New York State Resilience Institute for Storms and Emergencies (NYS RISE): Translate Weather and Climate Research to Actions

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And

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NYS RISE
Resiliency Institute for Storms & Emergencies

Consortium of 5 Universities and 1 National Lab in New York State

Stony Brook University
New York University
Columbia University
Cornell University
City University of New York
Brookhaven National Laboratory

Co-Directors:
Minghua Zhang, School of Marine and Atmospheric Sciences, SBU
Bud Griffis, School of Engineering, NYU

NYS RISE
Resiliency Institute for Storms & Emergencies

Mission

1. To inform critical decisions before, during, and after extreme weather events
2. To quantify vulnerability and resilience in infrastructures, ecosystems, and operations to storms.
3. To speed up translation from research on preparedness to application
4. To aid recovery efforts from Superstorm Sandy

Four Initial Areas

1. Rapid Response
2. Cascading Dynamics of Water and Infrastructure
3. Vulnerability Assessment and Resilience Strategies
4. Storm and Environmental Risks under Climate Change

1. Rapid Response

Assessment of readiness plans to weather events

Scenario-driven short-term evacuation modeling

Enhancements to long lead forecasting

Rapid warning system enhancements

Current Plans and Practices in NYS:

Hazard Mitigation Plans for State, County and Towns

Ranked from Best to Worst:

- **Plan Basics (1)**
- **Participation (2)**
- **Goals (3)**
- **Inter-Organizational Coordination**
- **Hazard Identification and Risk Assessment**
- **Capability Assessment (-3)**
- **Monitoring (-2)**
- **Proposed actions and Implementation Information (-1)**

(Bud Griffis)

Workshop on Hazardous Weather Communication

Sponsored By: AMS Long Island/NYC Chapter, NOAA/National Weather Service and Stony Brook University

When: Tuesday, November 18th, 7-9 PM *

Where: The New York State Center of Excellence in Wireless and Information Technology, Stony Brook University, Stony Brook, NY (see map below)

What: Communication is critical step in the severe warning and decision process. Hear from a panel of experts below on the latest approaches, issues, and potential solutions for extreme weather events.

Led by Brian Colle

Emergency Management
John Bruckbauer, Deputy Commissioner
Office of Emergency Management
Nassau County

Media Communication
Rich Hoffman
News 12 Meteorologist

Source: NHC Report/Flickr

Forecast Warning Support
Dr. Jason Tuell, Director
National Weather Service
Eastern Region


Source: Newsday

Emergency Management
Edward Schneyer
Director of Emergency Preparedness
Suffolk County

Science Communication
Christine O'Connell
Center for Communicating Science
Stony Brook

Led by Brian Colle

Current Issues & Problems for Hazardous Weather Communication

Challenge on NWS side:

- **forecast information is long and technical**
- **great products but hidden – communication of this great data is often lost**

Media:

- **Too much information when the forecast varies across the NWS forecast area**

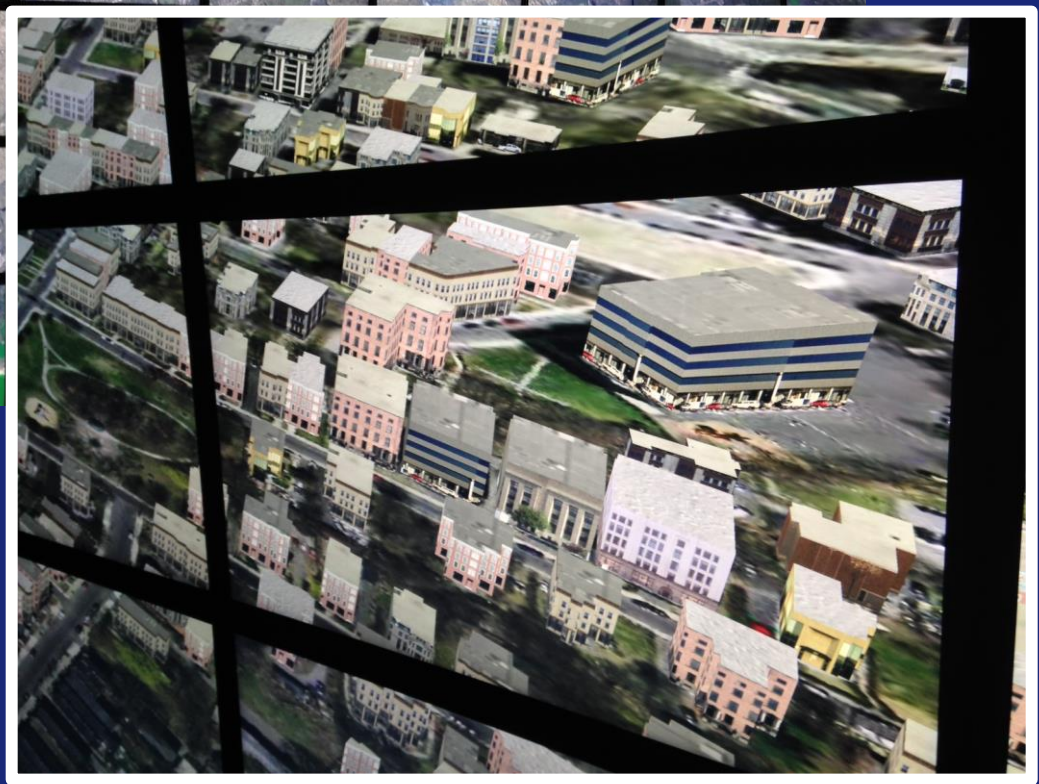
Emergency managers:

- Need more lead time. What is the time to make the transition from a minor situation to an upgraded hazardous situation?
- Flash flood warnings are frequently issued, but most people don't experience anything, so the public and government officials become complacent when they hear flash flood warnings
- NWS uses too many terms that confuse the public
- People may listen to you, but do not actually understand your message

The Bottom Line:

Longer lead time, more localized forecasts, more intuitive message - graphically

Communication: visualization of probabilistic impact simulations using forecast products



2. Cascading Dynamics of Water and Infrastructure

Transportation

Electric power system

Wastewater infrastructures

Freshwater distribution System

Coastal ecosystem and fisheries

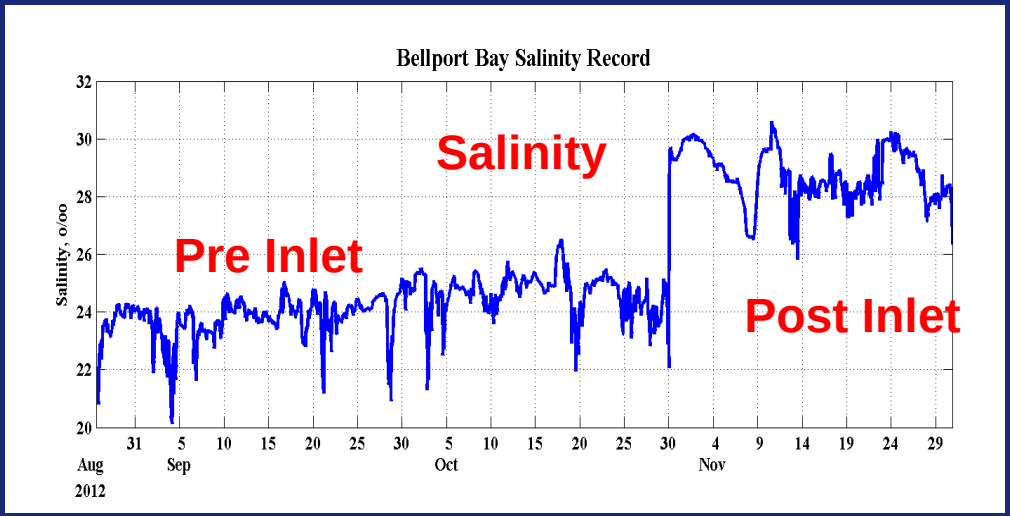
Responding to New inlet in Great South Bay

Close the new inlet or not?

