of urban ecosystems, then the picture changes. By employing the term ‘bioinfrastructures’ we seek to acknowledge infrastructures as intrinsically lively (see [Introduction](#)). Perhaps cities themselves can be rethought not only as using ecosystems but rather as ecosystems themselves (Acosta et al. 2022), made up of intricate biostructures that we have so far failed to consider. Urban design, civil engineering and architecture have often prioritized an increasingly stark separation of the materials and life spheres that continue to enable the human organism as if it was not part of a set of ecological relations. Yet if green and blue infrastructures are considered as merely service providers, then we run the risk of ignoring cycles of decay and growth that all life necessarily engages in.



An informative sign, situating Mexico City within the broader catchment area where the original lake system was. Photo: Raúl Acosta, January 2019.

What I believe the Ecoducto experiment demonstrates is that in connecting the matter and flows necessary for life, one learns that everything already there – human-made or otherwise – is also part of such ecosystems. Imagining the restoration of a river in Mexico City entails rethinking how the city itself can relate to its own complex water history. It is well known that the megalopolis is sinking. The lakebed on which it grew has been drained to such an extent that buildings, streets and avenues are gradually descending (Vitz 2018). Learning how to restore ecosystems entails a type of

multispecies justice that also sheds light on social inequalities. This train of thought is captured in the signboard that shows the stages of Ecoducto: its beginnings in the form of picnics as protests demanding action; an initial restoration with traffic lanes down the sides; and the full restoration with just cycleways along the sides. Hence, it is not another case of green gentrification, where new green spaces serve to expel poorer inhabitants, but rather an effort to make the restored urban landscape work for all city dwellers, regardless of income or status.



*A signboard showing the stages that activists hope for Ecoducto: from initial picnics demanding action, to the final stage of river restoration.*

Photo: Raúl Acosta, January 2019.

The urban chaos that is Mexico City is the product of decades of improvised policies by the semi-authoritarian single-party regime that was in power for most of the twentieth century (Davis 1994). Ecoducto reflects a yearning for more inclusive forms of development, open to all urban dwellers and not just the affluent. Although quite small in the grand scheme of a megacity, it represents a hope of engaging ecology with cultural memory, so that city dwellers, commuters and visitors can feel part of an urban transformation. I wonder if bioinfrastructures may end up unravelling the predominant model of subsuming nature to human-centred designs, by showing how ecological relations reflect the need for multispecies and social justice that in turn informs a life-based urbanism.

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