THE NEW SCHOOL
URBAN SYSTEMS LAB

ANNUAL REPORT

2022

Research, design, and engagement for more equitable and resilient cities

urbansystemslab.com **@USL_NYC**
79 5th Avenue, 16th Floor, New York, NY 10003

ABOUT THE URBAN SYSTEMS LAB

Since 2015, the Urban Systems Lab (USL) has advanced urban systems science to provide the knowledge and analysis for developing more equitable, resilient, and sustainable cities. Our work spans a variety of issues including urban climate resilience, nature-based solutions, big data and artificial intelligence, data visualization and design, urban ecology, environmental justice and equity, and urban policy and planning.

In this annual report for 2022, learn more about how we bring together designers, urban ecologists, scientists, researchers, and policymakers with the goal to improve the lives of those most vulnerable to climate and other impacts and to enhance decision making and science communication from local to global scales.

MESSAGE FROM THE DIRECTOR

The Urban Systems Lab has had an incredible past year with our students, faculty and staff creating new knowledge and engaging for impact at local, national and international scales and in multiple cities across the world. From launching the Flood Vulnerability Health Assessment for Milwaukee, to providing core design, research and dataviz to support the WE ACT Climate Ready Uptown Plan in NYC for local community driven emergency response and planning. We are also excited to play a key role in launching the NYC Climate Vulnerability and Impact study to bring new science into the 4th Assessment of the NYC Panel on Climate Change, co-authoring multiple chapters for the recent IPCC reports with multiple members and USL collaborators contributing, and launching the NATURA Global Roadmap for Urban Nature-based Solutions at COP15 and the IPCC Summary for Urban Policy Makers at COP27, and much more.

This year, the USL continues to expand the diversity, reach, and impact of our collective work, and may be our most productive and impactful years yet. Between new awards, grants, publications, reports, events, collaborations and press, our shared work highlights the diverse and talented people that make up the USL. We will continue in 2023 to advance our core mission to provide the fundamental scientific urban data, knowledge and design working across multiple disciplines to support communities and cities to transform themselves for resilience to climate change, for improving equity for the most vulnerable, and to drive adaptation efforts that invest in nature-based solutions.

Timon McPhearson
Director, Urban Systems Lab
Professor of Urban Ecology
The New School

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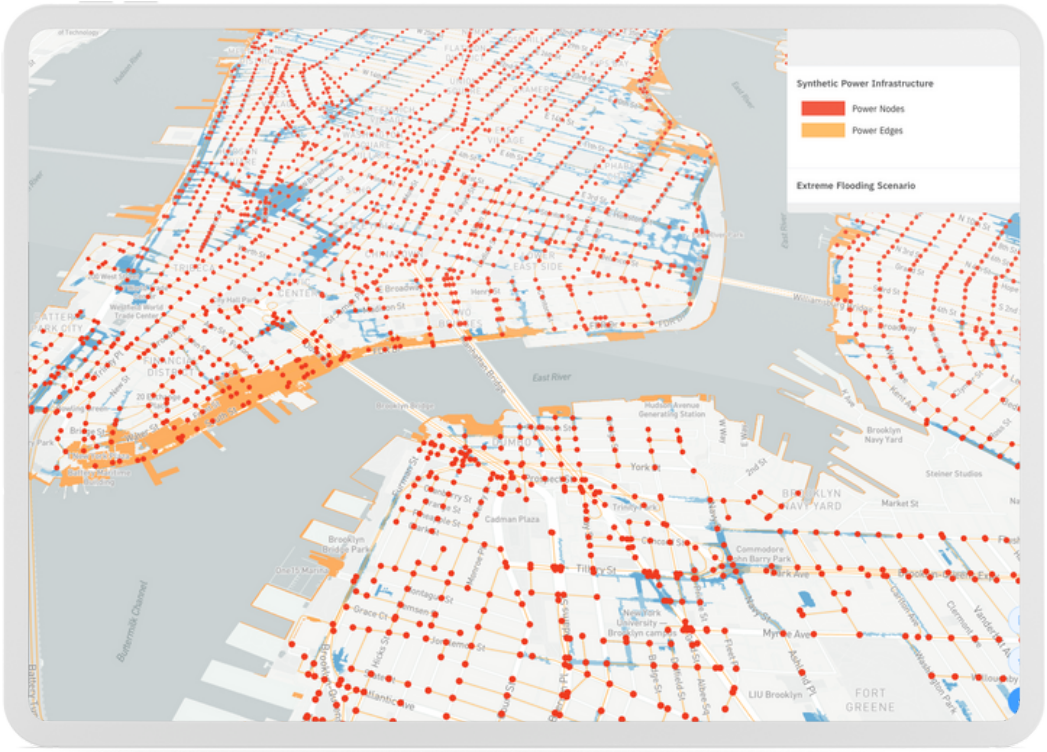
OUR WORK

Synthetic Infrastructure (SyNF) Solutions to Improve the Sustainability of Energy Infrastructure Systems

ALFRED P. SLOAN FOUNDATION

Team: Ahmed Mustafa, Timon McPhearson, Daniel Sauter, Mikhail Chester, David Iwaniec, Ryan Hoff, Ryan Sparks
Partners and Support: Sloan Foundation, Arizona State University, Georgia State University

This initiative brings together researchers at the Urban Systems Lab, Arizona State University (ASU) and Georgia State University (GSU) to co-develop synthetic infrastructure models for Phoenix, New York City and Atlanta that will simulate critical failure in energy distribution systems and potential cascading impacts on other power, water, and transportation infrastructure during extreme events to optimize solutions, and improve reliability and robustness. The custom coded synthetic infrastructure modeling environment (SyNF model) links multiple data sources to ultimately generate new synthetic energy network data that attempts to mimic real-world energy networks and therefore not only fills energy network data gaps, but provides the novel ability to examine failure scenarios and their cascading impacts to other energy dependent infrastructure networks.



City of New York Synthetic Power Infrastructure. Urban Systems Lab OCELLUS Platform

Environmental Justice of Urban Flood Risk and Green Infrastructure Solutions

KRESGE CREWS
Climate Resilient & Equitable Water Systems

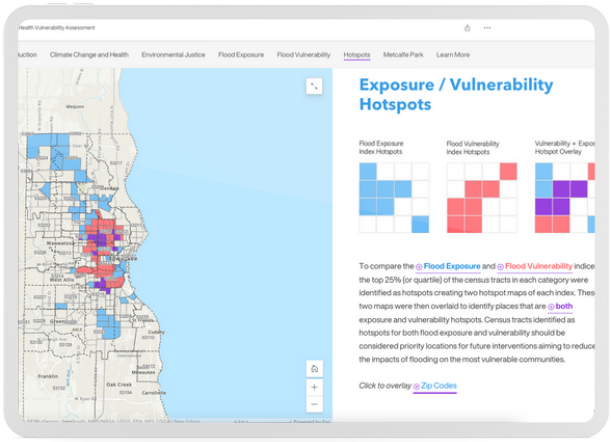
Team: Pablo Herreros Cantis, Timon McPhearson, Chris Kennedy, Jiray Avedisian
Partners and Support: Kresge Foundation, Groundwork Milwaukee, Groundwork USA

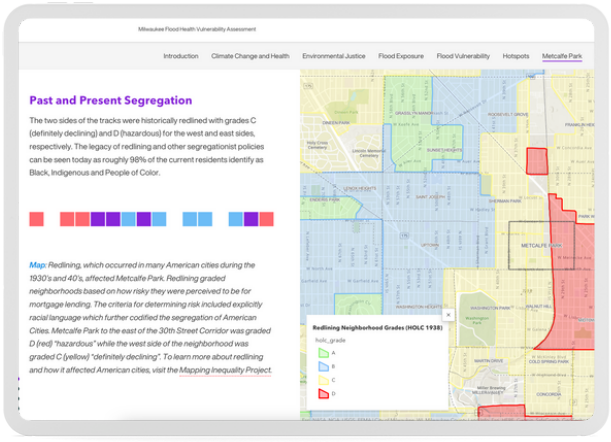
Over the past year the Urban Systems Lab (USL) team continued to support the Kresge CREWS network and leveraged previous research to advance understanding of the environmental justice implications of urban flooding in cities across the US. Our close partnership with Groundwork USA was strengthened through a collaboration with Groundwork Milwaukee resulting in a new tool, the "Milwaukee Flood Health Vulnerability Assessment". The USL team also launched a new web resource "Is Green Infrastructure a Universal Good?" and Executive Summary report synthesizing results from a study of 122 official GI city plans in 20 diverse U.S. cities. We also worked closely with partners at WE ACT for Environmental Justice, co-leading the development of the "Climate Ready Uptown Plan" to help improve emergency preparedness in Northern Manhattan. See below for more details:

Milwaukee Flood Health Vulnerability Assessment

In 2022 the USL partnered with Groundwork Milwaukee, Wisconsin Health Care Professionals for Climate Action, Data You Can Use, and Groundwork USA to launch the Milwaukee Flood and Health Vulnerability Assessment (FHVA). The FHVA is a tool to identify communities across Milwaukee where exposure to urban flooding and pre-existing health, housing and socioeconomic conditions intersect and create disproportionate vulnerabilities to the impacts caused by extreme flooding. Informed by a similar effort in San Francisco, the tool will support GWM's Climate Safe Neighborhoods Initiative, which "works closely with residents and stakeholders to organize, mobilize, and effect systems change to make communities more resilient to extreme heat and flooding".

