

Resilience Research, Policy, and Planning in Connecticut

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Rising Tides: Fairfield Museum After Dark

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UConn



Connecticut Institute for Resilience & Climate Adaptation (CIRCA)

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About CIRCA

The mission of the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) is to increase the resilience and sustainability of vulnerable communities along Connecticut's coast and inland waterways to the growing impacts of climate change on the natural, built, and human environment. [Read More...](#)

Living Shorelines	Critical Infrastructure	Inland Flooding	Coastal Flooding & Waves	Policy & Planning	Sea Level Rise
Preserving the natural elements of the shore while also providing protection from erosion.	Connecting firm science with the decision-making needs of state and local leaders.	Working to enhance communities resilience to flooding throughout the state.	Community climate adaptation policy and planning through research and analysis.	Community climate adaptation policy and planning through research and analysis.	Working to enhance resilience to sea level rise along Connecticut's coastline.

Featured Projects & Products



News & Announcements

From Our Blog

[Branford Connecticut's Coastal Resilience Plan](#)

September 27, 2016

[CIRCA Awards Funding to Towns](#)

June 24, 2016

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Living Shorelines

Living shorelines are nature-based erosion control techniques. Living shorelines are not a new concept, though they are new to Connecticut and the Northeast. As much of the State's shoreline is armored with hardened structures, there is a growing interest in preserving the natural elements of the shore while also providing protection from erosion.

This interest can be found even within state government; after significant storms struck Connecticut, the CT Legislature passed Public Act (12-101) (2012): An Act Concerning the Coastal Management Act and Shoreline Flood Erosion Control Structures. This Act calls for consideration of alternatives to hard shoreline armament, like living shorelines. With this specific law in place, there is an urgency to fully understand the science and policy issues surrounding living shoreline deployment in Connecticut. CIRCA is actively working in Connecticut and regionally to provide the necessary information to successfully implement living shorelines where appropriate, across the state.

Living shorelines can be an excellent alternative to hard structures at the coast for a variety of reasons. Importantly, hard structures (e.g. bulkheads, revetments, seawalls, etc.) are often damaging to a coastline. These types of structures can increase erosion at the shore, inhibit natural coastal processes, and destroy natural habitat for fish, animals, and plants. Where hard structures "fail," living shorelines succeed. Living shorelines mimic natural settings and have many positive co-benefits to erosion control, including but not limited to: habitat creation, water quality enhancement, and maintaining natural coastal processes.

Living shorelines are built, and may include some hardened elements (hybrid approaches). See photos for different types of living shorelines.

CIRCA and Living Shorelines

CIRCA's research projects are intended to better understand the application of living shorelines as an erosion control technique in the State. Little is known on what to site, where to site, or how to site, in terms of the use of this technology in Connecticut. CIRCA will work to advance the general understanding of living shorelines as well technical aspects. As living shorelines are a relatively new erosion control method in the State and region, CIRCA will work to increase public awareness in Connecticut and with regional partners.

CIRCA Research Projects

CIRCA's current research projects in the area of living shorelines are listed below.

NOAA Coastal Resilience Networks: "Enhancing Coastal Resilience in Connecticut" (CREST)

The NOAA Coastal Resilience Networks: "Enhancing Coastal Resilience in Connecticut" project provided wave information for the harbors in Old Saybrook and New Haven, a review of design guidelines and tools for site assessment of living shorelines, and an online map viewer.

Scoping of Dredge Material Islands & Wetlands for Green Infrastructure Resiliency

The Scoping of Dredge Material Islands and Wetlands for Green Infrastructure Resiliency Project



Bank Stabilization with Coir Logs. Photo courtesy of Wilkinson Ecological Design, Inc.



Artificial Reef with Reef Balls Photo courtesy of R. Francis, CT Department of Energy and Environmental Protection.

