MONTCLAIR STATE UNIVERSITY

Advancing Municipal Resilience through University Partnerships

NJ Coastal and Climate Resilience Conference March 9, 2026

Amy Tuininga, PhD; Josh Galster, PhD; Yang Deng, PhD; Alex Moore, PhD; Matthew Murray; Gen Hinson, PhD

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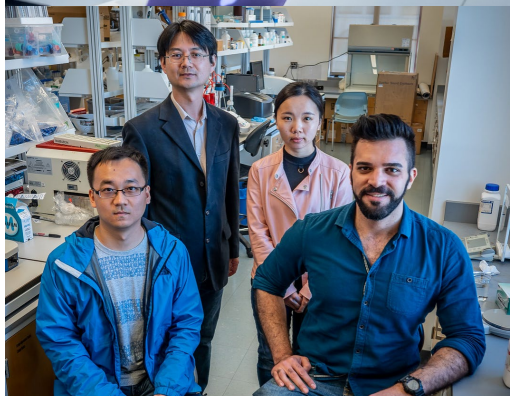
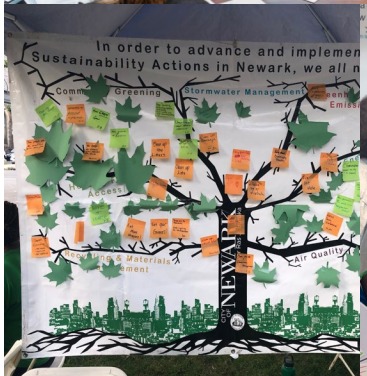
Faculty Expertise



Student Research

Community Engagement



Faculty Expertise and Student Research Addressing Community Needs

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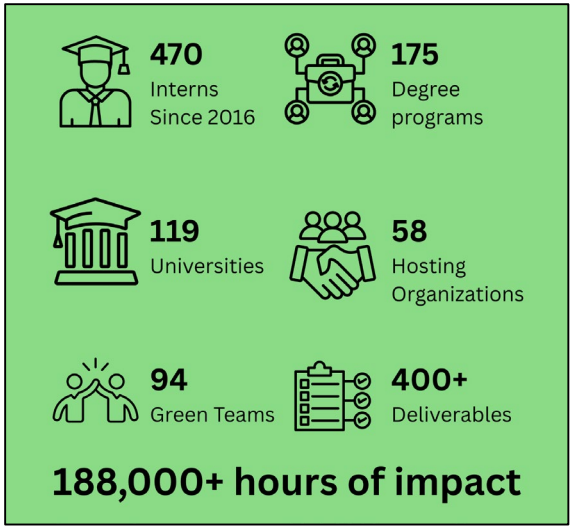
PSEG Institute
FOR SUSTAINABILITY STUDIES
GREEN TEAMS PROGRAM



Green Teams Program Objectives

- **Student teams work with municipalities,** companies, and nonprofits on defined sustainability challenges
- Each team contains a **diverse set of majors and experiences** aimed to tackle **complex environmental problems**
- Students receive **expert instruction** in sustainability topics, technical tools, teamwork, and communication
- The Program creates **pathways to internships, jobs, and further education** in sustainability fields

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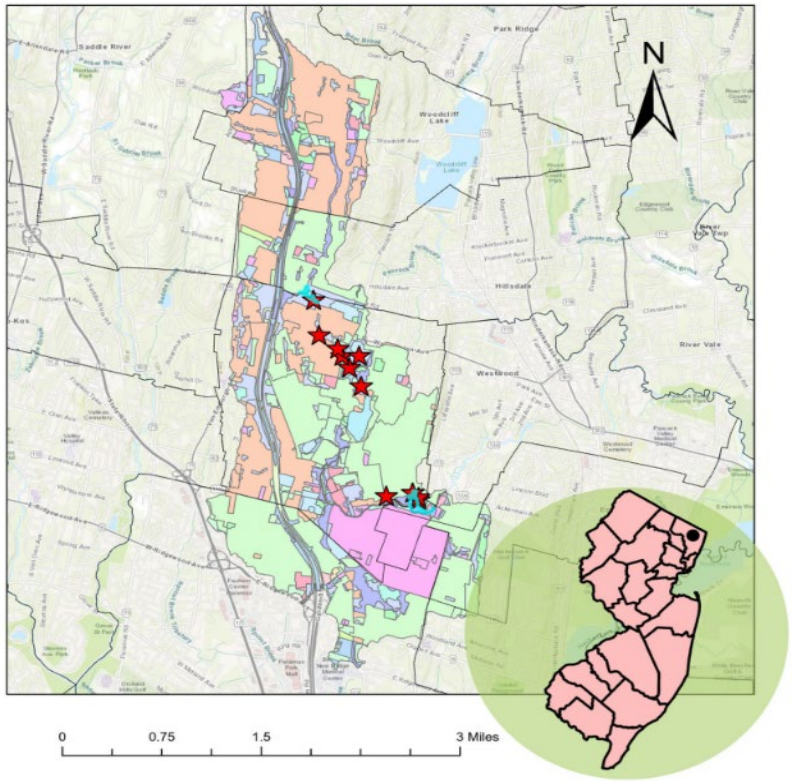
Municipal Partnerships - Washington Township, Bergen County

Flood Sites and Land Use



State of New Jersey, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, EPA, USDA