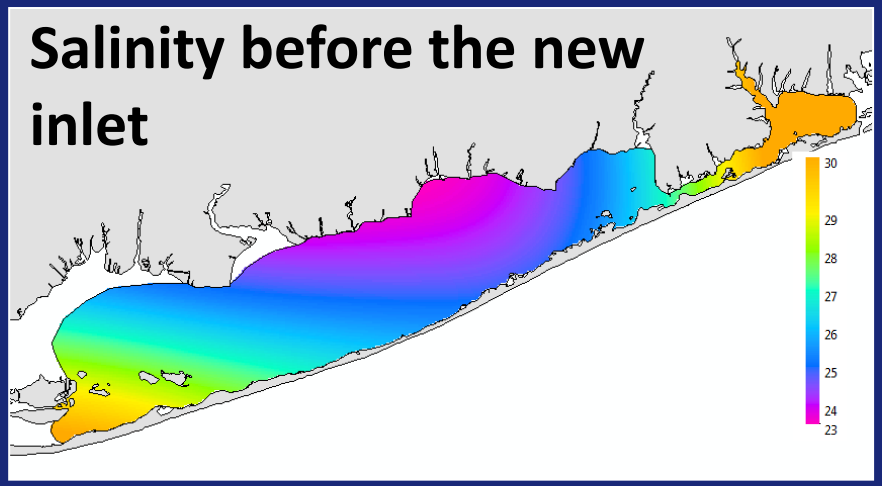
Buoy, SoMAS Stony Brook

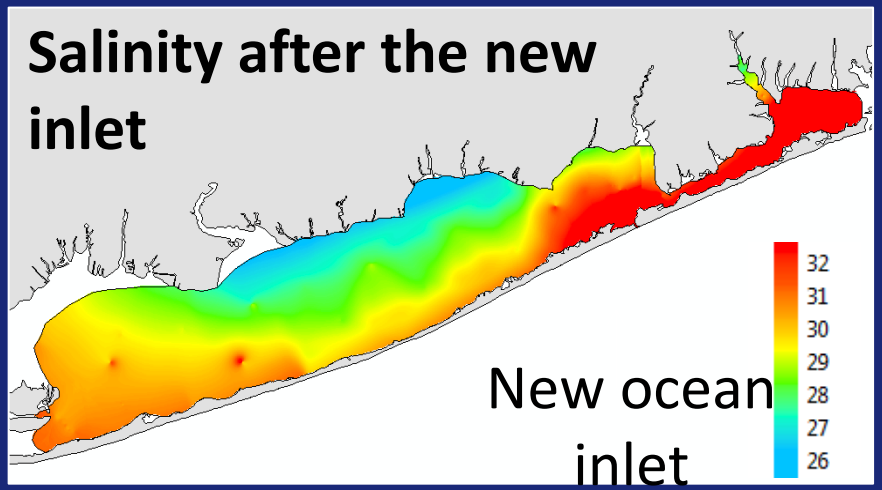
Significant Increase of Salinity, but Little Change of Water Levels

(Charles Flagg, Tom Wilson)