Further Reading

- Center for Coastal Resources Management of New Jersey DEP Living Shorelines Guidelines [link](#) CT
- NOAA FACTSHEET

NOAA Coastal Resilience Networks: "Enhancing Coastal Resilience in Connecticut" (CREST)

Projects by Topic

- [All Projects](#)
- [Living Shorelines Projects](#)
- [Critical Infrastructure Projects](#)
- [Inland Flooding Projects](#)
- [Coastal Flooding & Waves Projects](#)
- [Sea Level Rise Projects](#)
- [Policy & Planning Projects](#)

All Projects

- [Enhancing Coastal Resilience \(CREST\)](#)
- [High Resolution Coastal Forecasting \(HROC\)](#)
- [Coastal Green Infrastructure Resilience Planning](#)
- [Real-time Flood Prediction and Vulnerability Analysis](#)
- [Jarvis Creek Sea Level & Flooding Variability](#)
- [Municipal Resilience Planning Assistance](#)
- [HUD National Disaster Resilience Competition \(phase II\)](#)
- [Financing Resilience in Connecticut](#)
- [Public Support for Adaptation to Sea Level Rise](#)
- [Resilient Coastal Communities under Wind & Flood Hazards](#)

About the Project

The CREST Project, "Enhancing Coastal Resilience in Connecticut," was funded by a two-year grant from the National Oceanic and Atmospheric Administration (NOAA) to the University of Connecticut. A team of research and extension faculty and staff from the departments of Civil and Environmental Engineering, Extension and UConn Marine Sciences, along with Connecticut Sea Grant, the Center for Land Use Education and Research and the Connecticut Department of Energy and Environmental Protection's Office of Long Island Sound Programs worked on the following objectives.

- An assessment of existing patterns of coastal erosion;
- Identification of shoreline character and coastal protection approaches in-place;
- Determination of storm wave characteristics at the shoreline to provide information needed to create design guidelines for assessment of protection alternatives under current and likely future climate states;
- Review of available design guidelines for the deployment of "living shoreline" shore protection strategies and the development of a research agenda to enhance understanding of the effectiveness of the approach in Connecticut;
- Development of an online Map Viewer;
- Incorporation of the knowledge developed in the project in both coast-wide and in-depth community-level educational programs, targeted at local land use officials.



Products

The website developed for the project contains a [map viewer](#) for site suitability for living shorelines, a [description of the wave research model and findings](#), and the [results of a wave model](#) at five locations in Long Island Sound.