GROUNDWORK Milwaukee
GROUNDWORK USA
WHPCA Wisconsin Health Professionals for Climate Action
DATA YOU CAN USE





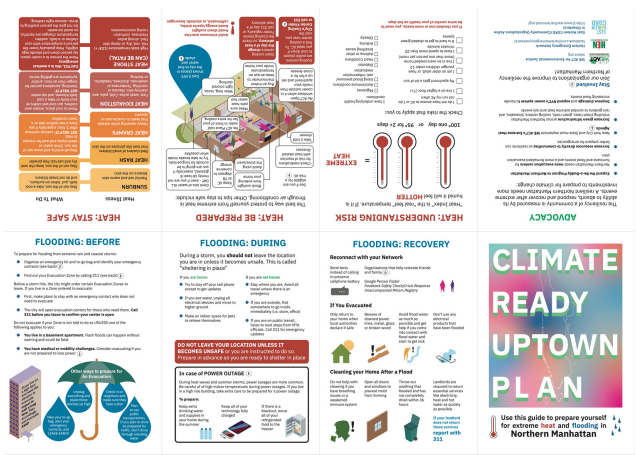
Screenshots of the Milwaukee Flood Health Vulnerability Assessment storymap

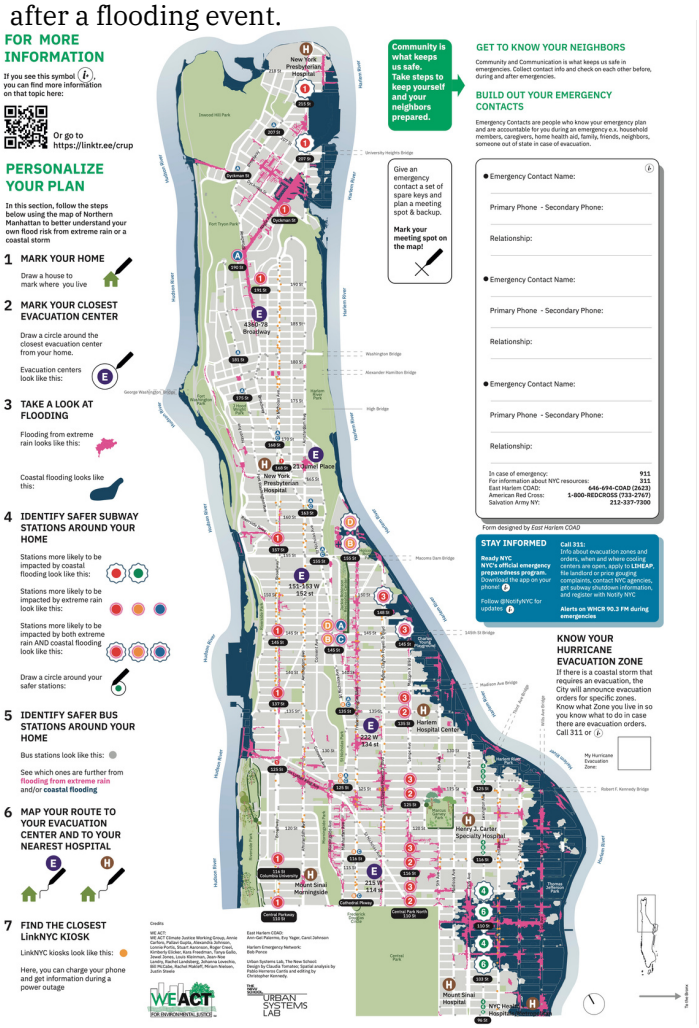
Climate Ready Uptown Plan

Team: Pablo Herreros Cantis, Claudia Tomateo, Annie Carforo, Chris Kennedy
Partners and Support: WE ACT for Environmental Justice, East Harlem COAD and Harlem Emergency Network, Kresge Foundation

With the support of the Kresge Foundation the USL team has assisted WE ACT for Environmental Justice, a local nonprofit in NYC, in creating the Climate Ready Uptown Plan for Northern Manhattan. The aim is to create a comprehensive community driven emergency preparedness plan that focuses on climate related hazards in partnership with East Harlem COAD and Harlem Emergency Network. This includes 1) Clear flood hazard maps that show threats of coastal flooding as well as stormwater flooding; 2) Best practices to prepare and react to flooding and extreme heat events; 3) A community resource map.

The USL's team led data processing and analysis to compile needed geospatial information and visualize urban flooding exposure in Northern Manhattan (East Harlem, Central Harlem, West Harlem, Washington Heights, Inwood) alongside locations of critical infrastructure and services (eg. community resources). Our design team has led development of a physical print map which also includes tips to help an individual prepare themselves and their family for flooding event, heatwaves or other hazards. This includes specific instructions on how to cool down, how to find available resources provided by the City of New York, and best practices for before, during and after a flooding event.





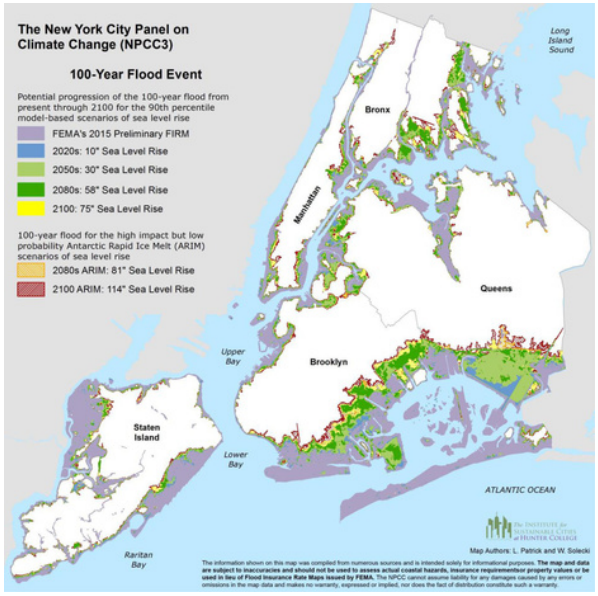
Images of the final Climate Ready Uptown Plan design. Designer Claudia Tomateo

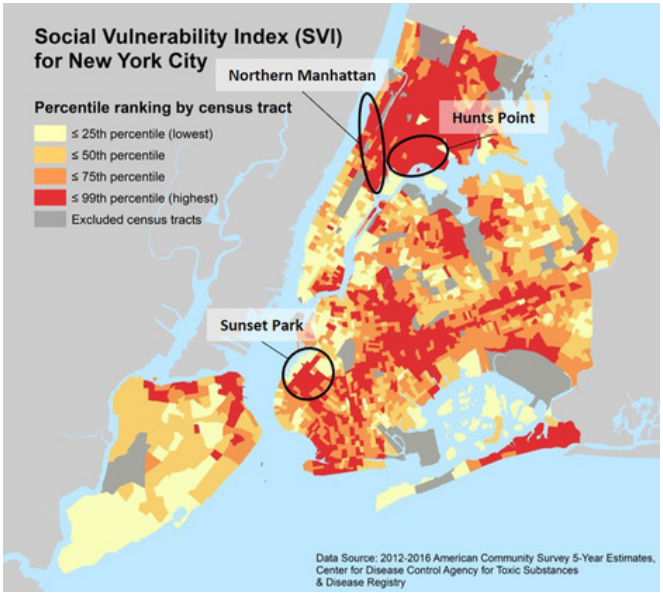
Town+Gown: Climate Vulnerability, Impact, and Adaptation Analysis (VIA)

Mayor's Office of Climate & Environmental Justice

TNS Team: Co-led by Timon McPhearson (USL) and Joel Towers (Tishman Center), Drake Reed, Adrienne Perovich, Pablo Herreros Cantis, Luis Ortiz, Chris Kennedy and others
Partners and Support: City of New York, Mayor's Office of Climate and Environmental Justice, NYC Department of Citywide Administrative Services, Columbia University, Cornell University, City University of New York, Drexel University, Lamont Doherty Earth Observatory, Sarah Lawrence College, Science and Resilience Institute at Jamaica Bay, Stevens Institute of Technology, Natural Resources Defense Council, Population Council, NASA/GISS, and USDA Forest Service, Arcadis

In 2022, the Urban System Lab in partnership with the Tishman Environment and Design Center at The New School was selected by the Mayor's Office of Climate and Environmental Justice (MOCEJ), to carry out a $2.5M study on future climate change and its potential impacts to inform decision-making by the City of New York and assessment reports by the NYC Panel on Climate Change. Since its launch in August 2022, an interdisciplinary team has worked collaboratively to develop a comprehensive analysis of future potential climate conditions and associated socio-economic impacts in New York City. The team includes scientists from nine academic institutions, four governmental institutions and nonprofit organizations, and from the private sector. Together, this team will work collaboratively to develop a comprehensive analysis of future potential climate conditions and associated socio-economic impacts in New York City.





Maps created for the NPCC3 report (2019)

Mayor's Office of Climate & Environmental Justice · THE NEW SCHOOL · NYC DCAS Citywide Administrative Services · CUNY The City University of New York · Columbia University · Drexel · Stevens Institute of Technology · Sarah Lawrence College · USDA Forest Service · NRDC · Population Council · Arcadis · NASA

Converging Social, Ecological, and Technological Infrastructure Systems (SETS) for Urban Resilience

Team: Ahmed Mustafa, Timon McPhearson, Elizabeth Cook, Luis Ortiz, Daniel Sauter, Mikhail Chester, David Mac Iwaniec
Partners and Support: National Science Foundation, City of New York, Barnard College, Arizona State University, Georgia State University, USDA

The Converging Social, Ecological, and Technological Infrastructure Systems (SETS) for Urban Resilience project is a 5 year NSF initiative to accelerate advances in convergent urban systems science in San Juan (PR), Atlanta, New York, and Phoenix. In 2022, the team continued to conduct research in each target city, including additional modeling, simulation and analysis. The New York Convergence team also partnered with the New York City (NYC) Mayor's Office of Climate and Environmental Justice (MOCEJ) to facilitate a NYC Climate Adaptation Scenarios workshop series, a wide ranging yet structured set of anticipatory discussions on future climate resilience and adaptation. Through a series of five 3-hour virtual workshops, diverse participants co-developed positive future visions for New York City of sustainability, resilience, and adaptation to climate change and extreme events.