Legend

- FloodSites
- NJ Municipalities 3857

SherryF_LU

LABEL12

- AGRICULTURAL WETLANDS (MODIFIED)
- ALTERED LANDS
- ARTIFICIAL LAKES
- ATHLETIC FIELDS (SCHOOLS)
- BRIDGE OVER WATER
- CEMETERY
- CEMETERY ON WETLAND
- COMMERCIAL/ SERVICES
- CONIFEROUS BRUSH/ SHRUBLAND
- CONIFEROUS FOREST (10-50% CROWN CLOSURE)
- CONIFEROUS FOREST (>50% CROWN CLOSURE)
- CONIFEROUS WOODED WETLANDS
- CROPLAND AND PASTURELAND
- DECIDUOUS BRUSH/ SHRUBLAND
- DECIDUOUS FOREST (10-50% CROWN CLOSURE)
- DECIDUOUS FOREST (>50% CROWN CLOSURE)
- DECIDUOUS SCRUB/ SHRUB WETLANDS
- DECIDUOUS WOODED WETLANDS
- DISTURBED WETLANDS (MODIFIED)
- EXPOSED FLATS
- HERBACEOUS WETLANDS
- INDUSTRIAL
- INDUSTRIAL AND COMMERCIAL COMPLEXES
- MAJOR ROADWAY
- MANAGED WETLAND IN BUILT-UP MAINTAINED REC AREA
- MANAGED WETLAND IN MAINTAINED LAWN GREENSPACE
- MILITARY INSTALLATIONS
- MIXED DECIDUOUS/ CONIFEROUS BRUSH/ SHRUBLAND
- MIXED FOREST (>50% CONIFEROUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% CONIFEROUS WITH >50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH 10-50% CROWN CLOSURE)
- MIXED FOREST (>50% DECIDUOUS WITH >50% CROWN CLOSURE)
- MIXED SCRUB/SHRUB WETLANDS (DECIDUOUS DOM.)
- MIXED TRANSPORTATION CORRIDOR OVERLAP AREA
- MIXED URBAN OR BUILT-UP LAND
- MIXED WOODED WETLANDS (CONIFEROUS DOM.)
- MIXED WOODED WETLANDS (DECIDUOUS DOM.)
- NATURAL LAKES
- OLD FIELD (< 25% BRUSH COVERED)
- ORCHARDS/ VINEYARDS/ NURSERIES/ HORTICULTURAL AREAS
- OTHER AGRICULTURE
- OTHER URBAN OR BUILT-UP LAND
- PHRAGMITES DOMINATE COASTAL WETLANDS
- PHRAGMITES DOMINATE INTERIOR WETLANDS
- PLANTATION
- RAILROADS
- RECREATIONAL LAND
- RESIDENTIAL, HIGH DENSITY OR MULTIPLE DWELLING
- RESIDENTIAL, RURAL, SINGLE UNIT
- RESIDENTIAL, SINGLE UNIT, LOW DENSITY
- RESIDENTIAL, SINGLE UNIT, MEDIUM DENSITY
- STORMWATER BASIN
- STREAMS AND CANALS
- TIDAL MUD FLAT
- TIDAL RIVERS, INLAND BAYS, AND OTHER TIDAL WATERS
- TRANSITIONAL AREAS
- TRANSPORTATION/ COMMUNICATION/ UTILITIES
- UNVEGETATED FLATS
- UPLAND RIGHTS-OF-WAY DEVELOPED
- UPLAND RIGHTS-OF-WAY UNDEVELOPED
- WETLAND RIGHTS-OF-WAY
- <all other values>