Researchers and Staff Supported on Project

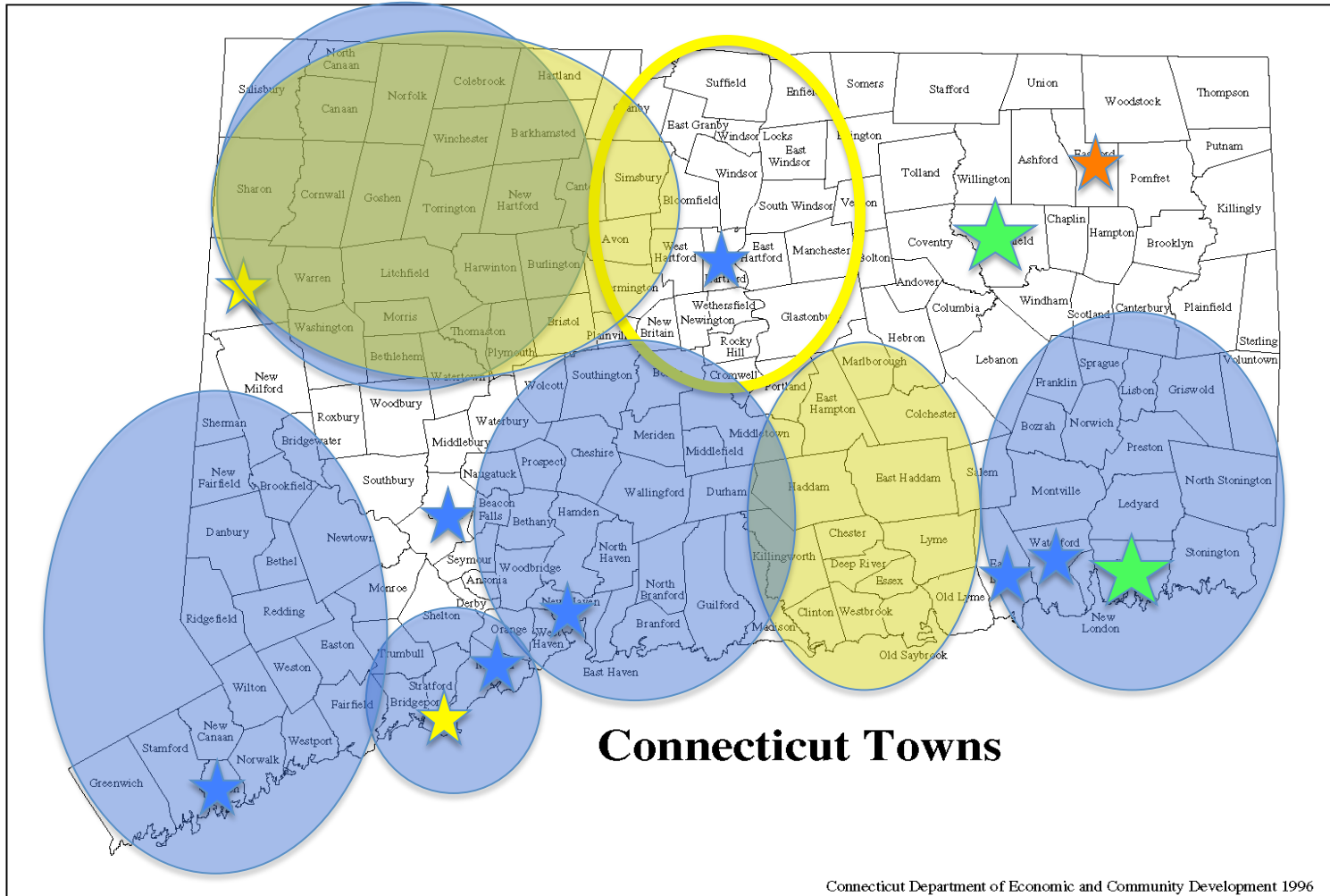
- [James O'Donnell](#), UConn Marine Sciences
- [Manos Anagnostou](#), Civil and Environmental Engineering, UConn CIRCA
- [Sylvain De Guise](#), Pathobiology & Veterinary Science, CT Sea Grant
- [Brian Thompson](#), CT DEEP Office of Long Island Sound Programs
- [Chet Arnold](#), UConn CLEAR
- [Emily Wilson](#), UConn CLEAR
- [Joel Stocker](#), Extension, UConn CLEAR
- [Juliana Barrett](#), Extension, CT Sea Grant, UConn CLEAR
- [Bruce Hyde](#), Extension, UConn CLEAR
- [Jennifer O'Donnell](#), UConn Marine Sciences
- [Alejandro Cifuentes-Lorenzen](#), Postdoctoral Fellow, UConn Marine Sciences
- [Jason Zylberman](#), Graduate Student, Dept of Natural Resources and the Environment