Approximately 35 government practitioners from 24 city, state, and federal agencies gathered virtually over the course of five weeks (see Table 1 for agencies involved). Together, participants co-developed six distinct climate adaptation scenarios: Multiple co-occurring hazards, Coastal flooding, Extreme heat, Winter extremes, Extreme precipitation, and Drought and shifting water demand. Scenario themes were developed in response to practitioner concerns and the city's sustainability and environmental management plans. Through a series of workshop and post-workshop activities, including innovative ideation, timelines, visual illustrations, and day-in-the-life narratives, participants defined long-term goals and strategies for each scenario to develop radical visions for New York City in 2100.

Images from *NYC Climate Adaptation Scenarios for 2100.* Left: Visualization of coastal flooding adaptation and resilience strategies in 2100. Right: Visualization of extreme heat adaptation and resilience strategies in 2100. Designer: Eleanor Davol

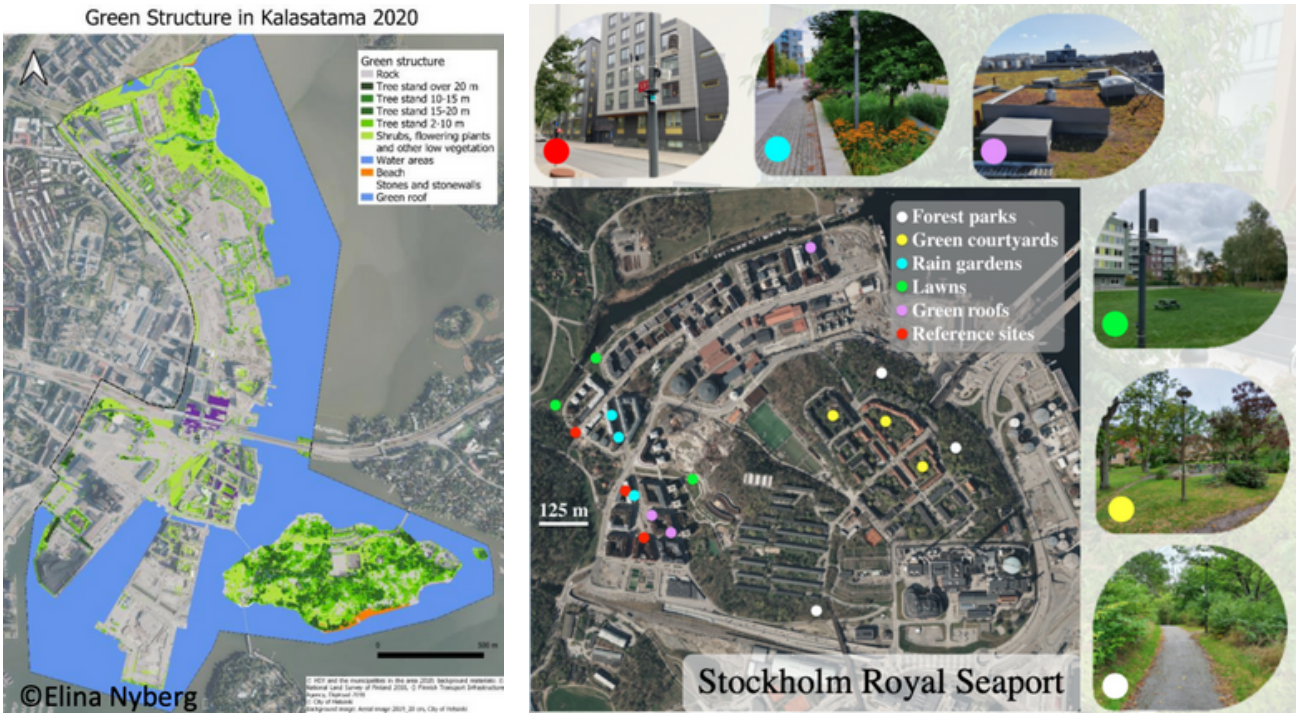
SMARTer Greener Cities

Project Team: Erik Andersson, Timon McPhearson, Anton Stahl Olafsson, Silviya Korpilo, Natalie M Gulsrud, Christopher Raymond, Artur Branny and others

Partners: Nordforsk, Stockholm Resilience Centre

SMARTer Greener Cities aims to develop and test novel tools and processes for explicitly converging social, ecological, and technological approaches. The convergence of these approaches will promote resilient and equitable urban futures in Helsinki, Copenhagen, and Stockholm, and generate new opportunities for transformative change and increasing resilience to extreme events in other Nordic cities. This year the team released several policy briefs including policy recommendations for the City of Helsinki focused on human wellbeing, including whether residents experience and find restorative places and sounds in fast developing districts and how different types of nature-based solutions can support psychological restoration.

A second policy brief explores how local wireless sensors can enable smarter and greener plans in Stockholm and other urban areas. The team also organized a multi-sensory living pavilion in Helsinki in partnership with the Finnish Environment Institute (SYKE) and the University of Helsinki. The aim of the event was to demonstrate possibilities for moving towards a smart and green city agenda by drawing upon new forms of sensors and citizen engagement technologies.



Right. Map of Kalasatama, Helsinki, Sweden. Left. Stockholm Royal Seaport, The map shows locations of 18 sensor locations.

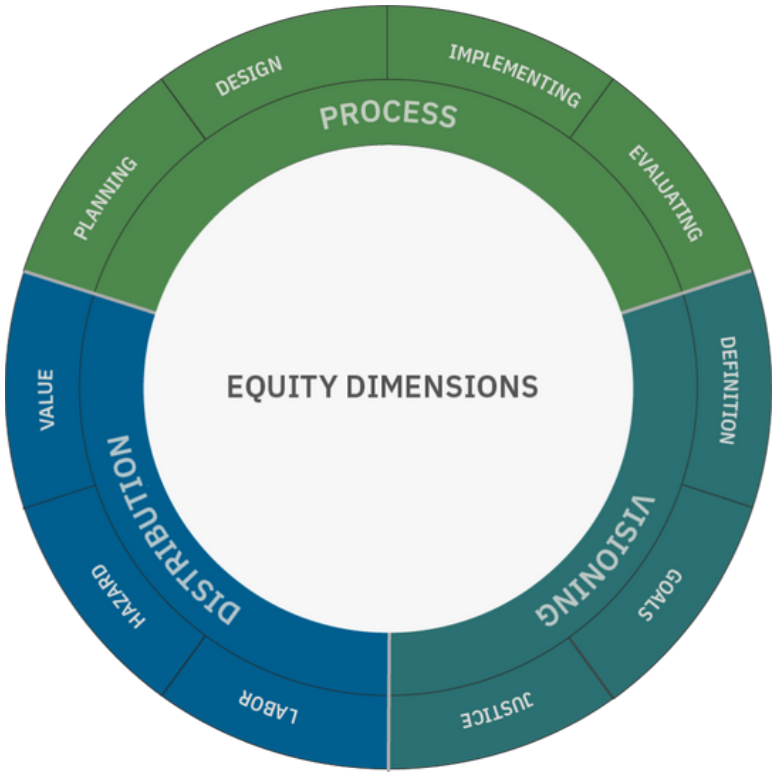
Equitable Green Infrastructure Planning in NY: Assessing the state of knowledge and best practices to facilitate collaborative learning

Project Team: Zbigniew Grabowski, Timon McPhearson, Veronica Olivotto
Partners: The New York State Water Resources Institute (WRI) and the New York State Department of Environmental Conservation (DEC), University of Connecticut

NEW YORK STATE WATER RESOURCES INSTITUTE
Cornell University

NEW YORK STATE Department of Environmental Conservation

This research study is focused on assessing the state of knowledge around Green Infrastructure (GI) and Equity within the GI planning community within New York State to inform knowledge dissemination about existing concerns around equity and GI and strategies to address them. The current state of knowledge is being assessed through an online survey instrument disseminated to municipal green infrastructure planners and watershed groups and through existing partners. Survey results will be analyzed and disseminated through a peer reviewed publication and public facing short report on current equity issues with NYS GI planning, and hosted on the platform www.giequity.org on a New York State specific webpage. A workshop is being planned for 2023 to discuss results and connect practitioner and research communities to facilitate co-learning and identify further opportunities to embed equity concerns within pending state and local GI policy and programs, including the Climate Smart Communities and NYS Climate Act.



A graphic explaining major equity dimensions considered for “Is Green Infrastructure a Universal Good?”

The Nature-based Solutions for Urban Resilience in the Anthropocene (NATURA)

USL Team: Co-led byTimon McPhearson (USL), Nancy Grimm (ASU), and Elizabeth Cook (Barnard College), with Loan Diep, Natalie Pierson, Chris Kennedy, Tessa Martinez and others
Partners and Support: National Science Foundation

The Nature-based Solutions for Urban Resilience in the Anthropocene (NATURA) project links networks in Africa, Asia-Pacific, Europe, North and Latin America, and globally to enhance connectivity among the world's scholars and practitioners and improve the prospects for global urban sustainability. In 2022, USL Postdoctoral Fellow Loan Diep and Director TImon McPhearson worked on developing The Global Roadmap for Urban Nature-Based Solutions to assess knowledge, challenges, and opportunities for innovation in research and practice within and across the world regions. The Global Roadmap aims to synthesize the scientific evidence on Nature-based Solutions (NBS) and identify knowledge gaps to leverage learning from NBS implementation within and across the world regions. It will develop and compare regional profiles of the state of knowledge in research and practice in North America, Latin America & the Caribbean, Europe, the Middle East & North Africa, Africa, Asia, and Oceania. This initiative will result in a high-level report and a series of communications serving at both global and regional levels to facilitate innovation and the effective impact of urban NBS.

