

# Consortium for Climate Risk in the Urban Northeast



## YEAR IN REVIEW



## KEY ACCOMPLISHMENTS

In 2025, one of CCRUN's key accomplishments was the publication of findings from a study on small business resilience strategies (Cann et al., 2025). The study identified strategies used by small businesses in coastal New York City and New Jersey to cope with and prepare for economic and weather-related disruptions to their operations. Small businesses serve critical functions in disaster recovery, providing essential goods and services, employment, and gathering spaces during times of crisis. Many small businesses face escalating threats to their continued operation, however, as they confront compounding economic and extreme weather-related disasters, especially those businesses located in coastal areas.

This study examines how small businesses in the region experience compound disasters, how they cope with and prepare for disruptions, and the barriers they encounter in building resilience. The findings suggest that small businesses in the region are responding to recent compound disasters, associated economic challenges, and extreme-weather shocks through four key approaches: implementing flexible and varied business operations; fostering networks with other local businesses and residents; adopting new, web-based technology; and emphasizing entrepreneurial spirit and independent coping strategies.



# CCRUN

CONSORTIUM FOR CLIMATE RISK  
IN THE URBAN NORTHEAST

A NOAA CAP/RISA TEAM

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[ccrun.climate.columbia.edu](http://ccrun.climate.columbia.edu)



## **NUEVA ESPERANZA**

In partnership with Nueva Esperanza, a local faith-based nonprofit organization, CCRUN began supporting the development of a Climate Resilience Plan for the Hunting Park neighborhood of North Philadelphia. The goal is to help the community respond to increasing risks from extreme heat and heavy rainfall flooding.



## **THE POST EXTREME EVENT LEARNING TOOLKIT**

The Post Extreme Event Learning Toolkit (PELT) was applied within a New York Mid-Hudson Valley town to help understand comprehensively what happened during a July 2023 extreme flooding event. The application of the tool provided brought together key individuals to discuss which adaptation strategies would be most beneficial for the town in terms of reducing vulnerabilities and enhancing economic sustainability.

## **NEW FOCUS AND PARTNERSHIPS**

### **WHITE CLAY CREEK**

This past year, CCRUN's Engineering and Urban Design team initiated a new partnership with stakeholders in the White Clay Creek watershed, including the White Clay Watershed Association, the Chester County Water Resources Authority, and water researchers at the University of Delaware. Spanning 107 square miles across Chester County, Pennsylvania, and New Castle County, Delaware, this watershed faces growing flood risks due to increased development in floodplains and more frequent extreme precipitation events.

In response, CCRUN is supporting efforts to conduct a comprehensive flood study that evaluates the capacity of existing FEMA floodplain designations, infrastructure vulnerabilities, and projections. This work will also explore the potential of green stormwater infrastructure (GSI) and improved land use policies to build long-term resilience. By integrating heat mitigation, flood risk reduction, and community benefits into a cost-benefit analysis, the team aims to support more informed decision-making for watershed and municipal planning.

CCRUN's engagement has increased partners' flexibility to pursue state and federal resilience funding and to explore land use and green infrastructure strategies, laying a foundation for coordinated, cross-jurisdictional climate planning with long-term economic and ecological co-benefits.

### **ELIZABETH, NEW JERSEY, AND YONKERS, NEW YORK**

The Building Local Capacity team has launched a research program with local partners in Yonkers, New York, and Elizabeth, New Jersey, to better understand the impacts of extreme rainfall on residential and commercial communities in both cities. With support from CCRUN's Social Science team, the Building Local Capacity team has developed a survey and targeted focus group instruments to source household and business-level impacts of extreme rainfall—including economic impacts, infrastructure deficiencies, and public health concerns—enhancing data assets relating to extreme rainfall impacts in the region.

The study was launched in response to recent extreme rain events, including the remnants of Hurricane Ida in 2021 and unnamed storms in April 2025, which caused mortality and rockslide events in Elizabeth and Yonkers, respectively. The study will engage with local, state, and regional policymakers; local nonprofit organizations; and residents to share research findings and ultimately improve regional ability to self-organize and direct future infrastructure investments, strategic planning efforts, and business and household resilience efforts. The new research effort leverages funding from the Hudson River Foundation.



## EVIDENCE OF SOCIETAL IMPACT

### CAMDEN COUNTY MUNICIPAL UTILITIES AUTHORITY (CCMUA)

CCRUN's Engineering and Urban Design team has performed hydrologic and hydraulic modeling work in Camden that has played a central role in shaping a major flood risk reduction project along Harrison Avenue. The project design leverages the team's modeling to evaluate both historical stormwater behavior and precipitation projections. As a direct result of CCRUN's technical support, CCMUA successfully secured \$20 million in state and federal design and construction funding to implement flood mitigation measures in this corridor. The team's research has ensured that the infrastructure is built with long-term climate resilience in mind, helping to prevent future damages and reduce the public cost of disaster response.