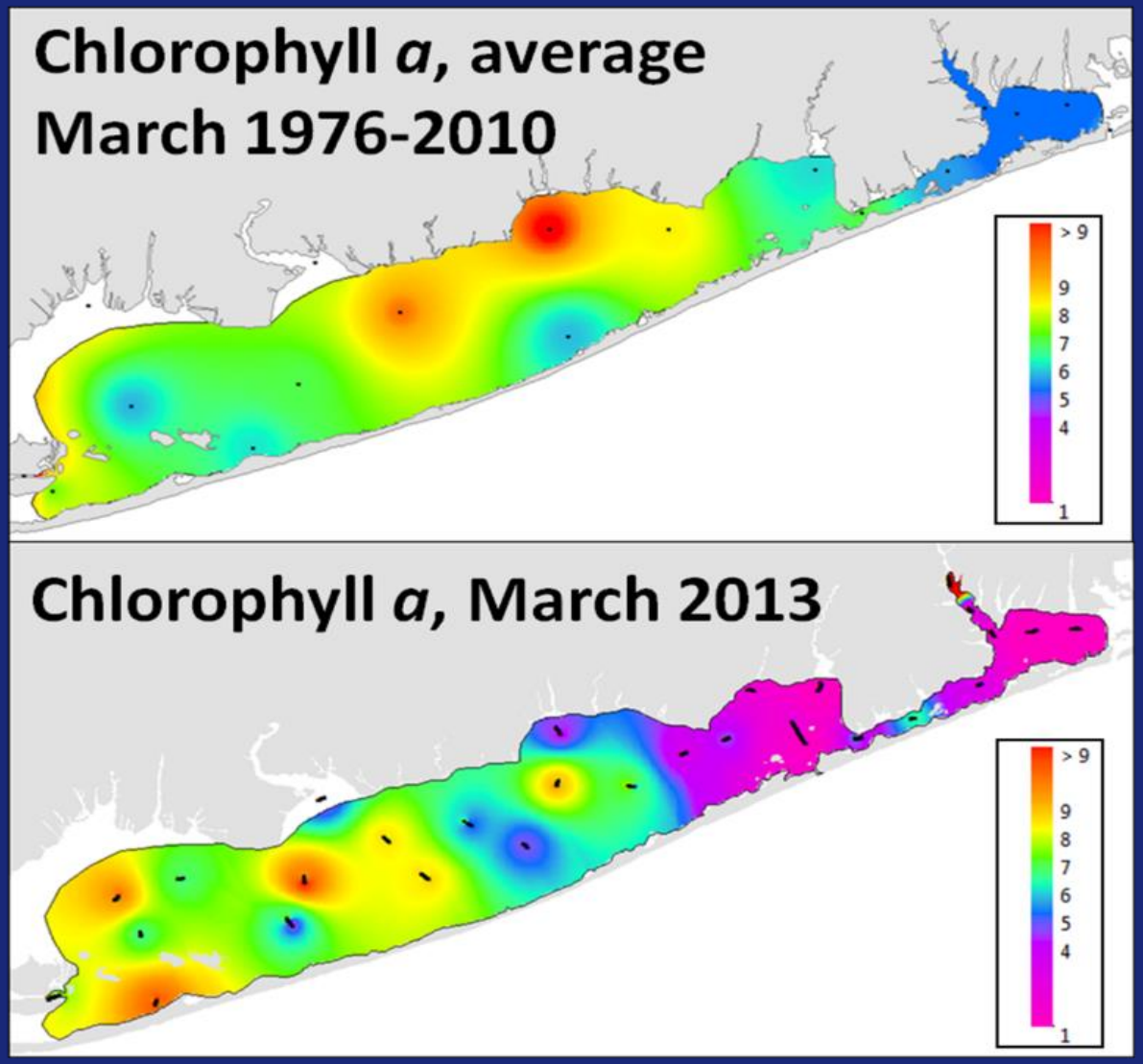


New inlet in Great South Bay





Changes in algae levels in the Great South Bay (GSB)