TOWNSHIP OF WASHINGTON

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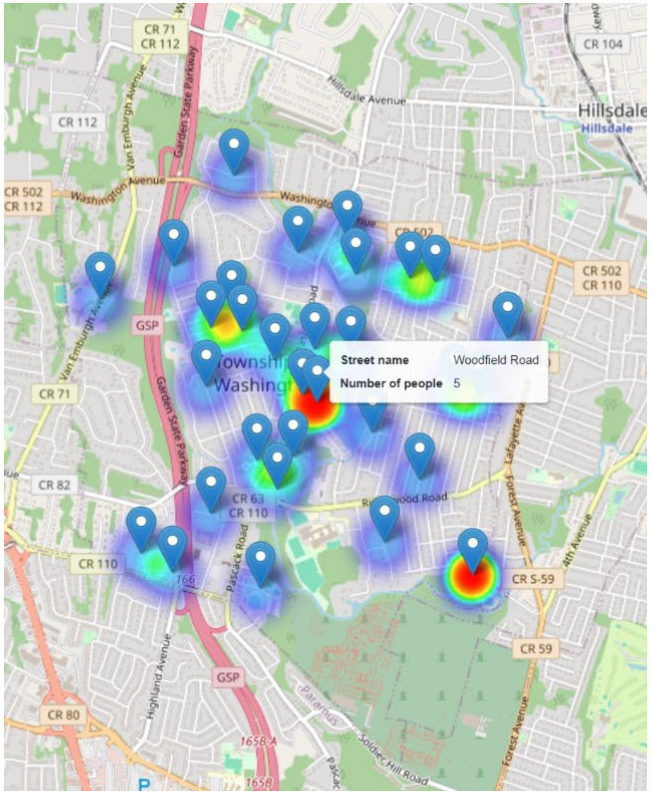
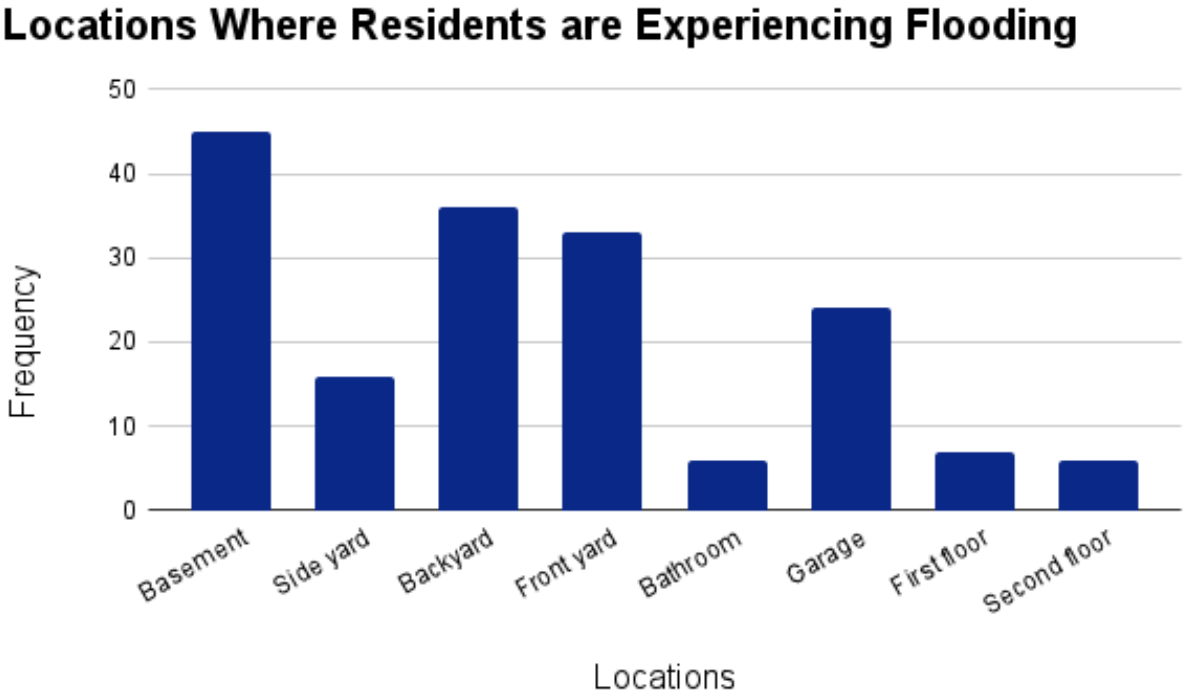
SURVEY RESULTS





TOWNSHIP OF WASHINGTON

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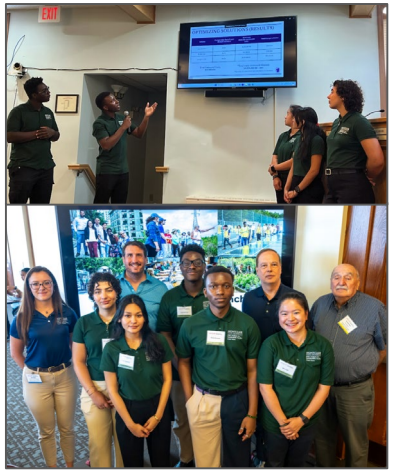
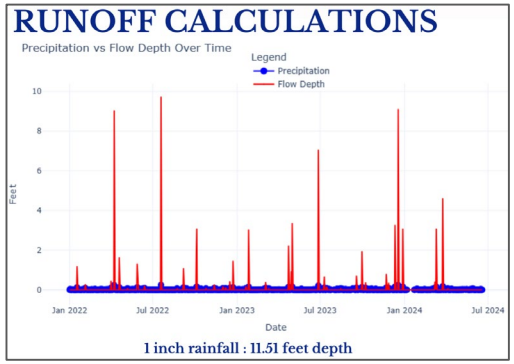
Municipal Partnerships - **Washington Township** , Bergen County





OPTIMIZING SOLUTIONS (RESULTS)

Solution	Cost per cubic foot of water drained/contained	Maximum drainable/containable water	Total Cost per Solution
Adopt-a-Drain	$0.01	20,365,235 ft3	$203,652
Buffer Zone	$0.73	302,587 ft3	$220,889
Love Your Lawn	$9.50	9,627,490 ft3	$91,461,154

- Conducted hydrological assessments and field surveys to identify flood-prone areas in Washington Township
- Engaged residents through surveys and focus groups to understand localized flooding, especially along riverbanks
- Collected data and created maps, including flood priority zones and a flood susceptibility map using ArcGIS Pro
- Assessed flood risks in vulnerable areas and outlined initial flood mitigation strategies
- Developed educational materials to raise community awareness and support flood risk reduction actions

