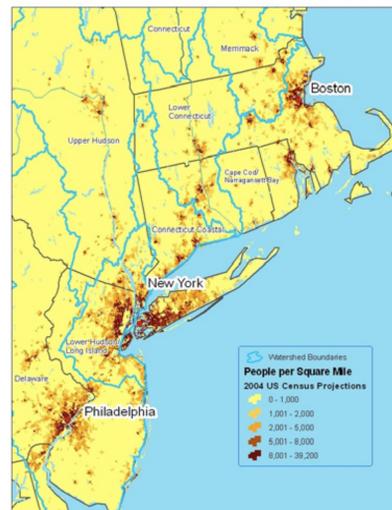


### SUMMARY

The Consortium for Climate Risk in the Urban Northeast (CCRUN), supports resilience efforts in the urban corridor stretching from Philadelphia to Boston. Challenges and opportunities include the diverse set of needs in broad urban contexts, as well as the integration of interdisciplinary perspectives. CCRUN is addressing these challenges through strategies including: **1) the development of an integrated project framework, 2) stakeholder surveys, 3) leveraging extreme weather events as focusing opportunities, and 4) a seminar series that enables scientists and stakeholders to partner.** While recognizing that the most extreme weather events will always lead to surprises (even with sound planning), CCRUN endeavors to remain flexible by facilitating place-based research in an interdisciplinary context.

### ABOUT CCRUN

The Consortium for Climate Risk in the Urban Northeast (CCRUN) is one of eleven teams funded under NOAA's Regional Integrated Sciences and Assessments (RISA) program. A partnership of five universities, CCRUN serves stakeholder needs in assessing and managing risks from climate variability and change. The only RISA team with a principle focus on climate adaptation in urban areas, CCRUN is designed to address the complex challenges that are associated with densely populated, highly interconnected urban settings, which include: urban heat island effects; poor air quality; intense coastal development, and multifunctional settlement along inland waterways; complex overlapping institutional jurisdictions; integrated infrastructure systems; and highly diverse, and in some cases, fragile socio-economic communities. In its sixth year, CCRUN has begun to expand its focus to include a range of different sizes and types of cities in the region. The network's structure enables local needs for targeted climate-risk information to be served in a coordinated way.



### KEY RESEARCH QUESTIONS

The three broad sectors of CCRUN's research are **coasts, public health, and water.** The themes of **1) climate science, 2) engineering and urban design, and 3) the social dimensions of adaptation** serve as the foundation for the cross-cutting research questions that span across and link the sectors.

**Climate** – Which climate and climate impact information products are influencing decision-making and adaptation action? What modifications are needed to address different types of stakeholders?

**Adaptation** – Which adaptation strategies are most effective for different urban populations and in different urban contexts? How can these strategies be improved?

**Transformation** – What are the region's key conditions (e.g., institutional, regulatory, infrastructural, and/or socioeconomic) that serve as opportunities for, or barriers to, 'ramping up' meaningful climate resilience practice?



### 1) INTEGRATED PROJECT FRAMEWORK

	Research Locations	Data & Information	Engineering & Adaptation Design	Social Science & Decision-Making	Specific Phase II Work Tasks and Products
Assessment and Learning (Link to Phase I)	"Early climate action sites" (e.g. Boston, NYC)	Which data products have been most useful?	What adaptations have already proven effective?	What are key opportunities, barriers, and tipping points for action?	<i>Ongoing needs assessment will reveal answers to the learning questions. List key products.</i>
Pressing Needs, Experimentation & Testing	Define "Test Bed Sites" for new science, experiment, and study	1) What are the key unknowns? 2) Select sites and identify problems of cross cutting nature 3) Synchronize baseline data collection efforts 4) Design synchronized adaptation experiments with stakeholders 5) Generate results and interpret with local stakeholders			<i>During this year, where (topically or geographically) will/have you started new work and what will/have you done? List key products.</i>
Validation, Gap Analysis, & Translation	"Application Sites" (e.g. New Haven, Newark, Hoboken, Wilmington, etc.)	Distinguish, evaluate, and update key regional information needs	Test findings with other boundary conditions; extrapolation and scale-up modeling	Leverage local opportunities to identify transition pathways	<i>Fun feature article, year-end review of sector activities and perspectives</i>

CCRUN developed an integrated research template to ensure that our work spans places, sectors, and needs, especially as articulated by regional practitioners. It begins with domain-specific assessments of research needs, some of which were evaluated during Phase I of the project (top row). The assessment findings are used to design and to co-locate research activities in new "test bed" sites, in places less emphasized by the team during Phase I (middle row). Finally, the validated research results from the test beds are used to extrapolate, scale-up, and assess findings to consider regional climate impacts in a third cohort of "application sites" (bottom row), which will inform future assessments.