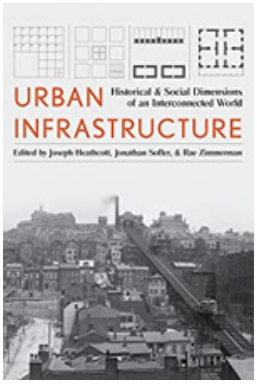
USL members also attended the first in-person All Hands Meeting in Malta with a total of 48 participants representing 26 networks, including 21 early-career members. The event enabled NATURA to consolidate current and future activities and solidify its mission. This past year, NATURA organized eight webinars including 21 speakers from across the network of networks. Loan Diep also led the NATURA Early Career Network, which provided continued support to early-career professionals through regular virtual meetings, emails, and Slack messaging to promote networking and career opportunities, share learning materials, and offer peer-to-peer support. Overall the number of networks in NATURA increased from 26 to 48. Increased number of members contributed to the NATURA Horizon Survey increasing from 102 to 161 responders who provided their perspectives on knowledge gaps in nature-based solutions. Finally, the NATURA working group on Urban Ecological Resilience co-led by McPhearson held virtual monthly meetings in spring 2022 and the first in-person TWG meeting in Stockholm in May 2022. The in-person workshop produced a research plan, starting with a conceptual framework on urban ecological resilience to be included in a forthcoming book chapter and a peer-reviewed journal article.



Images from the 2022 NATURA All Hands Meeting in Malta

RESEARCH AND SCHOLARLY IMPACT

Books and Book Chapters



Depietri, Y., & McPhearson, T. (2022). Green Infrastructure and Climate Risk in New York City: A Historical Perspective. In J. Heathcott, J. Soffer, & R. Zimmerman (Eds.), *Urban Infrastructure: Historical and Social Dimensions of an Interconnected World*. University of Pittsburgh Press. https://doi.org/10.2307/j.ctv30pnvb9

Journal Articles

Diep, L., Mulligan, J., Oloo, M. A., Guthmann, L., Raido, M., & Ndezi, T. (2022). Co-building trust in urban nature: Learning from participatory design and construction of Nature-Based Solutions in informal settlements in East Africa. Frontiers in Sustainable Cities, 4.

Grilo, F., McPhearson, T., Santos-Reis, M., & Branquinho, C. (2022). A trait-based conceptual framework to examine urban biodiversity, socio-ecological filters, and ecosystem services linkages. Npj Urban Sustainability, 2(1), Article 1.

Grabowski, Z. J., McPhearson, T., & Pickett, S. T. A. (2023). Transforming US urban green infrastructure planning to address equity. Landscape and Urban Planning, 229, 104591.

Grabowski, Z. J., Wijsman, K., Tomateo, C., & McPhearson, T. (2022). How deep does justice go? Addressing ecological, indigenous, and infrastructural justice through nature-based solutions in New York City. Environmental Science & Policy, 138, 171–181.

Balk, D., Tagtachian, D., Jiang, L., Marcotullio, P., Cook, E. M., Jones, B., Mustafa, A., & McPhearson, T. (2022). Frameworks to envision equitable urban futures in a changing climate: A multi-level, multidisciplinary case study of New York City. Frontiers in Built Environment, 8.

Grabowski, Z. J., McPhearson, T., & Pickett, S. T. A. (2023). Transforming US urban green infrastructure planning to address equity. Landscape and Urban Planning, 229, 104591.

Łaszkiewicz, E., Wolff, M., Andersson, E., Kronenberg, J., Barton, D., Haase, D., Langemeyer, J., Baró, F., & McPhearson, T. (2022). Greenery in urban morphology: A comparative analysis of differences in urban green space accessibility for various urban structures across European cities. Ecology and Society, 27(3).

Journal Articles

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.

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.

Treglia, M., McPhearson, T., Sanderson, E., Yetman, G., & Maxwell, E. (2022). Examining the distribution of green roofs in New York City through a lens of social, ecological, and technological filters. Ecology and Society, 27(3).

Gilbert, M. R., Eakin, H., & McPhearson, T. (2022). The role of infrastructure in societal transformations. Current Opinion in Environmental Sustainability, 57, 101207.

Diep, L., & McPhearson, T. (2022). Nature-based solutions for global climate adaptation. Nature, 606(7915), 653–653.

Krueger, E. H., McPhearson, T., & Levin, S. A. (2022). Integrated assessment of urban water supply security and resilience: Towards a streamlined approach. Environmental Research Letters, 17(7), 075006.

Sauter, D., McPhearson, T., Peng, X. E., Wu, Y., Fan, P., Bowe, E., Outwater, J., & Kennedy, C. Ocellus XR. New York, NY. The New School.

Diep, L., Parikh, P., Dodman, D., Alencar, J., & Martins, J. R. S. (2022). Problematizing infrastructural “fixes”: Critical perspectives on technocratic approaches to Green Infrastructure. Urban Geography, 0(0), 1–22.

Diep, L., Parikh, P., Duarte, B. P. dos S., Bourget, A. F., Dodman, D., & Martins, J. R. S. (2022). “It won’t work here”: Lessons for just nature-based stream restoration in the context of urban informality. Environmental Science & Policy, 136, 542–554.

McPhearson, T., E. Cook, M. Berbés-Blázquez, C. Cheng, N.B. Grimm, E. Andersson, O. Barbosa, D.G. Chandler, H. Chang, M. Chester, D. Childers, S. Elser, N. Frantzeskaki, Z. Grabowski, P. Groffman R.L. Hale, D.M. Iwaniec, N. Kabisch, C. Kennedy, S.A. Markolf, A.M. Matsler, L.E. McPhillips, T.R. Miller, T.A. Muñoz-Erickson, E. Rosi, T.G. Troxler. (2022). A social-ecological-technological systems approach to urban ecosystem services. One Earth, 5, 5, 505-518.

Kennedy, C. (2022). Ruderal Resilience: Applying a Ruderal Lens to Advance Multispecies Urbanism and Social-Ecological Systems Theory. Frontiers in Built Environment, 8.

Frantzeskaki, N., & McPhearson, T. (2022). Mainstream Nature-Based Solutions for Urban Climate Resilience. BioScience, 72(2), 113–115.

Journal Articles

Mejía, G. A., Groffman, P. M., Downey, A. E., Cook, E. M., Sritrairat, S., Karty, R., Palmer, M. I., & McPhearson, T. (2022). Nitrogen cycling and urban afforestation success in New York City. Ecological Applications, e2535.

Grabowski, Zbigniew, Ffion Atkins, Lelani Mannetti, Clair Cooper, Danielle McCarthy, Robert Hobbins, Matt Smit, Yuliya Dzyuban, Charlyn Green, Yeowon Kim, Hopeland P, Pablo Cantis, Luis Ortiz. (2022, January 18). Embracing Diverse Concepts of Nature-based Solutions to Enact Transformational Change: A Perspective From the Early Career Working Group of the NATURA Network. The Nature of Cities.

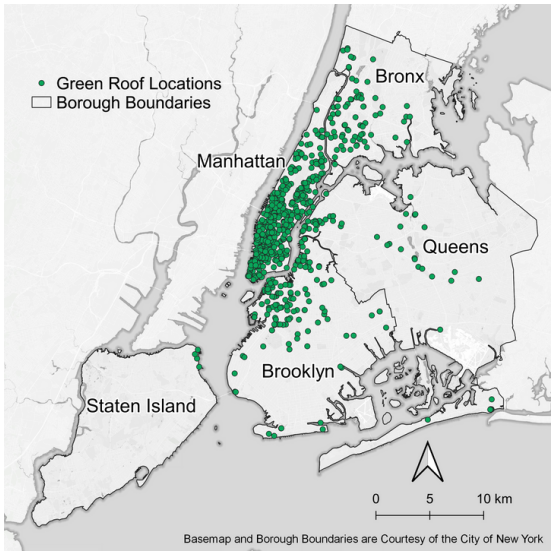
Grabowski, Z. J., McPhearson, T., Matsler, A. M., Groffman, P., & Pickett, S. T. (2022). What is green infrastructure? A study of definitions in US city planning. Frontiers in Ecology and the Environment.

Ortiz, L., Mustafa, A., Cantis, P. H., & McPhearson, T. (2022). Overlapping heat and COVID-19 risk in New York City. Urban Climate, 41, 101081

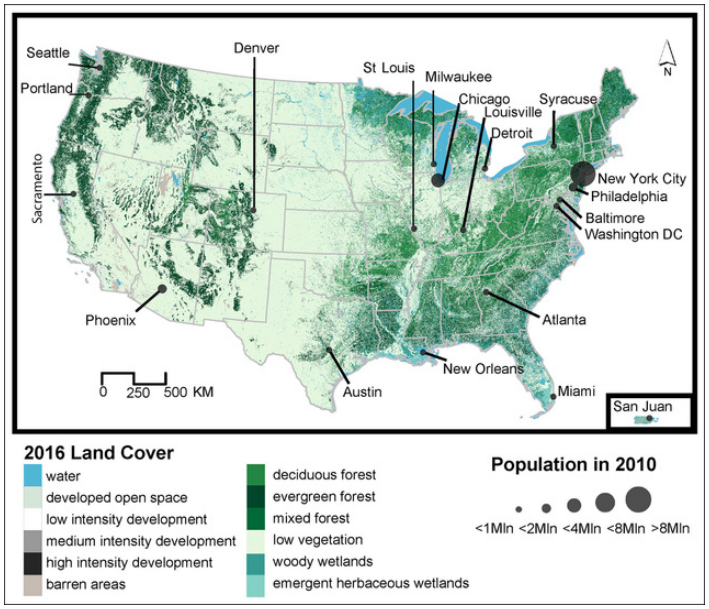
Ortiz, L., Gamarro, H., Gonzalez, J. E., & McPhearson, T. (2022). Energy burden and air conditioning adoption in New York City under a warming climate. Sustainable Cities and Society, 103465.