TOWNSHIP OF WASHINGTON

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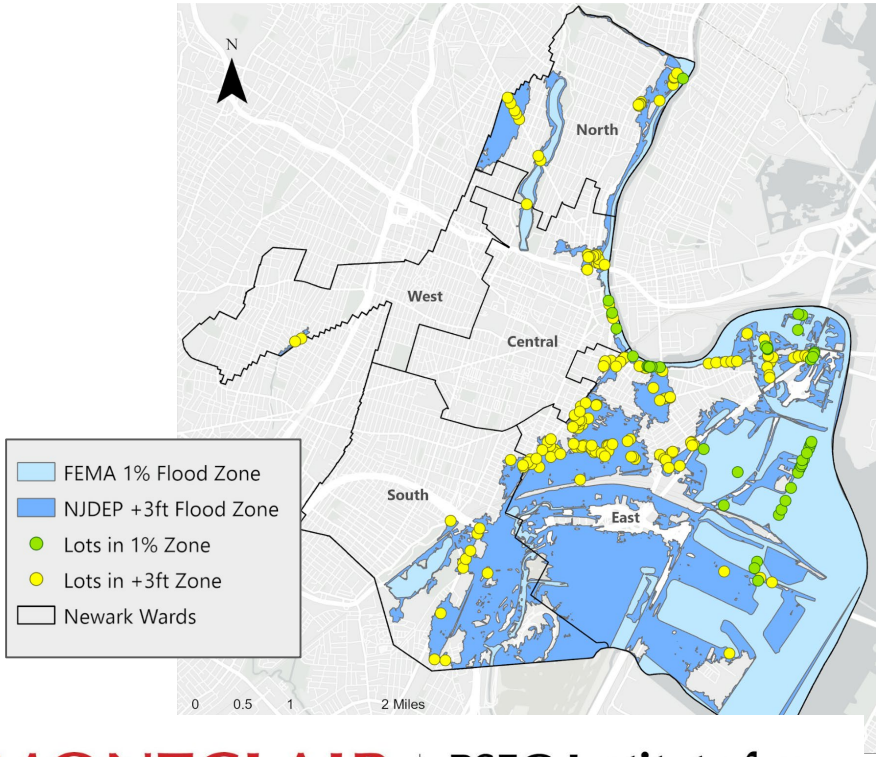
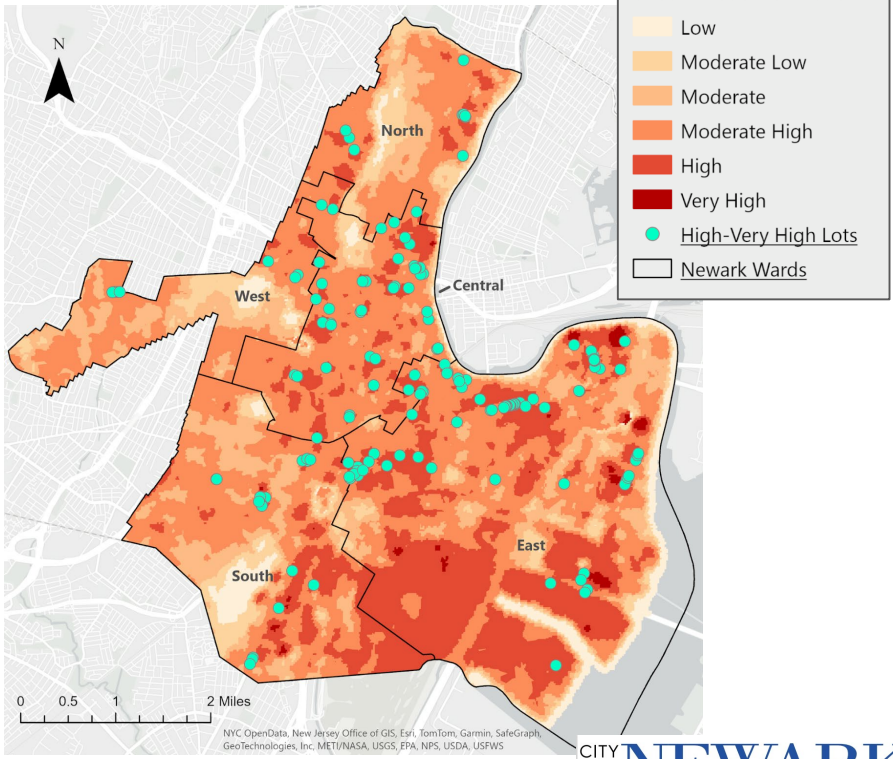
Municipal Partnerships - City of Newark, Essex County