### 2) STAKEHOLDER SURVEYS

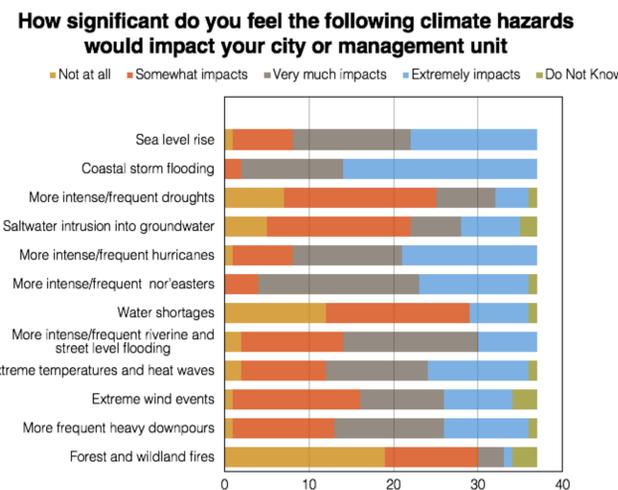
In order to better assess community-level understanding and concern about extreme weather events, a CCRUN stakeholder survey was distributed to ~40 attendees in June 2016 at a State of the (Jamaica) Bay Symposium.

Respondents were asked to assess the significance of a set of climate hazards on their city or management unit, the most useful sources of climate information, and the key barriers to implementing climate adaptation and resiliency in their field of work.

In response to the question, "if there is one thing that you need to better address climate hazards, and climate adaptation and resiliency needs, what would it be?", answers included:

- Science research of climate impacts
- Quantification of the uncertainty of climate risks
- Improved communication with local scientists

Tools for more targeted analysis are being developed based on the survey, which is available online.



### 3) EXTREME WEATHER EVENTS

Hurricane Sandy demonstrated that extreme weather events have outsized impacts on stakeholders, and can help galvanize action. For example, Hurricane Sandy:

- 1) raised awareness of the diverse vulnerabilities to extreme weather in the urban northeast (e.g., at both the networked infrastructure and community levels)
- 2) provided opportunities for science to inform recovery and rebuilding decisions [e.g., New York City's \$20 billion Special Initiative for Rebuilding and Resiliency (see right)]
- 3) brought diverse communities and economic resources together, providing opportunities for shared learning and action (e.g., The Science and Resilience Institute at Jamaica Bay [SRIJB] and Rebuild by Design projects)

In the years following Hurricane Sandy, each CCRUN sector focused research on understanding impacts and informing adaptation decisions (such as projected future flood heights). More recent stakeholder engagement efforts have focused on vulnerable communities and ecosystems. For example, CCRUN is partnering with SRIJB to better understand ecosystem resilience. CCRUN and SRIJB are also hosting Climate Forums aimed at informing local communities about the dangers of extreme weather events, learning about community concerns, and co-developing strategies to prepare for future extreme weather events. The first Climate Forum event was focused on coastal storms, bringing together science experts, first responders, and local residents to better understand risks and discuss preparedness.

### 4) SEMINAR SERIES



Date	Tentative Topic
October 5, 2016	Knowledge management
November 2, 2016	Temperature change management
December 7, 2016	Coastal ecosystem/landscape management
January 4, 2017	Sea level rise management
February 1, 2017	Precipitation change management
March 1, 2017	Greenhouse gas mitigation
April 5, 2017	Urban planning and design implications
May 3, 2017	Public health implications
June 7, 2017	Ecological systems impacts and restoration
July 5, 2017	Stewardship and engagement
August 2, 2017	Water resources management
September 6, 2017	Managing the extremes
October 4, 2017	Economic and social dimensions of adaptation

CCRUN and our stakeholder partners host a monthly seminar series on green infrastructure, climate and cities.

This series focuses on urban solutions to global problems associated with increasing temperature and sea level rise, precipitation variability and greenhouse gas emissions. We are interested in the implications of such changes on the complex infrastructure of intensely developed landscapes, and on the health, well-being, and vulnerability of urban residents. Speakers include both researchers and practitioners, all of whom have new ideas on how to promote resilient, livable, and sustainable cities.

All seminars are free, and held on the first Wednesday of every month at Drexel University. The sessions are broadcast live via webcast, but also recorded, and archived on the CCRUN website for access to the larger stakeholder community (www.ccrun.org).

### CONCLUSIONS

As CCRUN's focus has evolved towards extreme weather events such as Hurricane Sandy, we are developing a broad set of tools and activities, including those described here, to enhance stakeholder-science interactions and support resilience.