Branny, A., Møller, M. S., Korpilo, S., McPhearson, T., Gulsrud, N., Olafsson, A. S., Raymond, C. M., & Andersson, E. (2022). Smarter greener cities through a social-ecological-technological systems approach. Current Opinion in Environmental Sustainability, 55, 101168.

Sauter, D., McPhearson, T., & Kennedy, C. (2022, October 10). Ocellus XR: Visualizing Climate Risk, Vulnerability, and Equity in NYC. Public Seminar.



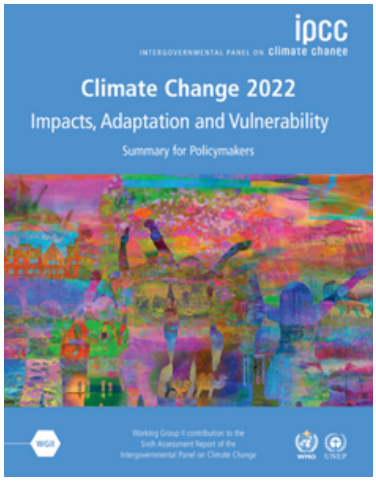
Estimated locations of green roofs in New York City based on aggregation of existing data, remote sensing analysis, and manual refinement. (Treglia et al. 2022)



Study cities. Circles denote population size according to the 2010 US Census. Colors indicate land cover reclassified from the 2016 Multi-Resolution Land Characteristics National Land Cover dataset. (Grabowski et al. 2022)

PRODUCTS

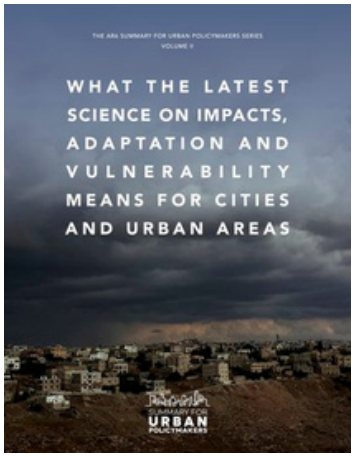
Reports and Other Publications



Climate Change 2022: Impacts, Adaptation and Vulnerability

The Working Group II contribution to the Sixth Assessment Report assesses the impacts of climate change, looking at ecosystems, biodiversity, and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change.

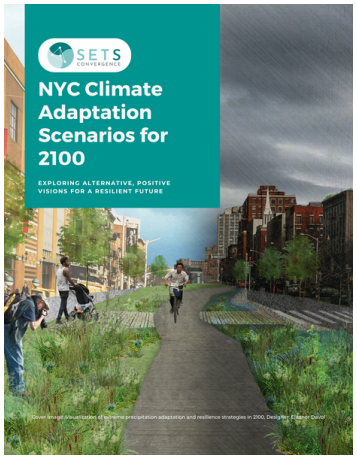
Lwasa, S., et al. (2022). IPCC AR6 WGII Chapter 8: Urban Systems and Other Settlements. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [C. Dubeux, D. Ürge-Vorsatz (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA.



The Summary For Urban Policy Makers of the IPCC's Sixth Assessment Report

The Summary for Urban Policymakers (SUP) series provides an overview of the IPCC Assessment Report (AR6), which USL's Timon McPhearson was a lead author on. This SUP report was released during COP27 in Egypt, providing targeted summaries of science on what the impacts from climate change, adaptation and vulnerability mean for cities and urban areas.

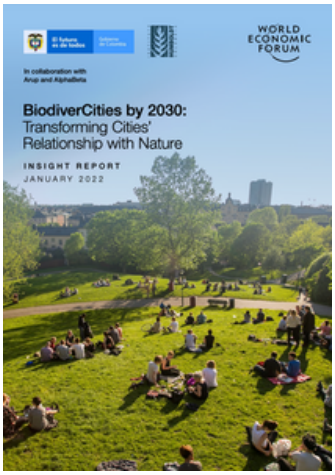
Revi, A., et al. (2022). The Summary for Urban Policymakers of the IPCC's Sixth Assessment Report. Indian Institute for Human Settlements.



NYC Climate Adaptation Scenarios for 2100

A report developed from a series of workshops organized by the USL with the New York City (NYC) Mayor's Office of Climate and Environmental Justice (MOCEJ) summarizing anticipatory discussions on future climate resilience and adaptation. Through a series of five 3-hour virtual workshops, diverse participants co-developed positive future visions for New York City of sustainability, resilience, and adaptation to climate change and extreme events.

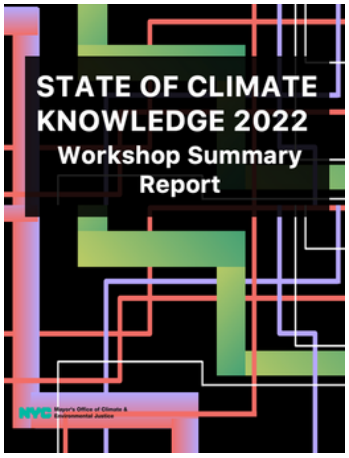
Cook, E., Ventrella, J., McPhearson, T., Parris, A., Tier, M., Muñoz-Erickson, T., Iwaniec, D., Mannetti, L., Green, C., & Tagtachian, D. (2022). NYC Climate Adaptation Scenarios for 2100: Exploring alternative, positive visions for a resilient future. Urban Systems Lab, The New School.



Biodivercities By 2030: Transforming Cities' Relationship With Nature

This report provides a vision for cities of the future and the needed systemic shifts to develop BiodiverCities that place nature at the heart of decision-making and infrastructure investments. Released by the World Economic Forum.

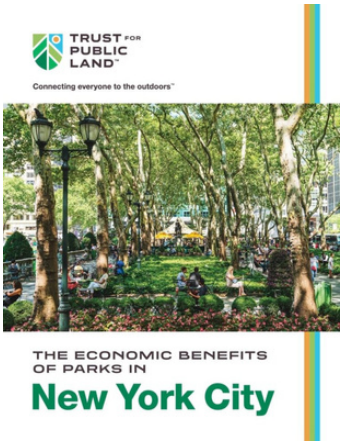
World Economic Forum, & Alexander von Humboldt Biological Resources Research Institute. (2022). BiodiverCities by 2030: Transforming cities' relationship with nature. https://www.weforum.org/reports/biodivercities-by-2030-transforming-cities-relationship-with-nature/



The State of Climate Knowledge 2022 Workshop Summary Report

This report provides a synopsis of the outcomes of the three-workshop series, which was designed to refine the CKE engagement process. Participants were asked to reflect on what was working and not working with climate knowledge exchange processes in NYC, develop principles and articulate key goals of the CKE, as well as identify potential strategies to achieve the goals and monitor their success.

City of New York. (2022). State of Climate Knowledge 2022: Workshop Summary Report. (Authors: Emilie Schnarr, Holly Bunker, Melissa O. Tier, Jennifer Ventrella.)



The Economic Benefits of Parks in NYC

This report details the true economic value of all NYC's outdoor green spaces. While previous studies have investigated the economic impact of individual parks, the Economic Benefits of Parks in New York City is the first benefit study of the city's entire integrated park system.

Clinton, J., Hwang, L., Egan, J., Hannon, M. Strickland, C., Abramson, M., Banner, R., Birnbaum, M., Charlop-Powers, S., Donoghue, S., Elam, E., Espinoza, A., Ganser, A., Gates, M., Kennedy, C., Koo, P., Lout, M., Lubov, H., Maxwell, E., McPhearson, T., Pregitzer, C., Roth, K., Sartori, K., Shepard, P., Smith, E., and Van Slooten, A. (2022). Economic Benefits of Parks in New York City. Trust for Public Land

Data Visualization Products

OCELLUS

OCELLUS is an interactive web application that visualizes social, ecological, and technological systems (SETS) data to improve understanding of urban systems and enhance decision making for more equitable and resilient cities. In 2022 we continued to update new data layers including 2 extreme and moderate stormwater flooding scenarios for New York City.

ocellus.urbansystemslab.com

OCELLUS XR

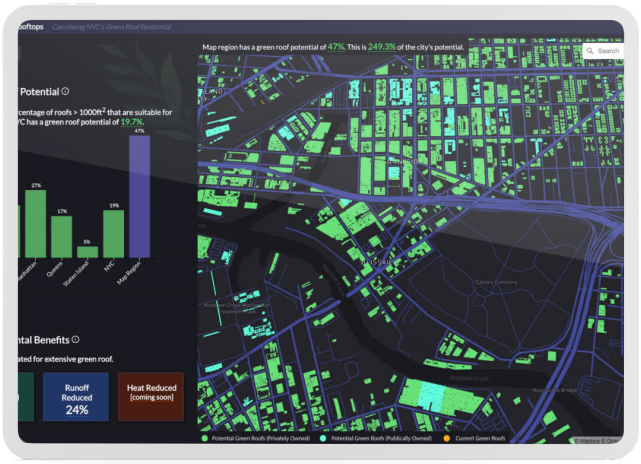
The OCELLUS XR app provides interactive geospatial maps and 3D visualizations of New York City to highlight hotspots for climate risks including critical elements of heat exposure, flood scenarios, buildings, trees and other key dimensions of the New York City urban environment. This year the team was awarded an Architecture League award to finalize a beta version of the app. Co-led by Daniel Sauter and Timon McPhearson with Joe Steele and Elena Peng

urbansystemslab.com/ocellusxr

Stormwater.nyc

Stormwater.nyc is a data visualization mapping platform that integrates publically available data on stormwater resiliency in NYC, with population demographics, land use/cover data layers, location of critical infrastructure and greenspaces, and the New York Panel on Climate Change's floodplain maps.

stormwater.nyc



Greening from the rooftops

A user interface for mapping the green roof potential of NYC developed by former USL research assistant Nour Zein. Green roofs are a proven solution to the urban consequences of climate change. Where are the current green roofs located, and how does the potential for green roofs look like in NYC? What ecological impacts would green roofs have?