### CO-DEVELOPING A DECISION SUPPORT FRAMEWORK FOR ADAPTATION TO COASTAL FLOODING: A COMPARATIVE CASE STUDY OF COMMUNITIES IN NEW YORK AND VIRGINIA

An ongoing project is co-developing with decision-makers a decision support framework for building resilience to coastal flooding. The project is a collaboration between CCRUN, MARISA CAP, and four partner communities that were strategically selected to represent a range of flood, socioeconomic, and governance conditions, thereby enabling the co-development of a framework that can serve locations beyond the study areas. Over the past year, the team has conducted the resilience assessments with the Shinnecock Nation, the Pamunkey Nation, and Mastic Beach and has collected data on past flood impacts and recovery.

The resilience assessments increased assets in the communities by providing current and future maps of flood extent and depth for several medium- and long-term scenarios. The resilience assessment workshops improved understanding of current and future flood risk through learning about future flood hazard as well as sharing of experience with flood impacts and recovery within each location.

## STATE AND LOCAL OUTREACH

### BOSTON

Through the B-COOL project, which monitored extreme heat in neighborhoods in Boston in Summer 2024, CCRUN researchers have engaged with the City of Boston, State of Massachusetts, and local National Weather Service Office. Results are informing potential changes in how heat advisories and heat emergencies are declared, particularly in urban areas.



### NEW YORK CITY

Responding in real time, CCRUN researchers worked with New York City's Department of Environmental Protection to analyze the Fall 2024 drought. The Weather and Climate team is currently investigating meteorological conditions that led to this drought and potential impacts on the city's water supply.

### PHILADELPHIA

CCRUN's modeling of the Darby-Cobbs watershed is being used by the City of Philadelphia to inform the development of a flood resilience plan for the East-wick neighborhood. Other stakeholders across the watershed are also referencing the model, demonstrating how science can build local adaptive capacity.



## KEY RESEARCH FINDINGS

### COMPOUND EXTREME EVENTS

The Weather and Climate team advanced understanding of hazards and risks associated with compound heat events. The researchers identified rainfall tendencies before and after extreme humid heat events, as well as humid heat tendencies before and after heavy rain events (Johnson et al., 2024). The team is also analyzing the relationship between heat metrics (like cooling degree days, temperature, and wet bulb temperature) and electricity usage to better understand the relationship between heat and demand for cooling.

### UNDERSTANDING FLOODING FROM POST-TROPICAL CYCLONE IDA IN NEW YORK CITY

In the Coasts and Floods team's ongoing research on Post-Tropical Cyclone Ida's impacts on New York City, the team is partnering with and funded by the US Geological Survey (USGS) and NYC Emergency Management. The research developed a coastal flood model that can incorporate pluvial/rain forcing, valuable to simulate compound flooding and its impacts (Kasaei et al., 2025). The Coupled Ocean-Atmosphere-Wave-Sediment Transport (COAWST) model is an open-source model and has a very wide global user base, which is useful in educational efforts as well as for having access to contributions from its broad user community.

## OUTPUTS AND TOOLS

The Stevens Flood Advisory System (SFAS) is a unique and widely used coastal total water level forecast system that provides year-round ensemble forecasts and email notifications, which help stakeholders prepare for coastal flooding across the US Mid-Atlantic and Northeast, which includes New Jersey, New York, Connecticut, Rhode Island, and Massachusetts.

## HIGHLIGHTED PUBLICATIONS

- Cann, K., Leichenko, R., Solecki, W., Madajewicz, M., Clemens, M., Howell, N., Kaplan, M., & Herb, J. (2025). [Business as usual? Small business responses to compound disasters in coastal New York City and New Jersey](#). *International Journal of Disaster Risk Reduction*, 119, 105288.
- Johnson, S., Ivanovich, C., Horton, R. M., Ting, M., Kornhuber, K., & Lesk, C. (2024). [Temporal connections between extreme precipitation and humid heat](#). *Environmental Research Letters*, 19(11), 114076.
- Kasaei, S., Orton, P. M., Ralston, D. K., & Warner, J. C. (2025). [Pluvial and potential compound flooding in a coupled coastal modeling framework: New York City during post-tropical Cyclone Ida \(2021\)](#). *Hydrology and Earth System Sciences*, 29(8), 2043–2058.