FLOOD RISK



EXTREME HEAT RISK



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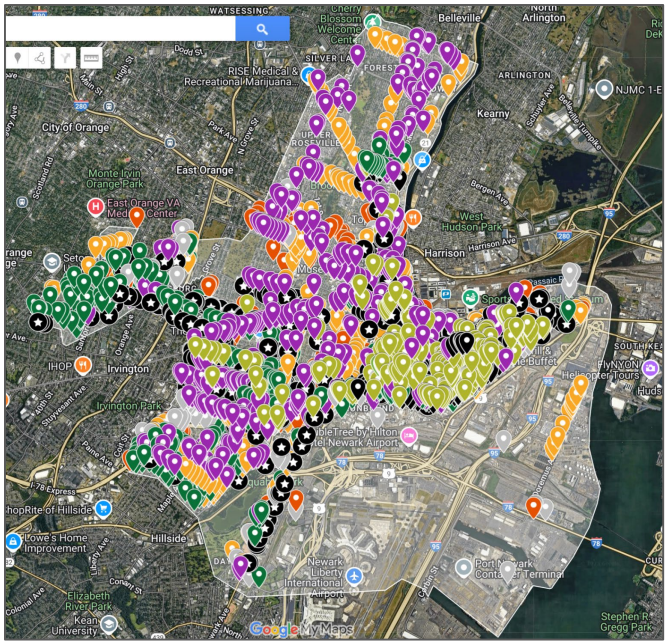
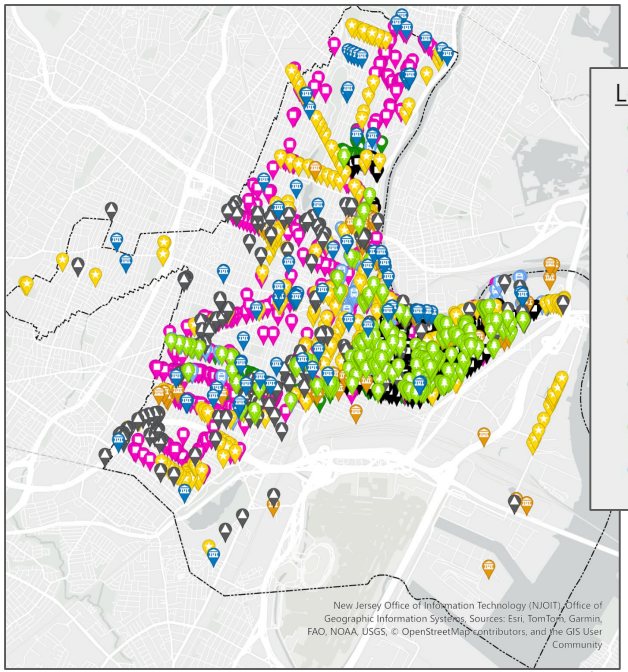
CITY OF NEWARK
Mayor Ras J. Baraka
OFFICE OF SUSTAINABILITY

Municipal Partnerships - City of Newark, Essex County

GREEN INFRASTRUCTURE - MAPPING LOTS





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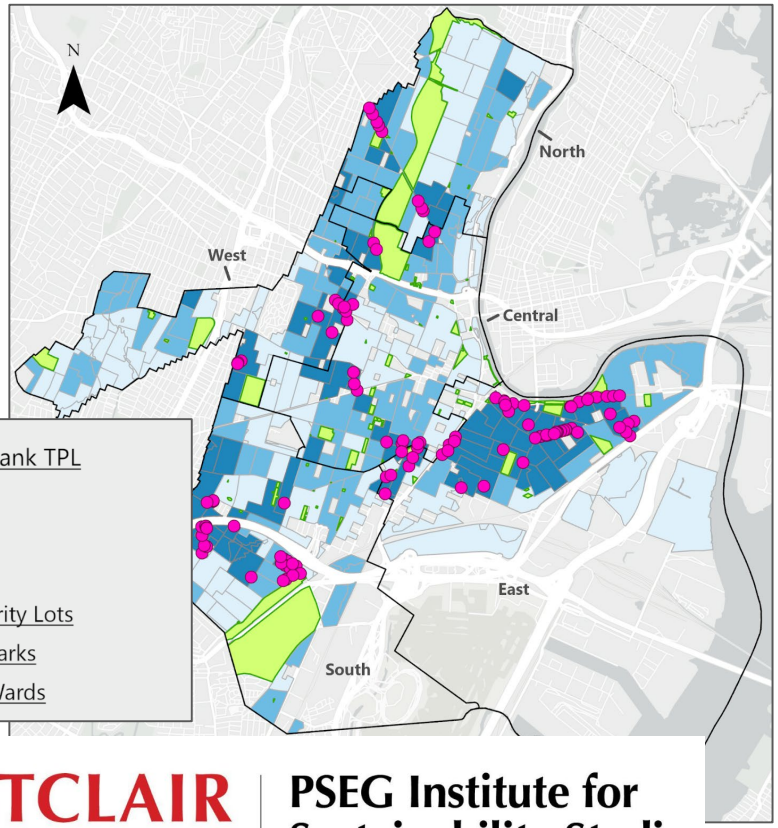
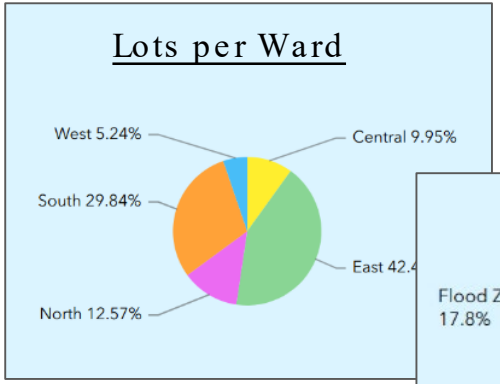
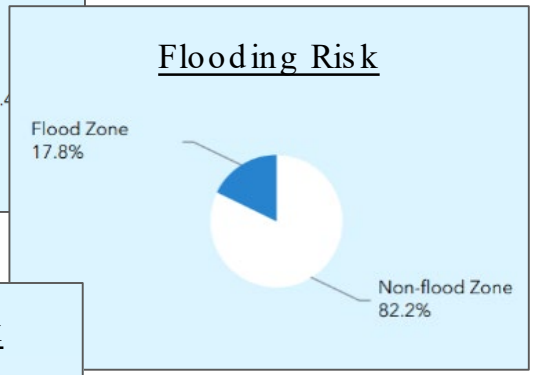
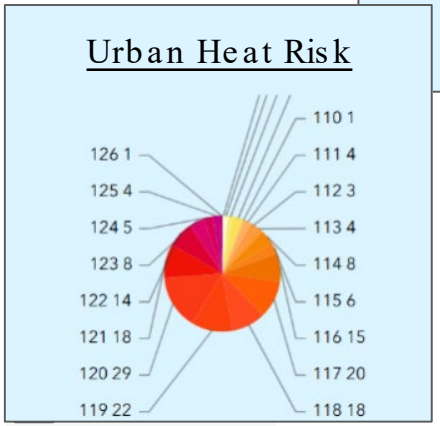
Municipal Partnerships - City of Newark, Essex County