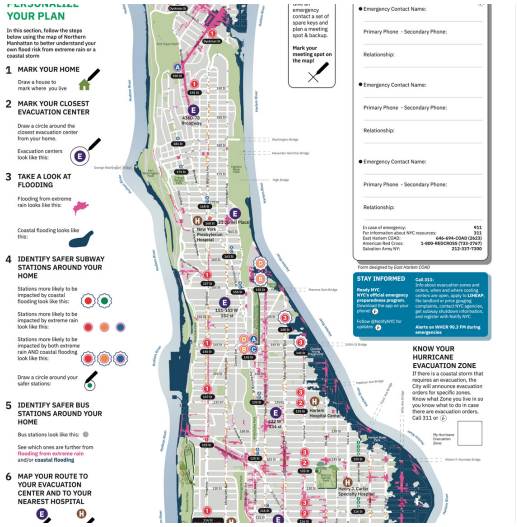
nourzein.me/views/green_roofs.html

Maps, Games and Print Materials

Ekos: The Path to Resilience

Ekos: The Path to Resilience is a multiplayer board game that challenges a group of six community members — a Mayor, City Planner, Community Organizer, Ecologist, Designer, and Modeler — to come together and envision a more equitable and sustainable Ekos in the face of climate change and other challenges.

urbansystemslab.com/ekos

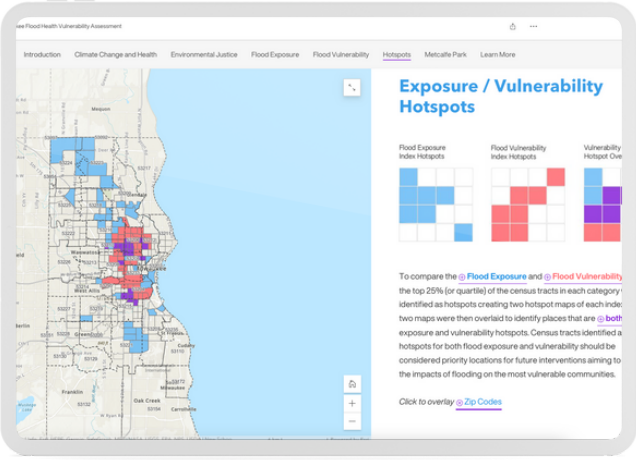


Climate Ready Uptown Plan

A guide to help Northern Manhattan community members understand their individual risk to climate related disasters – specifically extreme heat, coastal and stormwater (pulluvial) flooding – and provides pertinent information to help prepare themselves and their families. Designed by WE ACT for Environmental Justice in partnership with East Harlem COAD, Harlem Emergency Network.

urbansystemslab.com/project-index/crup

Web Resources and Story Maps



Milwaukee Flood Health Vulnerability Assessment

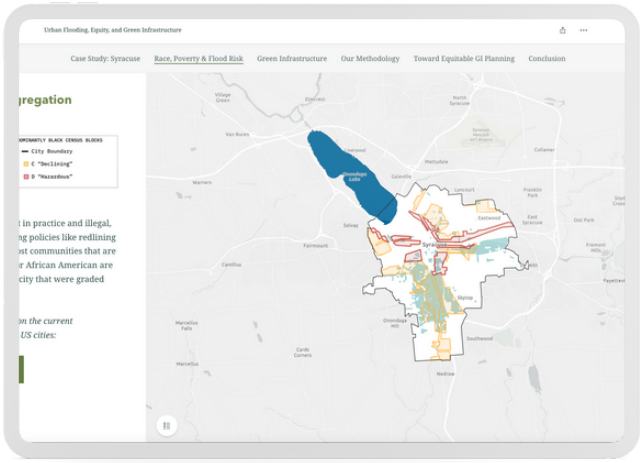
A storymap to accompany the Milwaukee Flood Health Vulnerability Assessment report. Co-developed by Lawrence Hoffman at Groundwork USA.

urbansystemslab.com/project-index/mfhva

Is Green Infrastructure A Universal Good?

A web resource that presents findings from an analysis of 122 green infrastructure plans from 20 US cities to reveal how urban planning has contributed to current landscapes of inequality, and what avenues exist to transform planning for equitable infrastructure. The website includes an in-depth look at each city studied, including green infrastructure history, a snapshot of key findings, maps, a GI equity score, and targeted recommendations for stakeholders.

giequity.org



Urban Flooding, Equity, and Green Infrastructure: Syracuse as Case Study

This storymap explores the ambitious GI program that Onondaga County has successfully implemented targeting the city's water quality problems related to the Combined Sewer Overflows (CSO) caused by its Combined Sewer System.

urbansystemslab.com/urbanfloodrisk

NEWS & PUBLIC ENGAGEMENT

December 2022

Urban Systems Lab at COP15 Climate Conference
Drs. Timon McPhearson and Loan Diep participated in the The 15th Conference of the Parties (COP15) to the United Nations Convention on Biological Diversity (CBD) in Montreal, December 2022. The meeting brought together governments from around the world to discuss new climate goals and develop an action plan for conserving biodiversity over the next decade. They presented at 7th Summit for Subnational Governments & Cities organized by ICLEI, and the UN-CBD CBO II session: “Cities and Biodiversity Outlook II Project: Building a pathway to integrating biodiversity into policy and practice in cities”.

November 2022

CRUP Project selected as winner of EPA’s “Let’s Talk About Heat Challenge”
WE ACT for Environmental Justice’s project the Climate Ready Uptown Plan (CRUP) was selected as a winner of the Environmental Protection Agency’s “Let’s Talk About Heat Challenge”. In partnership with East Harlem COAD and Harlem Emergency Network CRUP is a physical pamphlet that helps Northern Manhattan community members understand their individual risk to climate related disasters – specifically extreme heat, coastal and stormwater (pluvial) flooding. The Urban Systems Lab’s Claudia Tomateo and Pablo Herreros Cantis co-led the design of the map and pamphlet which aims to improve emergency preparedness planning in Northern Manhattan.

UN Climate Report: Summary for Urban Policymakers released at COP27
The Summary for Urban Policymakers (SUP) series provides an overview of the IPCC Assessment Report (AR6), which USL’s Timon McPhearson was a lead author on. This SUP report was released during COP27 in Egypt, providing targeted summaries of science on what the impacts from climate change, adaptation and vulnerability mean for cities and urban areas.

White House Roadmap for Nature-Based Solutions
USL's Timon McPhearson contributed to development of a White House Office of Science and Technology Policy report on nature-based solutions including a Roadmap for federal action including on Policy, Funding, Workforce Development, Research and Learning, and Leveraging Federal Assets.

October 2022

2022 Gulbenkian Prize for Humanity
The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) have been jointly awarded the 2022 Gulbenkian Prize for Humanity. This includes acknowledgment of the critical work IPCC authors at The New School such as Dr. Timon McPhearson and others have contributed through their work on the Sixth Assessment Report (AR6), “Climate Change 2022: Impacts, Adaptation and Vulnerability”. The award recognizes the important role scientists and practitioners play in addressing the climate crisis.

September 2022

Urban Systems Lab receives renewed support from Kresge Foundation’s CREWS program
The Urban Systems Lab received renewed support from the Kresge Foundation’s CREWS program to continue research on the environmental justice considerations related to urban flooding in US cities. Among many ongoing efforts, the team will be working with partners at Groundwork Milwaukee to launch the Milwaukee Flood Health Vulnerability Assessment.

The NYC Mayor’s Office of Climate and Environmental Justice selects interdisciplinary research team co-led by The New School’s Urban Systems Lab to study climate vulnerability, impact and adaptation In New York City
A team of interdisciplinary researchers, co-led by Professors Joel Towers and Dr. Timon McPhearson at The New School’s Tishman Environment and Design Center and Urban Systems Lab, was selected by the Mayor’s Office of Climate and Environmental Justice (MOCEJ), to carry out a $2.5M study on future climate change and its potential impacts to inform decision-making by the City of New York and assessment reports by the NYC Panel on Climate Change.

August 2022

Ocellus XR team receives 2022 Independent Projects Grant
Daniel Sauter, Claudia Tomateo and Joe Steele are recipients of a 2022 Independent Projects Grant from The Architectural League of New York and The New York State Council on the Arts. The funds will be used to support Sauter's development of Ocellus XR, an extended-reality mobile app which allows users to experience first-person 3D visualizations of climate risk, social vulnerability, and proposed green infrastructure plans in New York City. The app leverages design and data visualization to allow users to view climate hazards/solutions on a device as they walk through the city and project 3D maps onto physical surfaces.

