Planning Just Urban Futures through SETS

June 2, 2026

Dr. Timon McPhearson
Professor and Executive Director
Urban Systems Lab, New York University
timon.mcphearson@nyu.edu





79 WASHINGTON SQUARE EAST, 6TH FLOOR
NEW YORK, NY 10003

URBANSYSTEMSLAB.COM
URBANSYSTEMSLAB@NYU.EDU

@USL_NYC



About Us

The Urban Systems Lab is an interdisciplinary research, design, and practice space at NYU that generates actionable knowledge to advance equitable, resilient, and sustainable cities.

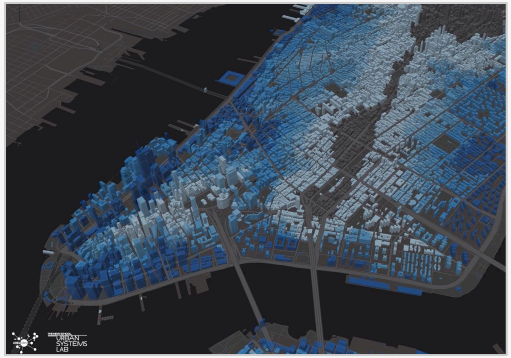


Our mission is to develop systemic solutions to the social and environmental challenges that drive urban inequity and injustice.