"What We Do" Areas

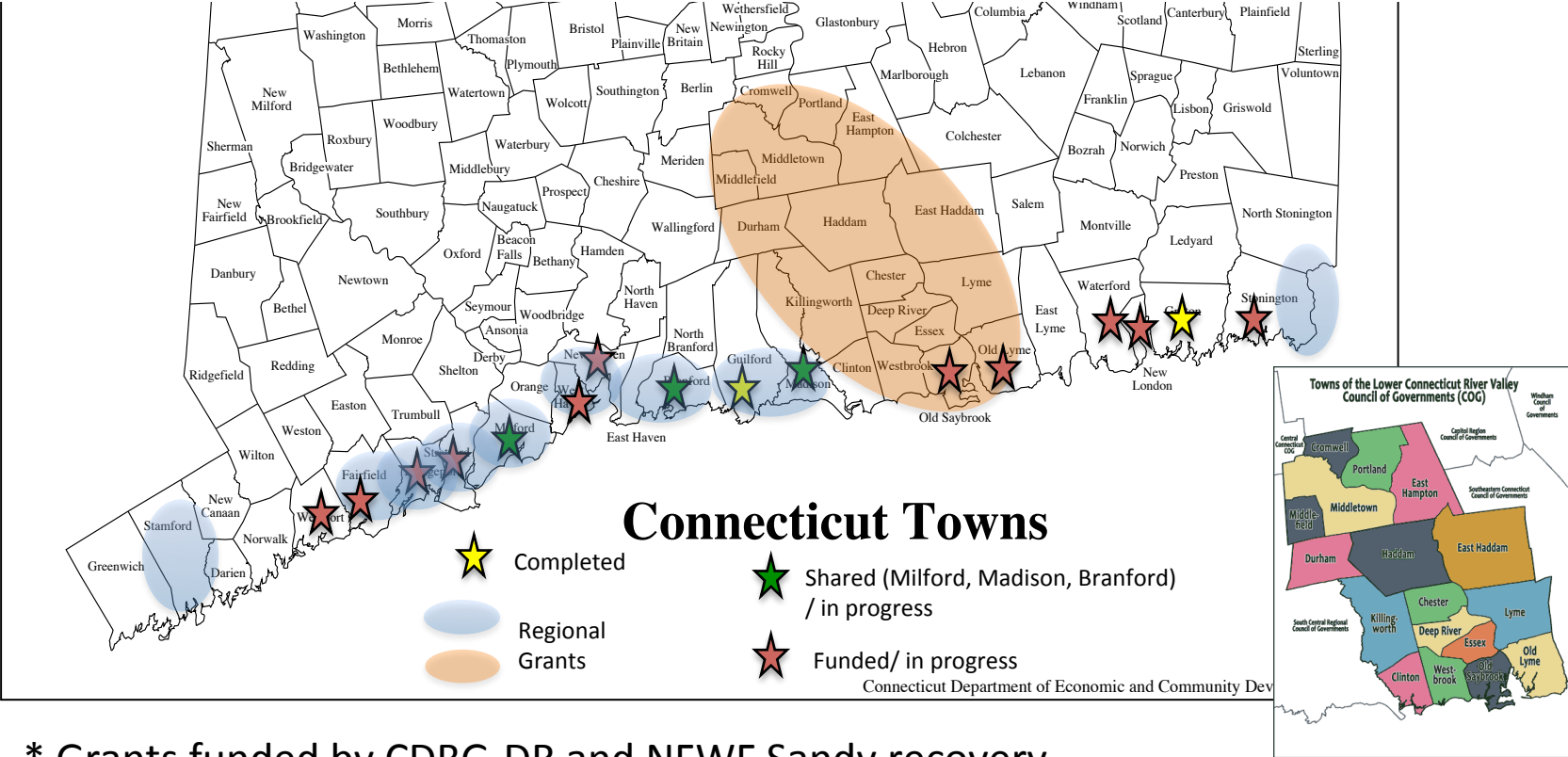
This project is a part of the following topical areas:

- [Coastal Flooding & Waves](#)
- [Living Shorelines](#)

CIRCA Grants and Projects



Sandy-funded Resiliency Planning in Connecticut...