July 2022

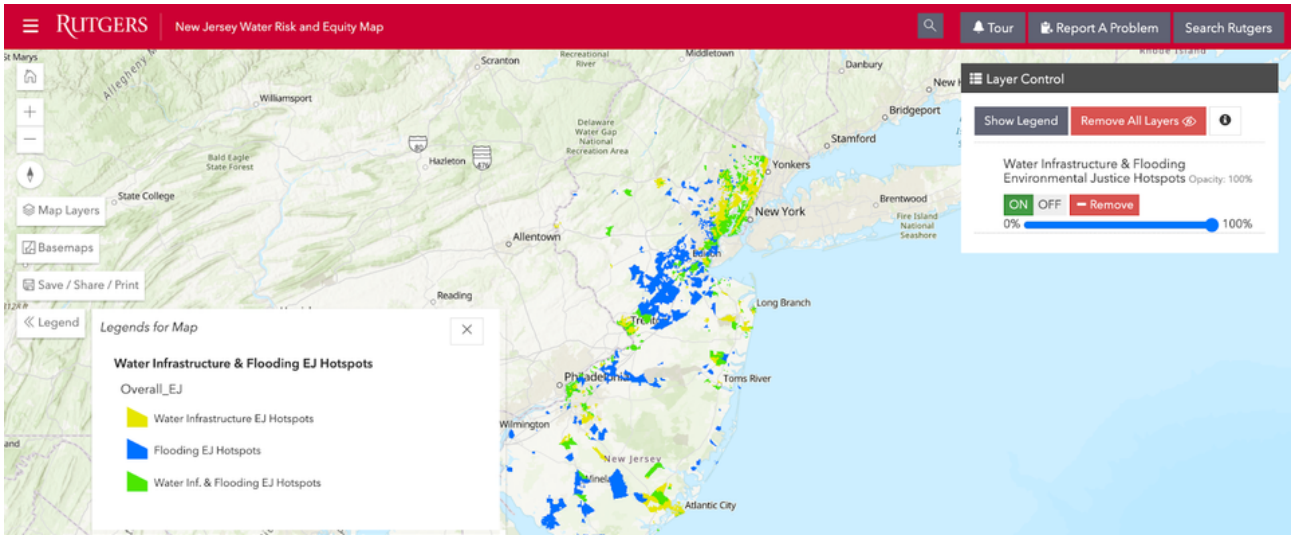
USL Team awarded grant from the Sloan Foundation to support Synthetic Infrastructure Modeling
The Urban Systems Lab received an award from the Sloan Foundation's Environment and Energy program to support synthetic infrastructure modeling. The goal is to develop coupled energy-water-transportation synthetic infrastructure models for New York, NY, Phoenix, AZ, and Atlanta, GA to simulate critical failure and failure cascades in energy infrastructure during extreme events to optimize solutions, and improve reliability and robustness. Synthetic infrastructure models bring together multiple data on infrastructure networks to fill energy distribution data gaps by simulating data. The project is led by the Urban Systems Lab (USL) at The New School in partnership with researchers at Arizona State University (ASU) and Georgia State University (GSU).

April 2022

USL Research Fellow received grant from NYS Water Resources Institute
Research Fellow Zbigniew Grabowski was awarded a grant from the New York State Water Resources Institute for the research project, Equitable Green Infrastructure Planning in NY: Assessing the state of knowledge and best practices to facilitate collaborative learning. This will support Dr. Grabowski's continued work with the USL and Cary Institute to advance understanding of how best to improve the equity of GI through policy and practice. The funding originates from the NYS DEC Hudson River Estuary Program and the NYS DEC Great Lakes Watershed Program.

March 2022

USL collaborators Jersey Water Works and New Jersey Future Win National Water Data Prize
Our colleagues at Jersey Water Works (JWW) and New Jersey Future (NJF) have been selected as winners of the Environmental Policy Innovation Center (EPIC)'s Water Data Prize in the Equity category for their development of the New Jersey Water Risk and Equity Map and Jersey WaterCheck. USL's Pablo Herreros Cantis served as an advisor on the project.

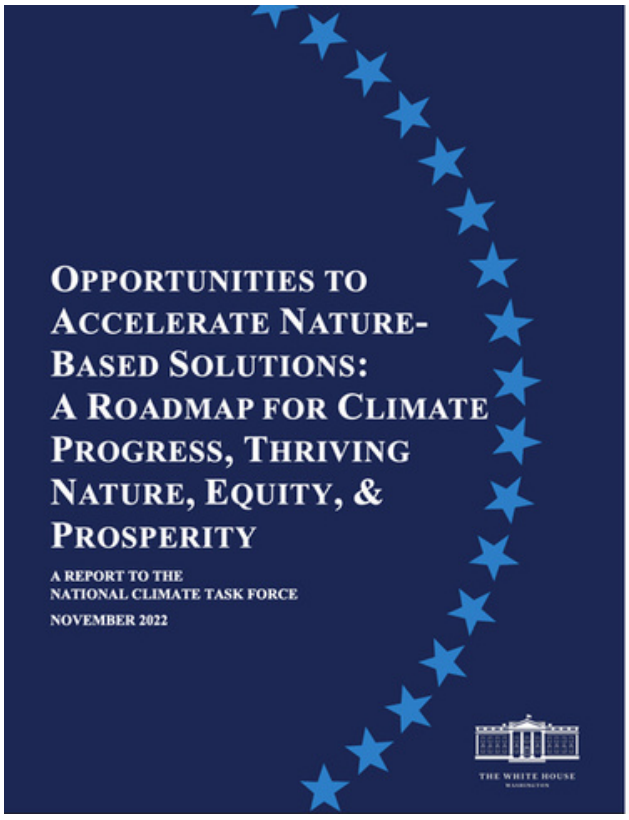


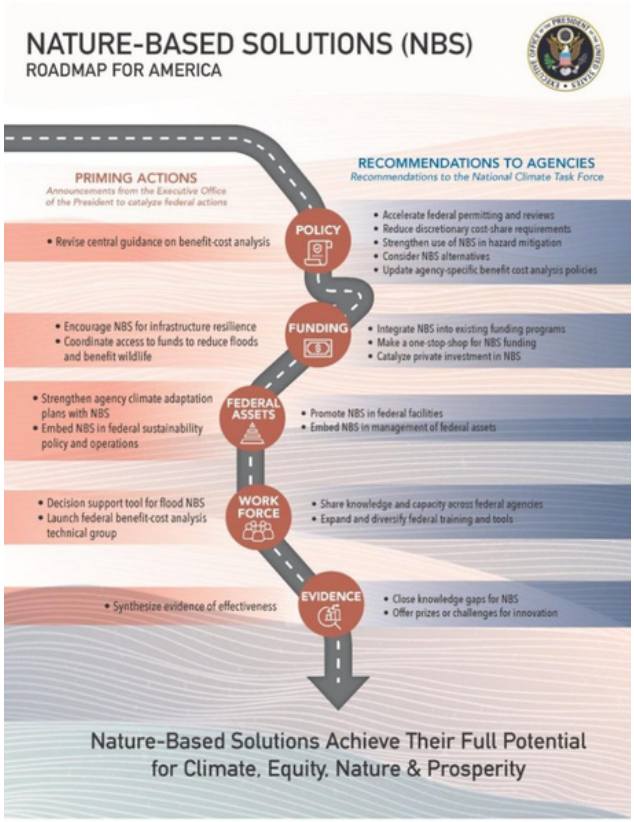
New Jersey Water Risk and Equity Map developed by Jersey Water Works, New Jersey Future (NJF) and Rutgers University with consultation from the Urban Systems Lab.

New Report on Economic Benefits of Parks in New York City
The Trust for Public Land has just released a new report on the Economic Benefits of Parks in New York City. The historic report quantifies benefits of the network of city, state, and federal parks in New York City (NYC). The report finds parks in NYC provide significant benefits to residents and the city as a whole, and that NYC's identity is intertwined with the park system, and the vitality of one affects the other. By offering a fuller picture of economic benefits, this report equips local decision-makers with quantifiable support to help fund, protect, create, and maintain the city's parks for the use of current and future residents and visitors. USL's Timon McPhearson served as a Lead Advisor on the study.

SMARTer Greener Cities Policy Brief Released
The first policy brief of the SMARTer Greener Cities was released. The research team proposes recommendations for urban planners and researchers based on our research on how technology and nature can promote multisensory experiences and psychological restoration in two residential areas in Helsinki, Finland.

Advancing US Federal Policy
In March 2022, PI McPhearson briefed the White House Office of Science and Technology Policy (OSTP) on the IPCC findings with respect to nature-based solutions. In follow-up meetings with OSTP, NATURA provided input to policy planning for US nature-based solutions investments leading to the Biden-Harris administration Executive Order issued on Earth Day 2022 to develop: 1) a report on nature-based solutions; 2) guidance on valuing nature; and 3) the first U.S. National Nature Assessment of the condition of nature within the United States. This is a breakthrough example of NATURA impact and also demonstrates that nature-based solutions are now becoming mainstreamed into US decision-making for climate action and social and environmental benefits.





The Biden-Harris Administration Nature-Based Solutions Roadmap, at COP27 in Egypt.