PARK PRIORITY RANKING









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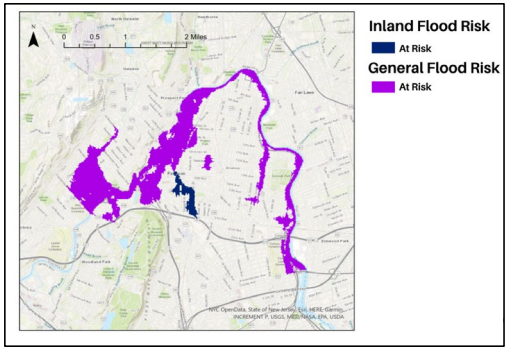
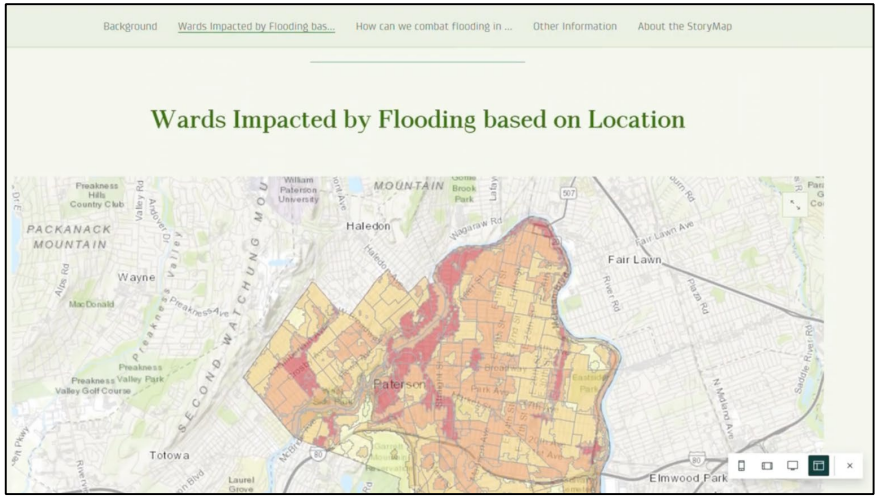
CITY OF NEWARK
Mayor Ras J. Baraka
OFFICE OF SUSTAINABILITY

Municipal Partnerships - **City of Paterson** , Passaic County

INLAND FLOOD RISK





- Advanced flood resilience, stormwater management, and climate adaptation for an EJ community of 160k+ residents.
- Used GIS, rainfall data, and a decision matrix to identify high-need locations for green infrastructure.
- Completed an impact assessment for a half-acre pilot (soil amendments, species selection, microforest benefits).
- Created an interactive ArcGIS StoryMap to engage community members and hosted a public event to elevate resident voices.
- Showcased how nature-based solutions reduce runoff, conserve water, and lower long-term costs.

The Nature Conservancy

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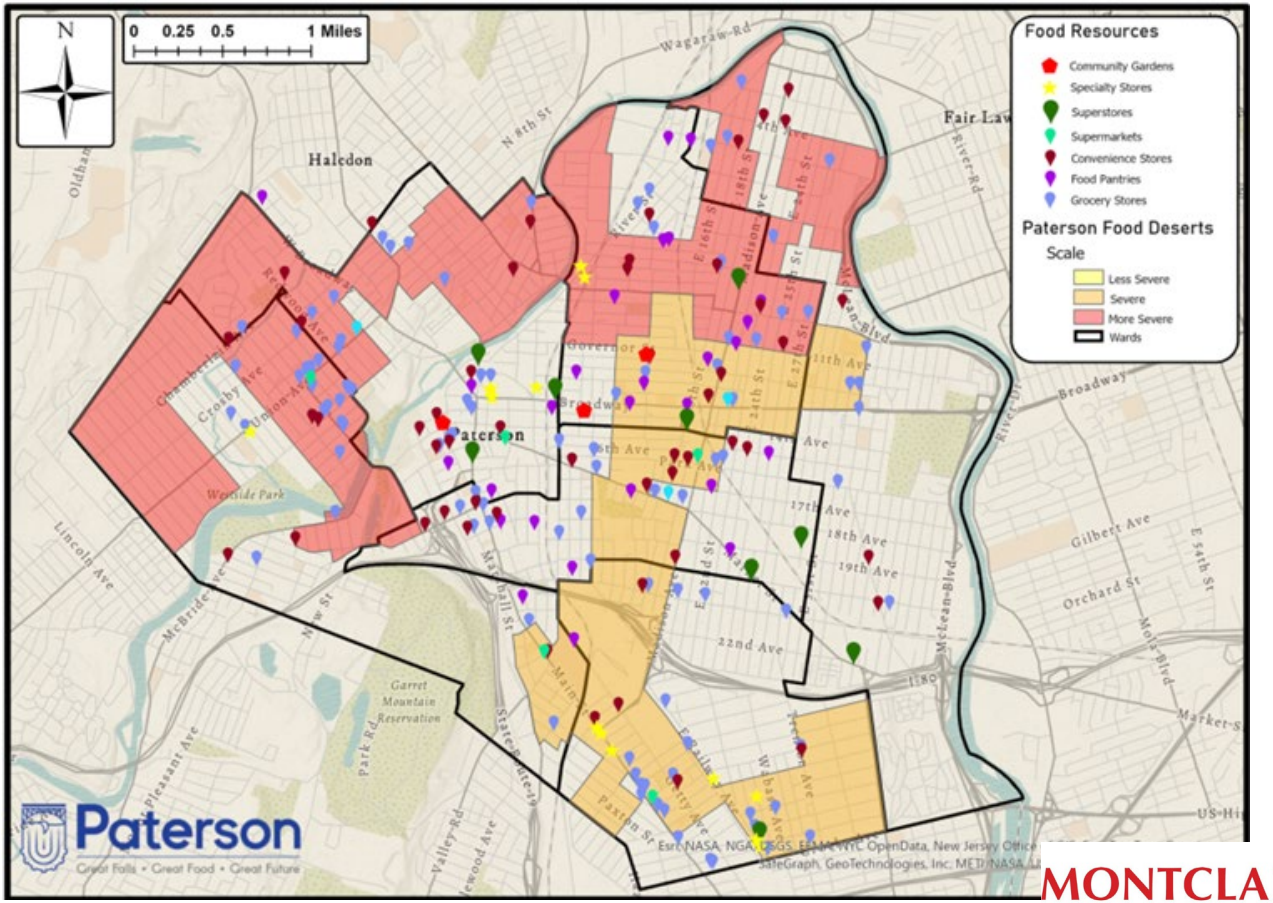
Municipal Partnerships - **City of Paterson**, Passaic County