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Research Areas



01 Climate Risk & Resilience



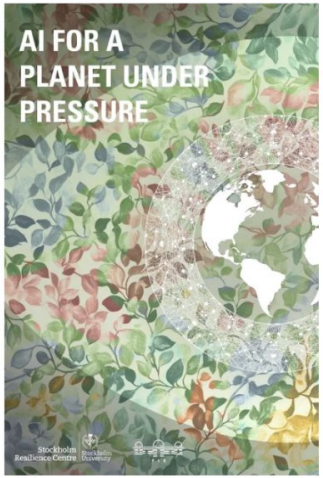
02 Urban Nature-Based Solutions



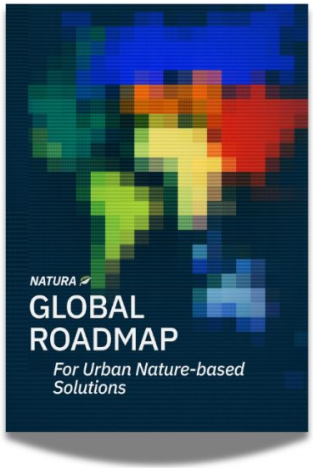
03 Coproduction & Engagement

Publications

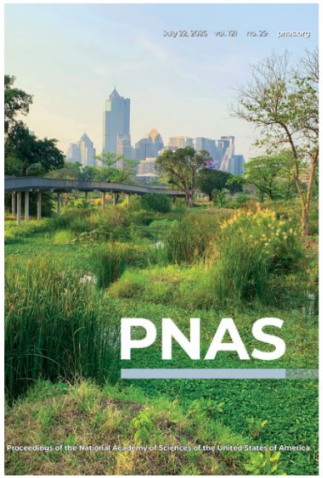
FEATURED REPORTS & PUBLICATIONS



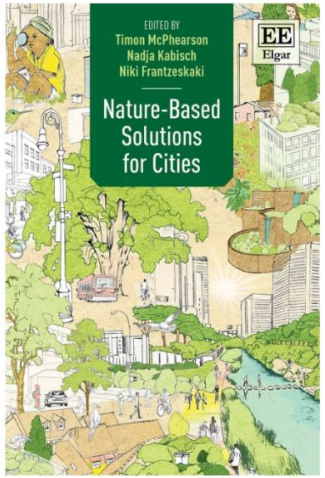
AI for a Planet Under Pressure



NATURA Global Roadmap for Urban Nature-based Solutions



PNAS: Nature-based Solutions for Urban Sustainability



Nature-based Solutions for Cities

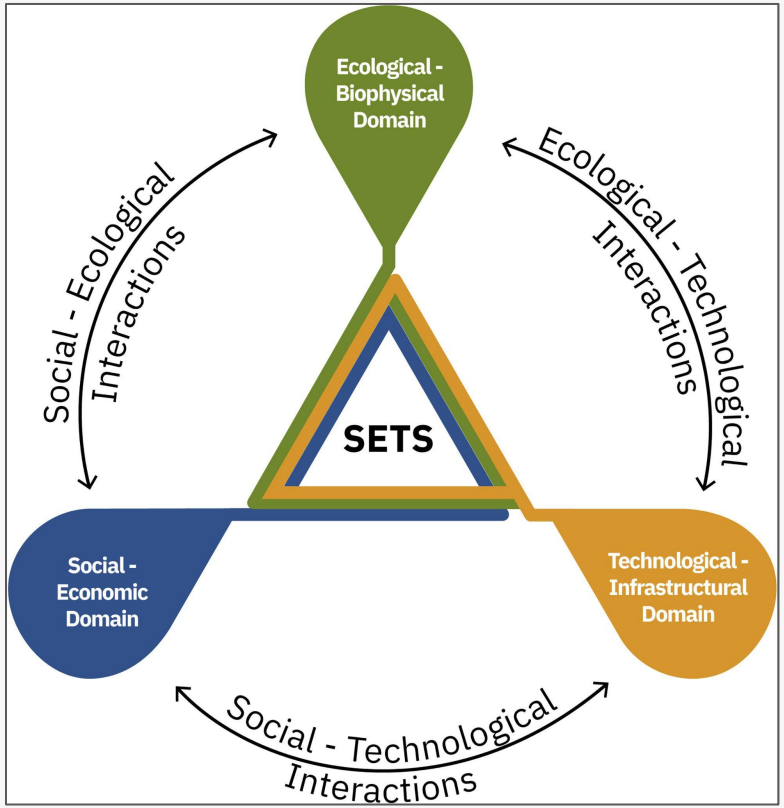


Figure: The social-ecological-technological systems (SETS) conceptual framework. (McPhearson et al. 2016; 2022)

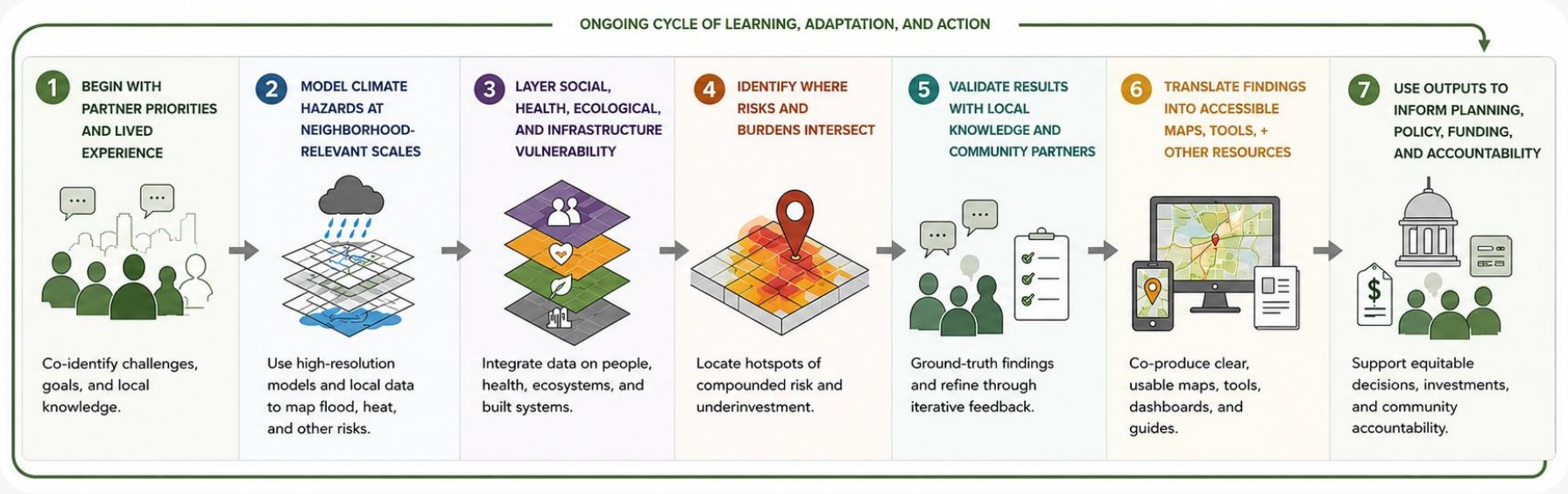
Cities are social-ecological-technological systems

A SETS approach understands cities as interconnected systems:

- **Social:** people, institutions, governance, culture, health, housing, histories, power
- **Ecological:** water, heat, soils, vegetation, biodiversity, habitats, ecosystem processes
- **Technological:** buildings, drainage, roads, energy, sensors, data, models, digital platforms