3. Vulnerability and Resilience Assessment

Critical facilities

Communities

Economic vulnerabilities

Resilience metrics

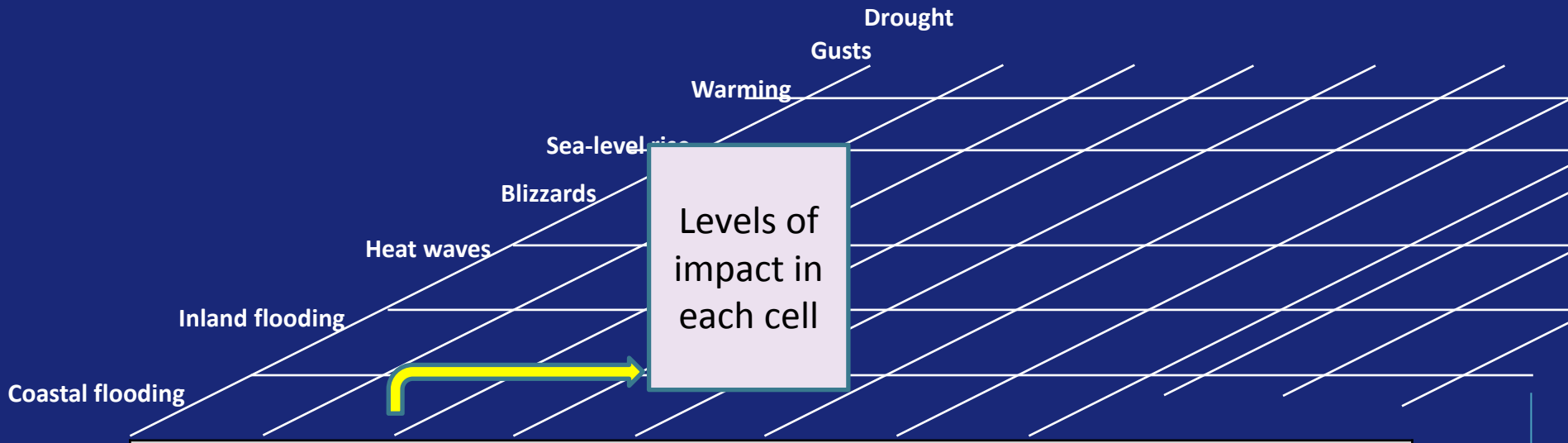
$$P(risk) = \sum_{Hazard} P(Hazard) \times P(Impact|Hazard)$$

Risk = (Public Safety, Public Health, Economic, Social, Environment)

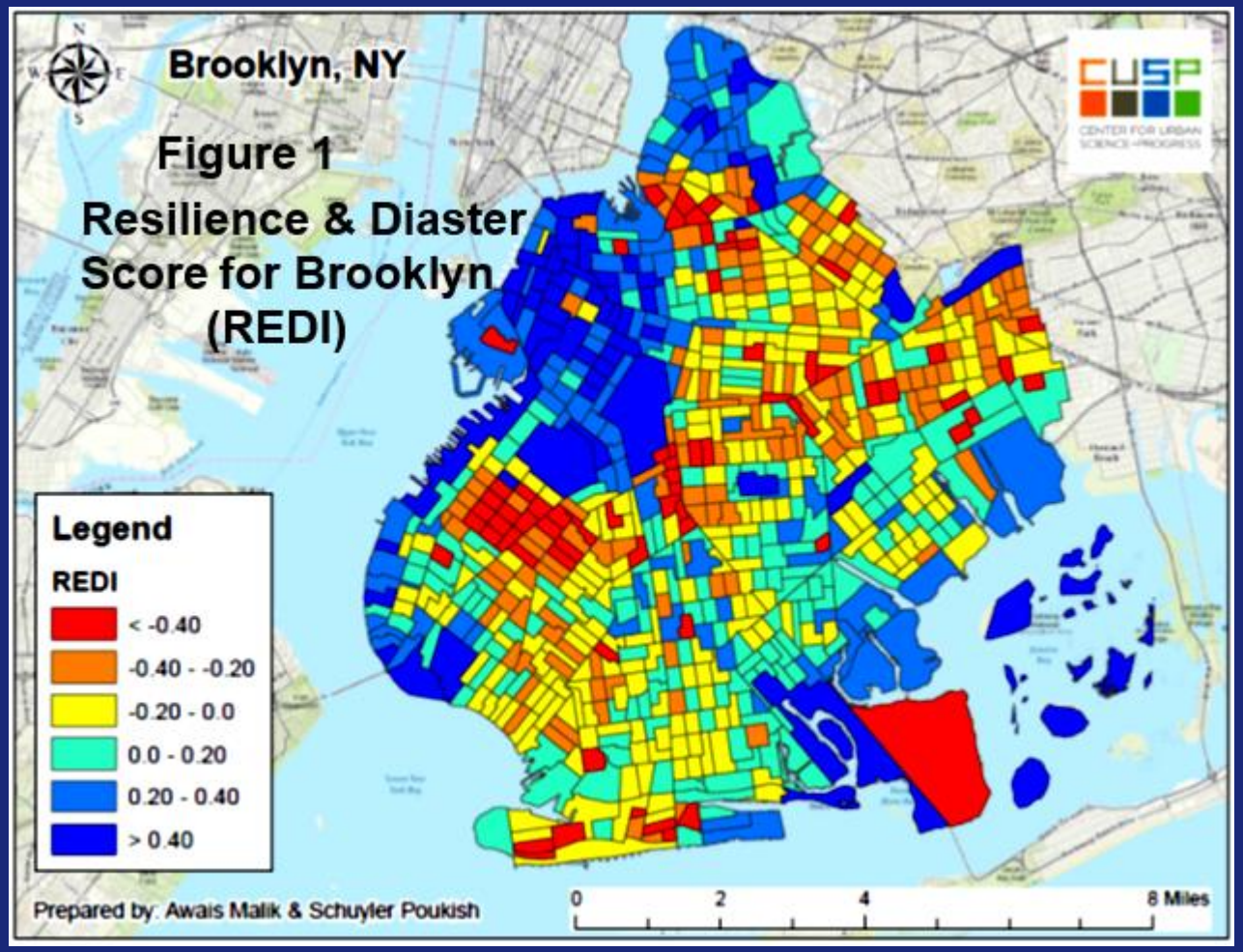
Consequence level given a climate or weather event in the previous table: using transportation as an example