February 2022

Researchers at the Urban Systems Lab contributed to a historic report from the Intergovernmental Panel on Climate Change (IPCC)
Researchers at the Urban Systems Lab contributed to a historic report from the Intergovernmental Panel on Climate Change (IPCC) based on the contributions from Working Group II: "AR6 Climate Change 2022: Impacts, Adaptation and Vulnerability. The report features Chapter 6 on climate risks, adaptation, and vulnerability for urban areas, co-authored by Dr. Timon McPhearson, Director of the Urban Systems Lab and professor at The New School. This is one of the most significant analyses of human settlements and cities which will continue to be hotspots for climate impacts and risks, but also drivers of climate solutions. Members of the Lab (Zbigniew Grabowski, Pablo Herreros-Cantis, Christopher Kennedy, Ahmed Mustafa, Veronica Olivotto, Luis Ortiz, Jennifer Ventrella) also contributed to developing a synthesis table in Chapter 6, "Urban Climate Resilient Development".

AWS podcast explores green infrastructure and social justice
The USL's Pablo Herreros Cantis and Chris Kennedy are featured in a news post from the Amazon AWS team highlighting work supported by the Kresge Foundation's CREWS program to research the environmental injustice of urban flood risk in US cities. The post discusses Pablo and Kennedy's appearance on episode 47 of Amazon's Fix This podcast series. To listen and learn more click here.

January 2022

Toward a more inclusive definition of green infrastructure
A new nationwide analysis of 122 plans from 20 US cities, published in Frontiers in Ecology and the Environment, found that many plans fail to explicitly define green infrastructure. When they do, they tend to focus on stormwater management, favoring engineered facilities over parks and larger urban green spaces. The study is the first systematic review of the use and definition of the green infrastructure concept in US city plans.

"Green infrastructure is broadly understood to be a good thing, but many city plans lack a clear definition of what it actually is. Hydrological definitions dominate. This narrow view can limit project funding and cause cities to miss out on vital social and ecological services that more integrative green infrastructure can provide."

Dr. Zbigniew Grabowski
USL Visiting Scholar

Event: Building Equity into US Urban Green Infrastructure Planning
The USL and Cary Institute hosted a webinar exploring how cities can build equity into green infrastructure planning efforts. In this hour long webinar, explore results from an analysis Drs. Timon McPhearson and Zbigniew Grabowski will shared a synthesis of a study of over 120 green infrastructure plans in 20 US cities.

EVENTS & CONFERENCES

Decemember 2022

The Urban Systems Lab participated in the COP15 Climate Conference- December 7th-19th 2022- Montreal, Canada to develop new action plans for climate change. USL members Timon McPhearson and Post-Doc fellow Loan Diep. On December 10th, Dr. McPhearson, presented “BiodiverCities: Latin American cities at the Forefront of Biodiversity Conservation and Climate Action”, and on December 12th, he served on the “The transformative change we want to bring for GBF implementation” panel. Dr. McPhearson, and Dr. Diep also launched NATURA’s Global Roadmap for Urban Nature-Based Solutions on December 16th at the COP15 conference.

Convention on Biological Diversity

Dr. Loan Diep (left) and Dr. Timon McPhearson (right) from Urban Systems Lab, The New School at COP15

November 2022

COP27 SHARM EL-SHEIKH EGYPT 2022

USL's Timon McPhearson participated in the 2022 United Nations Climate Change Conference (COP27), November 6-20th 2022 in Sharm-El Sheik, Egypt. At the conference, the IPCC Summary for Urban Policymakers was released at COP27. This edition provides targeted summaries of science from the latest UN climate report on what the impacts from climate change, adaptation and vulnerability mean for #cities and urban areas. USL Director Timon McPhearson was a lead author on the IPCC Assessment report 6 (AR6), and contributor to the Summary for Policymakers.

October 2022

Members of the USL participated in Sandy +10 is a convening at Columbia University to reflect on the 10 years since Hurricane Sandy impacted hundreds of communities across the Northeast and beyond. Panel discussions with local leaders, policymakers, and activists, covering a range of topics including preparedness, emergency response, housing and infrastructure recovery, community resilience, long-term planning for climate change adaptation, and governance.

USL’s Timon McPhearson presented at the International Climate Symposium, “Science-Based Choices for Climate Action, Insights from the IPCC 6th Assessment Report” us an in-person and livestreamed symposium hosted by Dickinson College in Carlisle, PA, USA on October 24 – 26. USL’s Pablo Herreros Cantis participated in Deluge Data, Data Deluge (Oct. 26, Nov. 2 and Nov. 4, 2022) an online talk series and in-person symposium that brings critical perspectives from the humanities and arts into dialogue with engineering and data practitioners engaged in flood sensing.

April 2022

Members of the USL participated in the Nature Based Solutions for Urban Resilience in the Anthropocene (NATURA) All Hands Meeting in Malta 2022 (April 4-6th 2022). The event brought together a total of 48 participants representing 26 networks, including 21 early-career members, and enabled NATURA to consolidate current and future activities and solidify its mission.

February - March 2022

Association of Geographers 2022 Annual Meeting: The USL's Jennifer Ventrella and Timon McPhearson, along with colleagues Elizabeth M Cook (Barnard College), Adam Parris (New York City Mayor's Office of Climate Resilience), David Iwaniec and Lelani Mannetti (Georgia State University), Tischa Muñoz-Erickson, USDA Forest Service, International Institute of Tropical Forestry; Daniela Tagtachian, City University of New York; Melissa Tier (Princeton University) presented the paper "Future climate resilience and adaptation visions of New York City" at the Association of Geographers 2022 Annual Meeting as part of the paper session, "Critical geographic perspectives on climate-resilient pathways". Ventrella, Cook, Parris and McPhearson also presented the paper "Envisioning future climate resilience adaptation and mitigation strategies".

The USL's Bart Orr presented "Solar Futures: Imagination, Contestation, and Infrastructural (Dis)Connection in Puerto" during the session Civic Infrastructural Action. The USL's Pablo Herreros-Cantis, McPhearson, Claudia Tomateo and Chris Kennedy will join Oded Holzinger (Groundwork Hudson Valley) to present "Co-Developing Research To Adapt Underserved Communities To Urban Flooding With An Environmental Justice Len" during the session "Community Engagement in Hazard Preparedness & Response Across Differing Methodologies".

January 2022

USL's Timon McPhearson, Z. Grabowski with Steward Pickett from the Cary Institute of Ecosystem Studies organized a webinar, "Building Equity into US Urban Green Infrastructure Planning". The webinar discusses how to plan and design integrative, equitable, and just green infrastructure systems, using recommendations and resources from a research study analyzing over 120 official green infrastructure city plans in 20 US cities.

PRESS

December 28, 2022
Interactive map pinpoints Milwaukee areas most at risk for flooding, related health risks - **Milwaukee Journal Sentinel**

December 1, 2022
To Be Equitable, US Urban Green Infrastructure Planning Must Transform - **Cary Institute**

November 8, 2022
Biden-Harris Administration Announces Roadmap for Nature-Based Solutions to Fight Climate Change, Strengthen Communities, and Support Local Economies - **White House**

November 7, 2022
A New York City neighborhood has scored a legal victory in its decade-long fight to protect a community garden - **CNN**

November 3, 2022
Baseline Analysis of Green Roof Distribution in New York City Published in Peer-Reviewed Journal, Ecology & Society - **The Nature Conservancy of New York**

October 27, 2022
New School Professor Timon McPhearson Part of Two Research Teams Honored with the 2022 Gulbenkian Prize for Humanity

October 26, 2022
Readout: OSTP, CEQ, and CPO Host Roundtables on Nature-based Solutions - **The White House Office of Science and Technology Policy**

September 19, 2022
Trapped: Yonkers residents seek refuge from dangerous urban heat islands - **Lohud**

September 8, 2022
The NYC Mayor's Office of Climate and Environmental Justice selects interdisciplinary research team co-led by The New School's Urban Systems Lab to study climate vulnerability, impact and adaptation in New York City - **NYC Mayor's Office of Climate and Environmental Justice**

August 10, 2022
Daniel Sauter, Claudia Tomateo and Joe Steele receives 2022 Independent Projects Grant - **The Architecture League of New York**

July 19, 2022
We've Surrendered the Subway to the Flood - **Curbed & New York Magazine**

June 30, 2022
Award-Winning Map Shows Water-Related Environmental Justice Issues in New Jersey - **New Jersey Future Blog**

June 22, 2022
Can Cities Survive Excess Heath? - **Forbes**

June 18, 2022
Black People Are More Likely To Die From Heat Stress Than White People In New York City, Report Says - **The Seattle Medium**

May 3, 2022
Shoring up Coastlines and Communities with Green Infrastructure - **Grist**

April 5, 2022
A Place for Fearless Progress featuring interviews with USL's Timon McPhearson - **The New School**

March 16, 2022
How Green Spaces Protect City Residents From Climate Change - **LX/NBC**

February 22, 2022
Environmental justice and green infrastructure solutions with Urban Systems Lab - **Amazon's Fix This! Podcast**

January 14, 2022
Researchers Propose New Definition For 'Green Infrastructure' - **Water Environment Federation**

January 6, 2022
Toward a more inclusive definition of green infrastructure - **The Partnership for Water Sustainability**

SUPPORT

The Urban Systems Lab receives generous support from The New School, The Kresge Foundation, The Cary Institute of Ecosystem Studies, The U.S. National Science Foundation, Sloan Foundation, The City of New York, WE ACT for Environmental Justice, New York State DEC/WRI Cornell, NY State Hudson River Estuary Program/Groundwork Hudson Valley, JPB Foundation and Zolberg Institute.

National Science Foundation
WHERE DISCOVERIES BEGIN

THE KRESGE FOUNDATION

NYC DCAS
Citywide Administrative Services

NEW YORK STATE Department of Environmental Conservation

NYC Mayor's Office of Climate & Environmental Justice

NEW YORK STATE WATER RESOURCES INSTITUTE
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