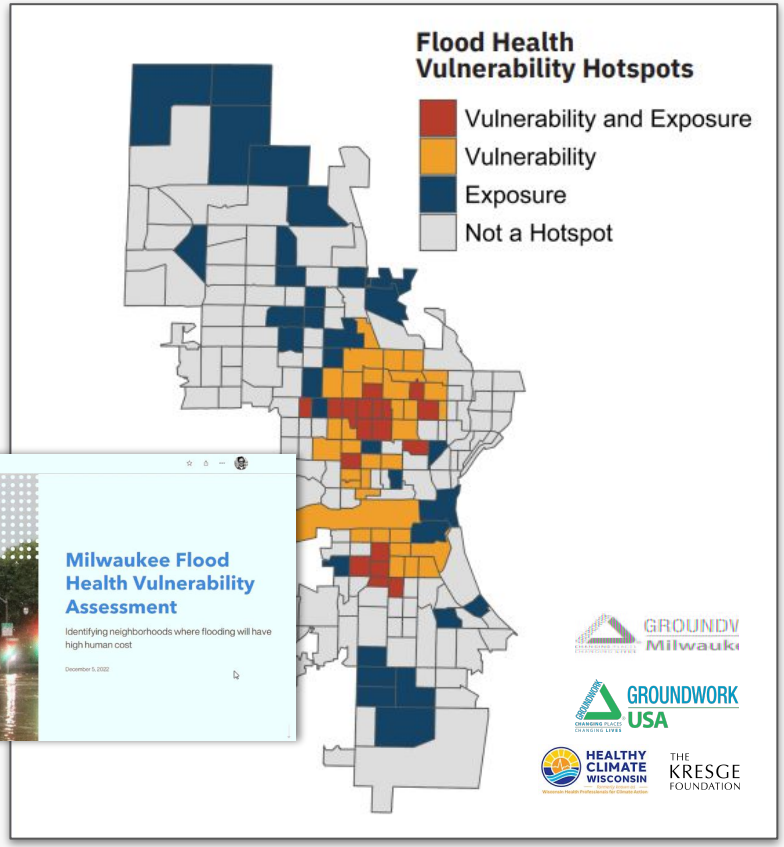
Why it matters: climate risks and adaptation outcomes emerge from interactions among all three systems, not from any one system alone.

Operationalizing justice through our work



Case Study

Milwaukee Flood Health Vulnerability Assessment



STUDY LOCATION

Milwaukee Citywide, Case study in Metcalfe Park neighborhood

PARTNERS

Groundwork Milwaukee, Healthy Climate Wisconsin, Data you Can Use, Groundwork USA

OBJECTIVES

- FHVA identifies where flood exposure overlaps with health, housing, and socioeconomic vulnerability
- Supports Climate Safe Neighborhoods organizing, community planning, and advocacy
- Link to Storymap

Case Study

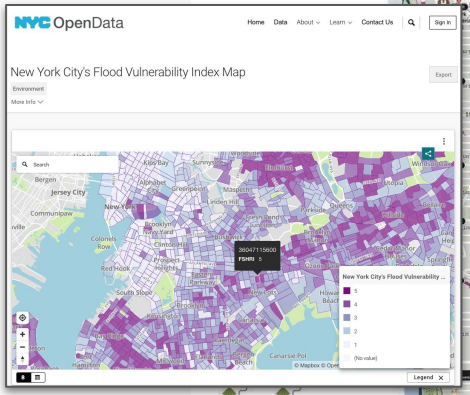
New York City: community preparedness and citywide vulnerability planning

Climate Ready Uptown supports Northern Manhattan emergency preparedness with WE ACT, East Harlem COAD, and Harlem Emergency Network

- A coproduced map and plan that includes flood hazard information, heat preparedness, emergency guidance, and community resource mapping

[NYC Flood Vulnerability Index] integrates exposure, susceptibility, and capacity to cope and recover

- The City's first index incorporating multiple indicators to provide guidance on vulnerability under various storm scenarios



NYC Mayor's Office of Climate & Environmental Justice
THE KRESGE FOUNDATION
WE ACT FOR ENVIRONMENTAL JUSTICE
EAST HARLEM COAD
HEN Harlem Emergency Network

Case Study

New Orleans: co-producing GI and hybrid solutions

STUDY LOCATION

Hollygrove-Dixon and Algiers in New Orleans, LA

PARTNERS

Hollygrove-Dixon Neighborhood Association, Healthy Community Services and Water Wise Gulf South, and the Kresge Foundation

OBJECTIVES

- Model frequent storm events (1 to 20- year storms).
- Assess drainage infrastructure.
- Identify priority sites for interventions.
- Integrate community knowledge into all analyses.