IMPACT SCORE /RISK TYPE	Insignificant 1	Minor 2	Moderate 3	Significant 4	Major 5
A. Public Health	• Limited access of emergency medical vehicles	• Limited access of health care personnel	• Inaccessible by emergency vehicles or personnel to isolated population	• Inaccessible by emergency personnel to large population	• Inaccessible by medical emergency personnel to large vulnerable population
B. Public Safety	• Limited access of police vehicles that require special efforts • Increased accidents possible	• Limited access by police vehicles and fire trucks for up to a week. • Increased accidents likely	• Inaccessible by police vehicles and fire trucks • Limited access for up to a month. • Increased accidents very likely	• Inaccessible by police vehicles and fire trucks for up to a week • Limited access for more than 1 month • Increased accidents certain	• Inaccessible by police vehicles and fire trucks longer than a week • Inaccessible for large population • Large number of increased accidents certain
C. Economic Activities	• limited interruption in normal economic activities • short term closure with less than direct economic loss of $200K	• Direct economic loss of between $200K to $1M	• Direct economic loss of between $1M to $5M	• Direct economic loss of between $5M to $10M	• Direct economic loss of over $10M • Permanent loss of business
D. Social Activities	• limited interruption • short term closure • multiple closures but manageable	• multiple closures under more than usual stress • minor displacement of affected population of less than 50	• Multiple closures for more than 1 week up to 1 month • Major closure leading to severe pressure • displacement of affected population between 50 to 500	• Major closure of more than 1 month • displacement of affected population between 500 to 5000	• permanent loss of major facility • displacement of affected population of more than 5000
E. Environmental Impact	• limited pollution or spill • limited impact on habitat	• minor pollution or spill lasting up to a week • habitat impacts	• minor pollution or spill lasting up for more than 1 week up to 1 month • moderate pollution or spill lasting up to one week.	• moderate pollution or spill lasting up for more than 1 week up to 1 month • major pollution or spill	• Major pollution or spill lasting for more than a week. • Permanent loss of habitats and

Risk prioritization of Facilities and its communication



Stakeholder Risks from Climate Change and Extreme Weather									
CCV/ Stakeholder/ Risk type	Transport-ation	Energy	Communic ations	Ecosystems	Drinking water	Waste-water	Health systems	Governance Community	Buildings/ Infrastruc-ture
Economic									
Social									
Environ-ment									
Health									
Safety									



(Constantine Kontokosta)