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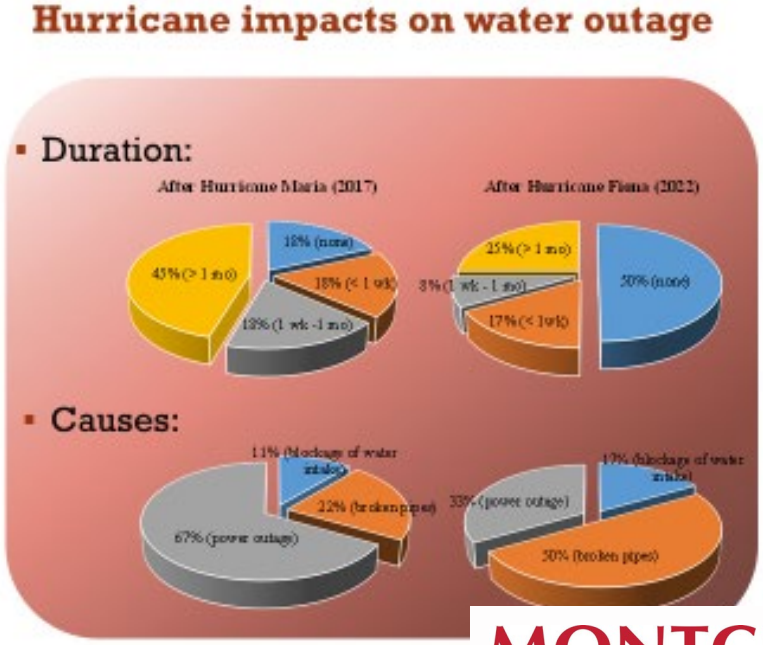
Faculty and Student Coastal Resilience Research:

Resilience of Water Supply Infrastructure

- Puerto Rico Following Hurricanes Maria and Fiona



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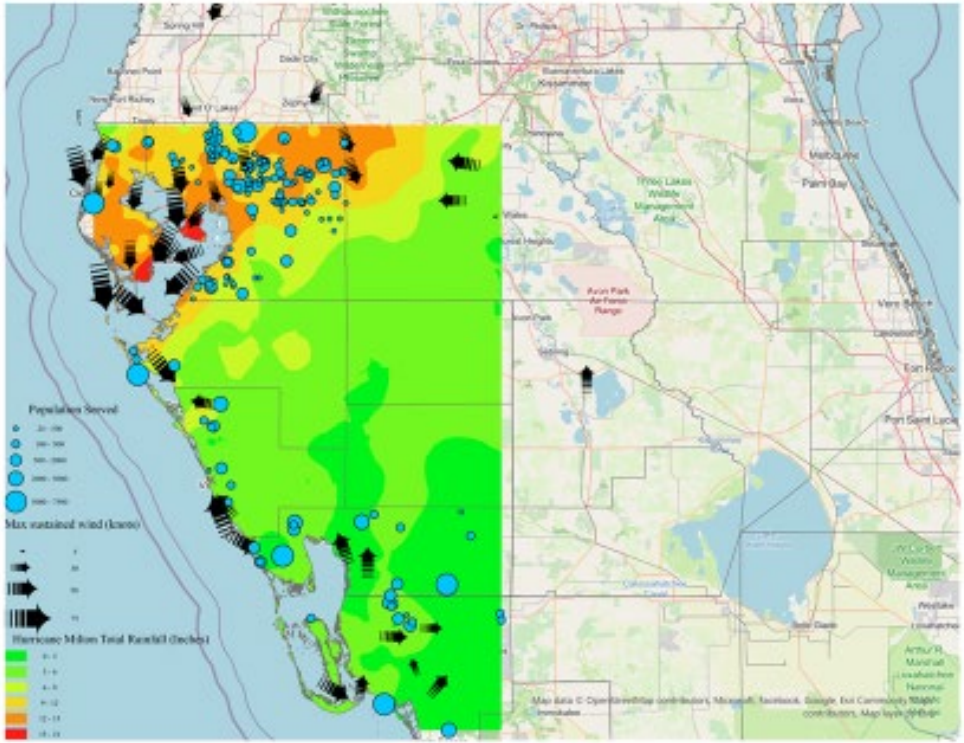
Faculty and Student Coastal Resilience Research:

Resilience of Water Supply Infrastructure

- Florida's Six Counties Following Hurricane Milion



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Faculty and Student Coastal Resilience Research:

- Representative Publications in Premier Journals

nature sustainability

Comment

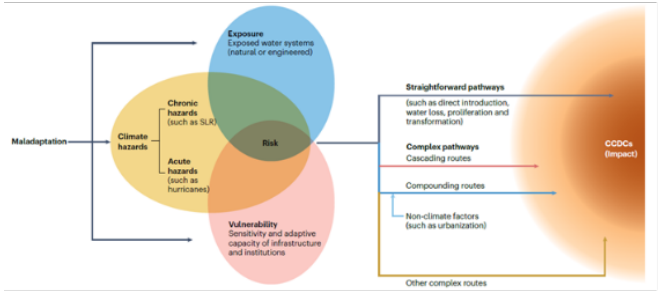
https://doi.org/10.1038/s41893-025-01747-x

Climate change-driven contaminants in water

Zepei Tang & Yang Deng

Climate change creates multiple pathways of water contamination. Here we call for defining climate change-driven contaminants as a distinct class and explore their implications.

sequence of climate change-amplified atmospheric rivers from late December 2022 until mid-January 2023 in the USA[1]. On atoll islands with populations exceeding half a million people globally, SLR combined with wave-driven overwash is projected to salinize freshwater lenses by mid-century, leading to widespread community displacement[3]. Likewise, a warming climate is strongly linked to outbreaks of harmful



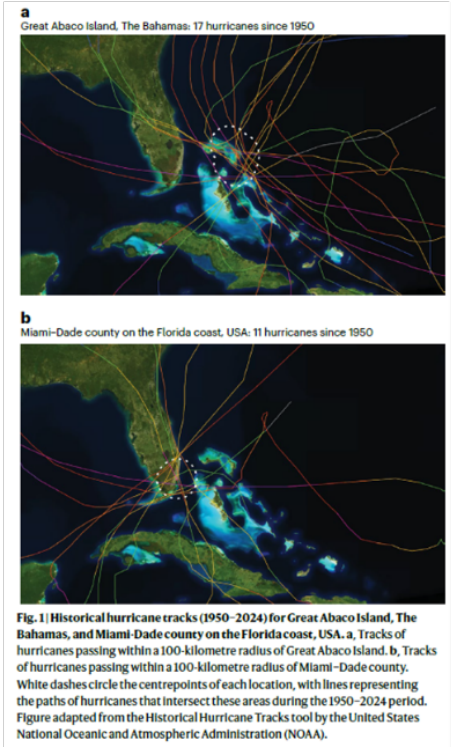


Fig. 1 | Historical hurricane tracks (1950–2024) for Great Abaco Island, The Bahamas, and Miami-Dade county on the Florida coast, USA. a, Tracks of hurricanes passing within a 100-kilometre radius of Great Abaco Island. **b**, Tracks of hurricanes passing within a 100-kilometre radius of Miami–Dade county. White dashes circle the centrepoints of each location, with lines representing the paths of hurricanes that intersect these areas during the 1950–2024 period. Figure adapted from the Historical Hurricane Tracks tool by the United States National Oceanic and Atmospheric Administration (NOAA).

Comment

nature water

https://doi.org/10.1038/s44221-025-00515-7

Small islands as laboratories and testbeds for resilient water supply

Yang Deng, Zepei Tang, Lisitai Yang, Qiufeng Lin & Walter Francisco Silva-Araya

Small islands provide early warning signals of climate- and disaster-driven impacts, while serving as real-world testbeds in which to develop adaptation strategies for continental water-supply infrastructure. This island-based approach could also be applicable to other critical infrastructure sectors on the mainland.

conventional thinking by reframing small islands not only as at-risk environments, but also as proactive proving grounds, where challenges can be identified, solutions can be tested, and insights can be gained to inform broader continental implementation. This Comment focuses on water-supply systems, but this island-based approach can also be applied to other water-related systems and other critical infrastructure sectors on the mainland.

As natural laboratories for early warning

Island laboratories provide early, frequent and pronounced evidence of climate impacts on water supply, often before similar challenges

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Career Services: Developing Talent to Support NJ Coastal and Climate Resilience

Employer Partnerships

Leverage employer relationships to support experiential learning and municipal projects.

Student Career Readiness

Prepare students with analytical, problem-solving, scientific literacy, and communication skills.

Supporting NJ Municipal Workforce Pipelines

Align student talent with municipal resilience and workforce needs in New Jersey.

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College of Science and Mathematics, Office of Career Services
csamcareers@montclair.edu | 973-655-7793

Thank you!

MONTCLAIR STATE UNIVERSITY | College of Science and Mathematics

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Northern New Jersey Community Foundation

Constellation

NASA

Hackensack Meridian *Health*

PSEG

New Jersey Resources

USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

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Thank you!

Let us hear about your needs to support municipal resilience.

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