Images from in-person workshops in New Orleans, March 20-21, 2026

Case Study

Atlanta: making localized flood risk visible

THE KRESGE FOUNDATION

STUDY LOCATION

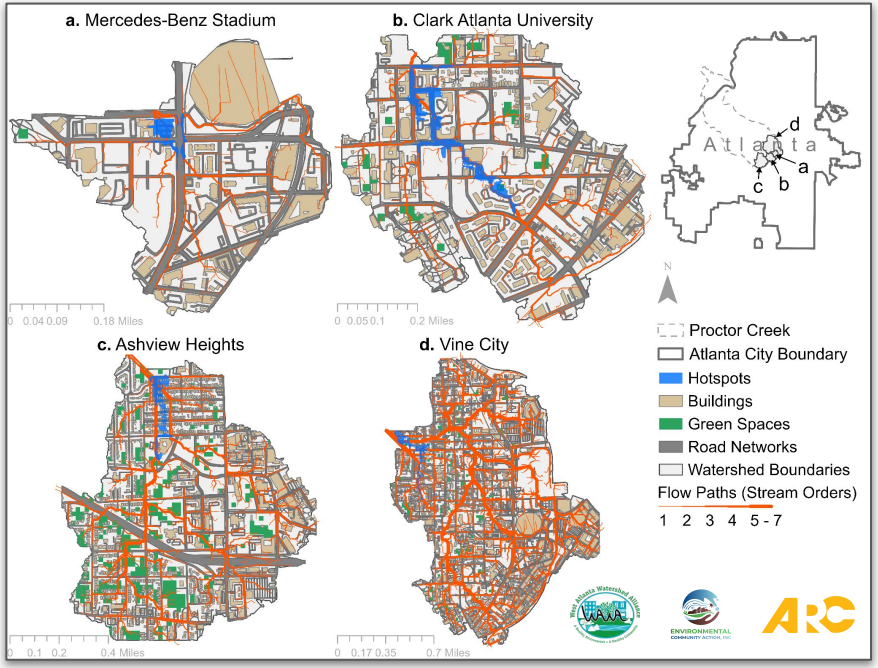
Atlanta University Center and Proctor Creek watershed

PARTNERS

West Atlanta Watershed Alliance, EcoAction, Atlanta Regional Commision, Kresge Foundation

OBJECTIVES

- Equity challenge: routine rainfall flooding is often underrepresented in conventional flood products resulting in limited investment and appropriately scaled solutions
- Conducted pilot flood risk study in 2 disadvantaged Atlanta neighborhoods, identifying hotspots of risk and social vulnerability
- Aim: deliver high-resolution flood data to help local communities advocate for resources and solutions



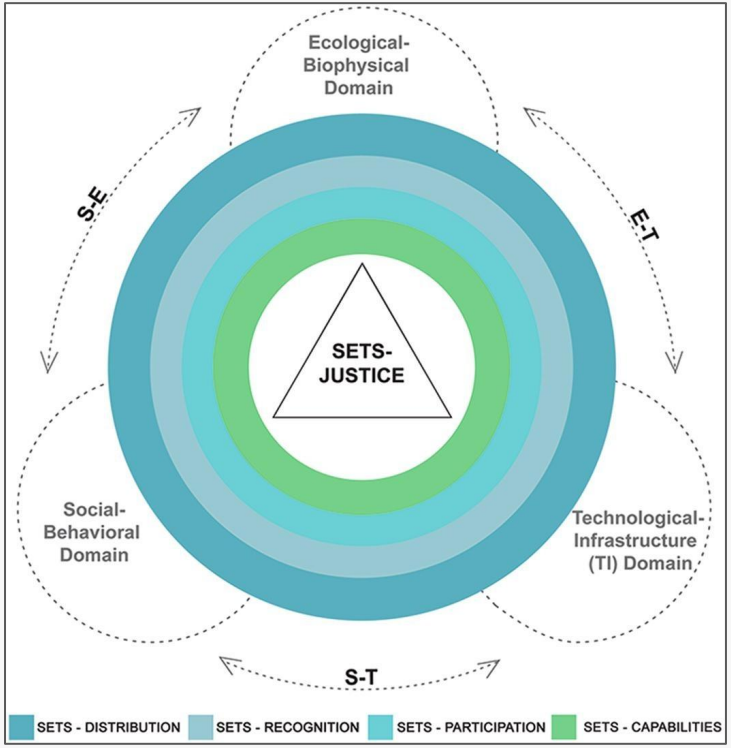
SETS as a justice and equity lens

SETS helps us understand how vulnerability is produced through connected systems:

- **Social** inequities shape exposure, sensitivity, and adaptive capacity
- **Ecological** conditions influence hazards, benefits, burdens, and livability
- **Technological** systems can reduce risk, but can also reproduce exclusion or underinvestment

Governance and planning determine whose knowledge counts and where resources flow

Key question: Where do social, ecological, and technological systems combine to produce risk, exclusion, under-resourcing, or unequal adaptive capacity?



Pineda-Pinto, M., Frantzeskaki, N., Chandrabose, M., Herreros-Cantis, P., McPhearson, T., Nygaard, C. A., & Raymond, C. (2022). Planning Ecologically Just Cities: A Framework to Assess Ecological Injustice Hotspots for Targeted Urban Design and Planning of Nature-Based Solutions. *Urban Policy and Research,* 1–17.

Multispecies & Ecological Justice

Many urban resilience actions or nature-based solutions still value nature mainly for human benefit. Multispecies justice asks:

- What capabilities do nonhuman species need to survive, adapt, and flourish?
- How do urban plans affect habitats, movement, reproduction, and ecological agency?
- How can planning consider more-than-human needs without erasing human inequities?
- What would it mean to design cities with other species, not only for people?

Multispecies urbanism understands cities as living systems shaped not only by people, buildings, and infrastructure, but also by animals, plants, soils, water, microbes, and ecological processes.



Pineda-Pinto, M., Kennedy, C., Collier, M., Cooper, C., O'Donnell, M., Nulty, F., & Castaneda, N. R. (2023). Finding justice in wild, novel ecosystems: A review through a multispecies lens. *Urban Forestry & Urban Greening*, 127902.

Case Study

Tibbetts Brook Case Study

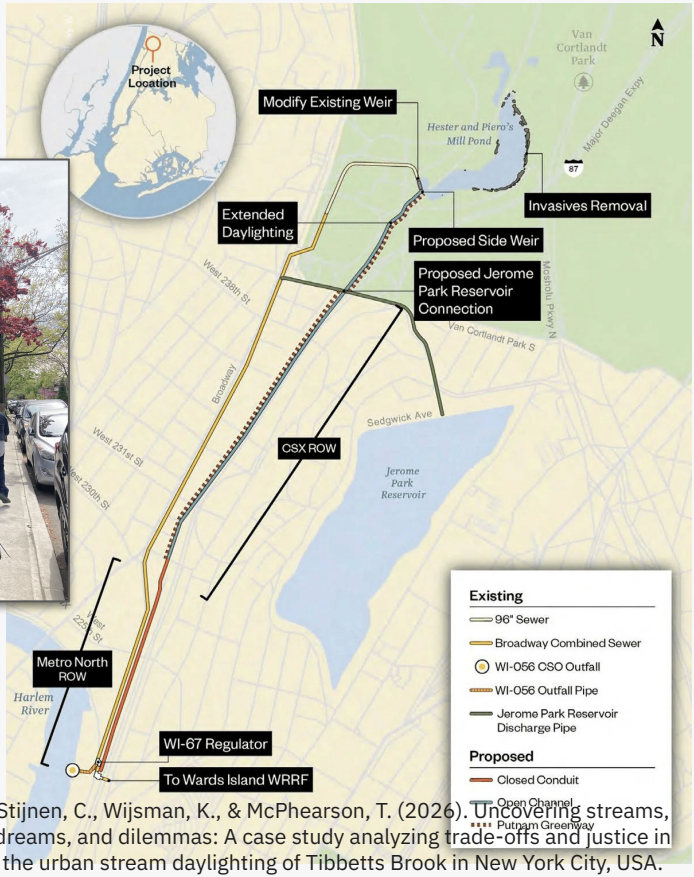
Visiting Scholar Charlotte Stijnen from Utrecht University worked NYC Parks and City as Living Lab to study the Tibbetts Brook Daylighting project.