* Grants funded by CDBG-DR and NFWF Sandy recovery

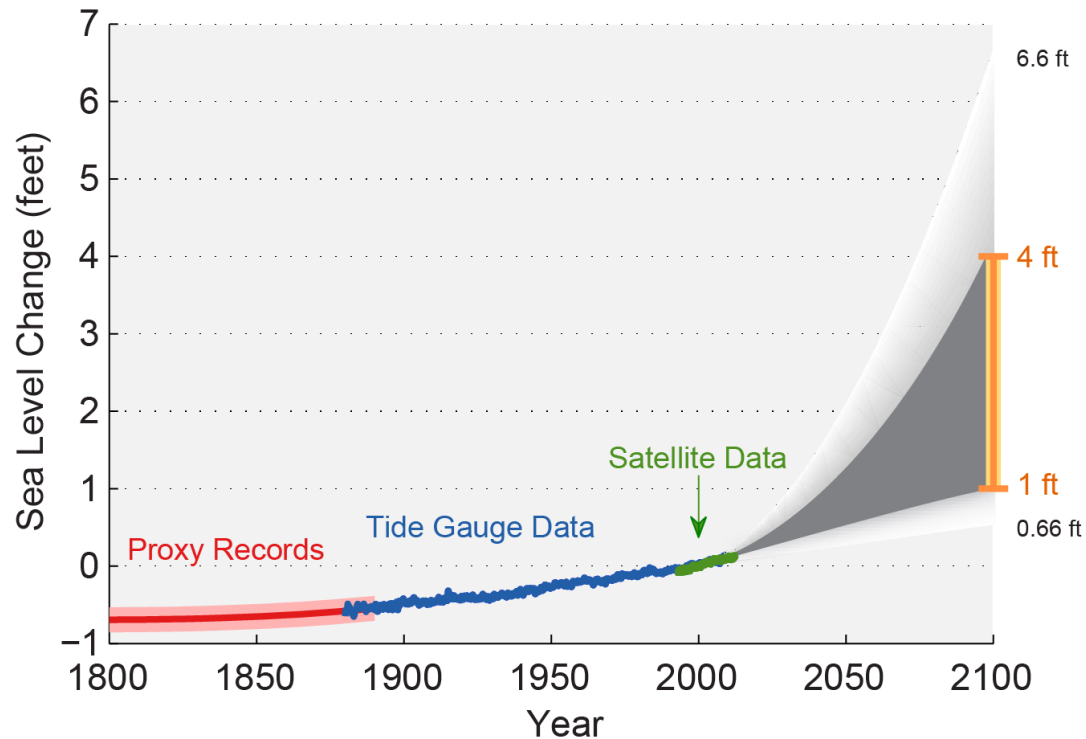
Priorities & Initiatives:

State Resilience Commitments

- State Law: PA 13-179 – plans of conservation and development and municipal resilience grants must consider sea level rise
- Long Term Recovery Task Force – co-chaired by DEMHS and CID
- *Shore Up Connecticut* fund for loans for home elevation
- E.O. 46 Governor’s Council on Climate Change – Chaired by DEEP
- E.O. 50 State Agencies Fostering Resilience Council – Chaired by OPM
- E.O. 53 Building code should increase the “resilience of structure to flood and wind hazards”
- Connecticut Institute for Resilience and Climate Adaptation at University of Connecticut