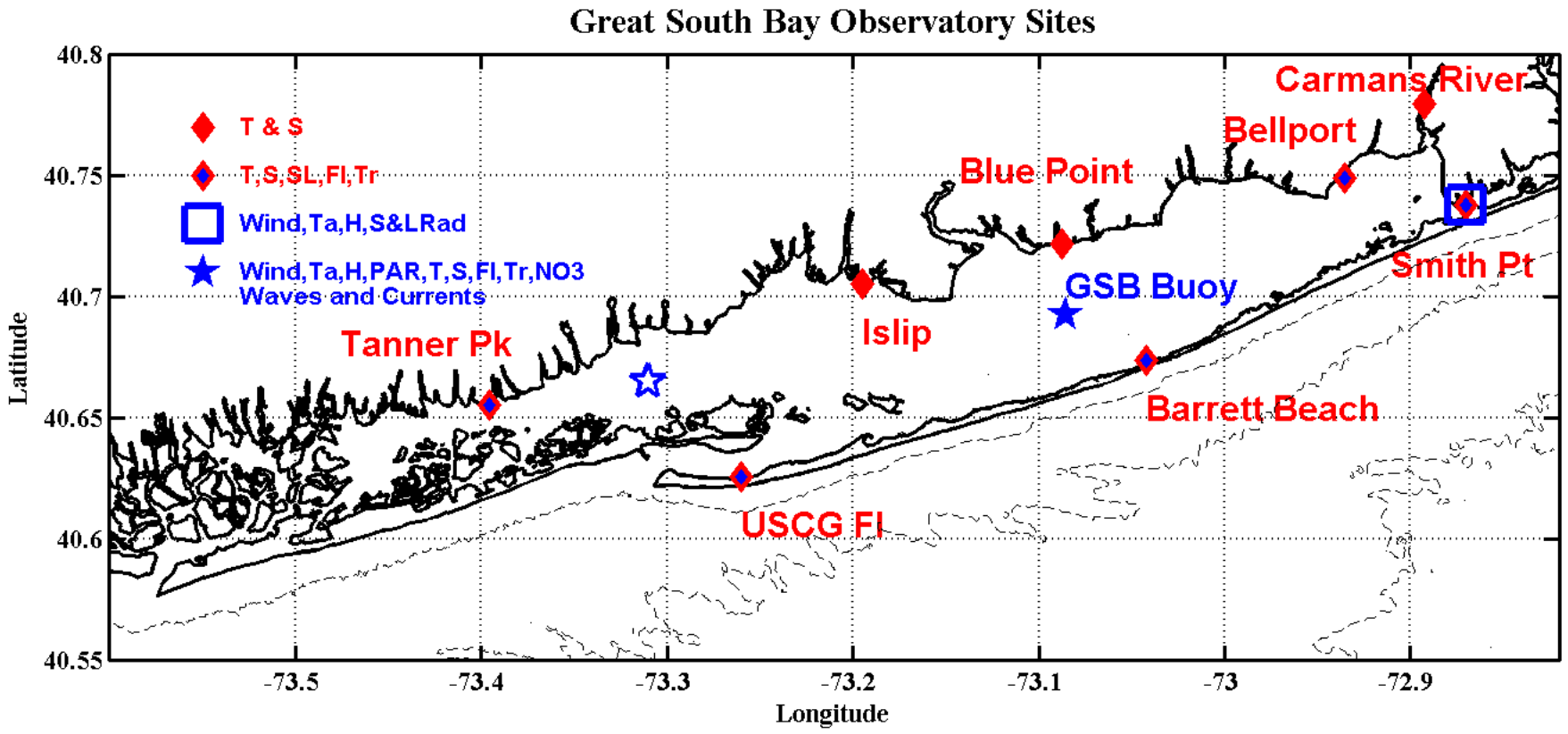
4. Storm risks under climate change

Sea level rise and coastal flooding

Integration of measurement systems

Monitoring: SoMAS Great South Bay Observatory

Funded by New York Department of State



Summary

1. NYS RISE was established to identify gaps of resiliency to extreme weather events and to make improvements
2. Much needs to be done on communications: visual products, knowing readiness plan and practices
3. Timely measurements are essential for actions during and after the events
4. A preliminary framework is proposed to assess weather-climate risks and their prioritization
5. We are eager to learn more from others