Findings:

- Daylighting as repair of buried ecological relations
- Water as infrastructure, habitat, memory, and public space
- Flood mitigation alongside habitat creation and ecological connectivity
- Design that considers people, water, soils, plants, fish, birds, insects, and microbial life
- A site for thinking about multispecies coproduction in dense urban systems

What would planning look like if the brook were treated as an active participant in urban planning or decision-making?





Stijnen, C., Wijsman, K., & McPhearson, T. (2026). Uncovering streams, dreams, and dilemmas: A case study analyzing trade-offs and justice in the urban stream daylighting of Tibbetts Brook in New York City, USA. *Environmental Development*, 58.

Case Study

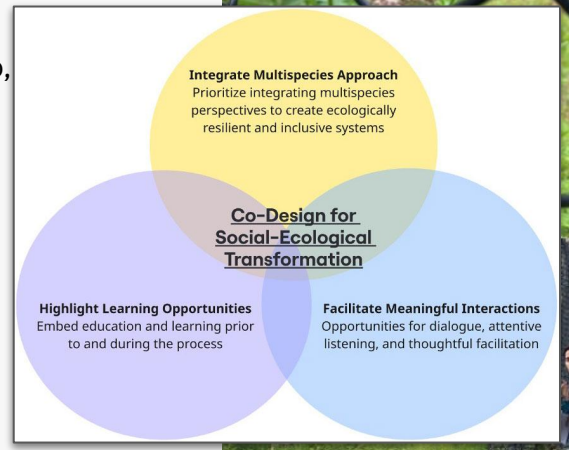
NovelEco and multispecies co-production

USL collaborated with Marcus Collier, Melissa Pineda-Pinto, Mairéad O'Donnell and others from the NovelEco team

The research explores:

- Novel urban ecosystems as sites of adaptation, biodiversity, and justice
- Multispecies co-design and more-than-human planning methods
- Ways to imagine and evaluate future urban ecologies beyond human-centered benefit metrics
- How participatory methods can help people attend to nonhuman needs, relations, and capabilities

Key message: coproduction can be inclusive of more-than-human actors and results in greater levels of empathy and understanding of social-ecological systems



O'Donnell, M., Pineda-Pinto, M., Kennedy, C. L., McPhearson, T., Bloodgood, L., & Collier, M. J. (2026). Exploring multispecies co-design for social-ecological transformation. *Ecology and Society*, 31(2).

Key Ideas

SETS helps move justice from principle to practice by linking evidence, lived experience, urban systems, and governance.

- Coarse hazard models can miss everyday climate burdens
- Under-resourced communities often face multiple overlapping vulnerabilities
- Community knowledge helps define what counts as risk, evidence, and action
- Adaptation should prioritize places where exposure, vulnerability, and underinvestment intersect
- Nature-based solutions should advance racial, social, ecological, and multispecies justice

Join us!
Multispecies Urbanism Lab at NYU



Pineda-Pinto, M., Lennon, M., Kennedy, C., O'Donnell, M., Andersson, E., Wijsman, K., & Collier, M. J. (2025). Realizing multispecies justice through a capability approach to promote nature-based solutions. *npj Urban Sustainability*, 5(1), 1–11.

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McPhearson et al. 2022. A social-ecological-technological systems framework for urban ecosystem services. One Earth. https://doi.org/10.1016/j.oneear.2022.04.007

Chang et al. 2021. Assessment of urban flood vulnerability using the social-ecological-technological systems framework in six US cities. Sustainable Cities and Society. https://doi.org/10.1016/j.scs.2021.102786

Pineda-Pinto et al. 2021. Examining ecological justice within the social-ecological-technological system of New York City, USA. Landscape and Urban Planning. https://doi.org/10.1016/j.landurbplan.2021.104228

Herreros-Cantis et al. 2020. The value of urban flood modeling. Urban Transformations. https://doi.org/10.1186/s42854-020-00014-w

Feagan et al. 2025. Co-producing knowledge systems for resilient and just coastal cities: A social-ecological-technological systems data visualization approach. Cities. https://doi.org/10.1016/j.cities.2024.105513

Pineda-Pinto et al. 2025. Multispecies justice for urban sustainability: A capability approach to design and planning. npj Urban Sustainability. https://doi.org/10.1038/s42949-025-00205-z

O'Donnell et al. 2026. Ecology and Society article on multispecies co-design / multispecies urbanism. https://ecologyandsociety.org/vol31/iss2/art21/

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Thank You

Dr. Timon McPhearson
Director and Professor
Urban Systems Lab, New York University
timon.mcphearson@nyu.edu