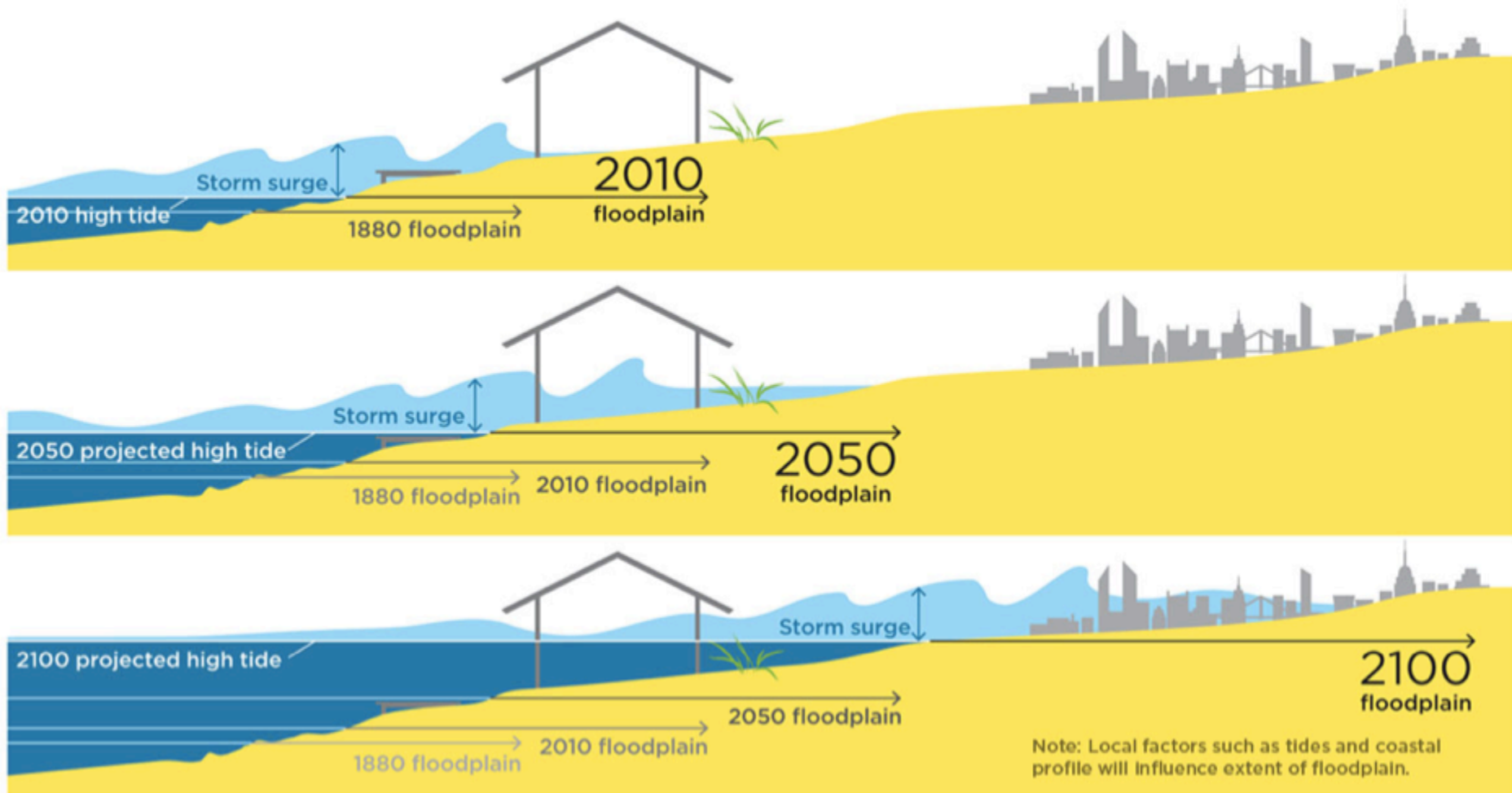
Impacts of Climate Change

Past and Projected Changes in Global Sea Level



NCA, 2014

Sea Level Rise Increases Frequency of Flooding



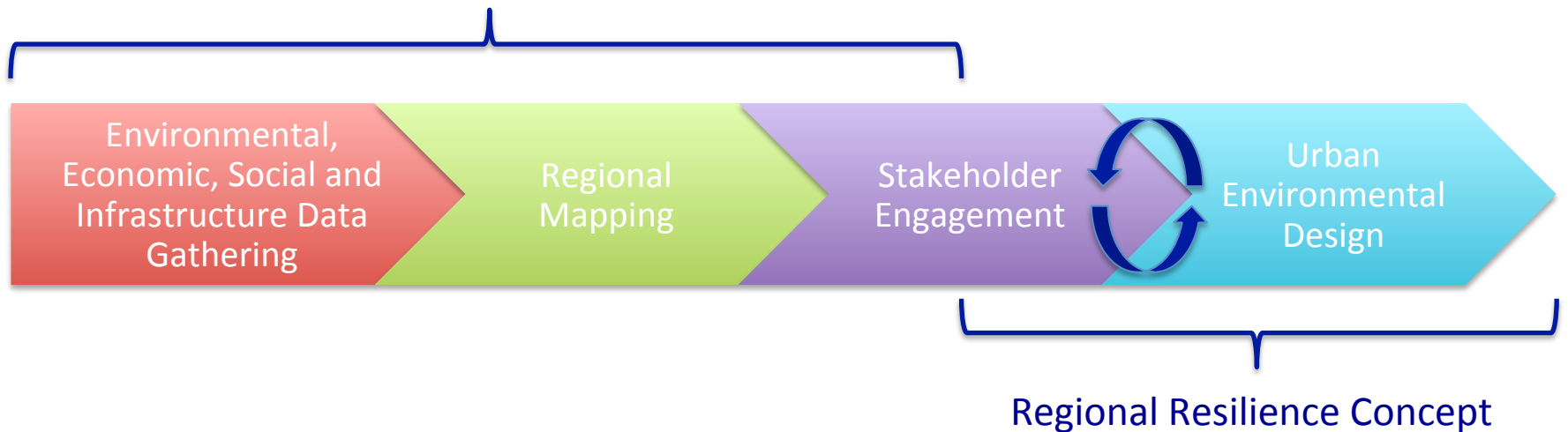
Union of Concerned Scientists, 2015

Success Story:

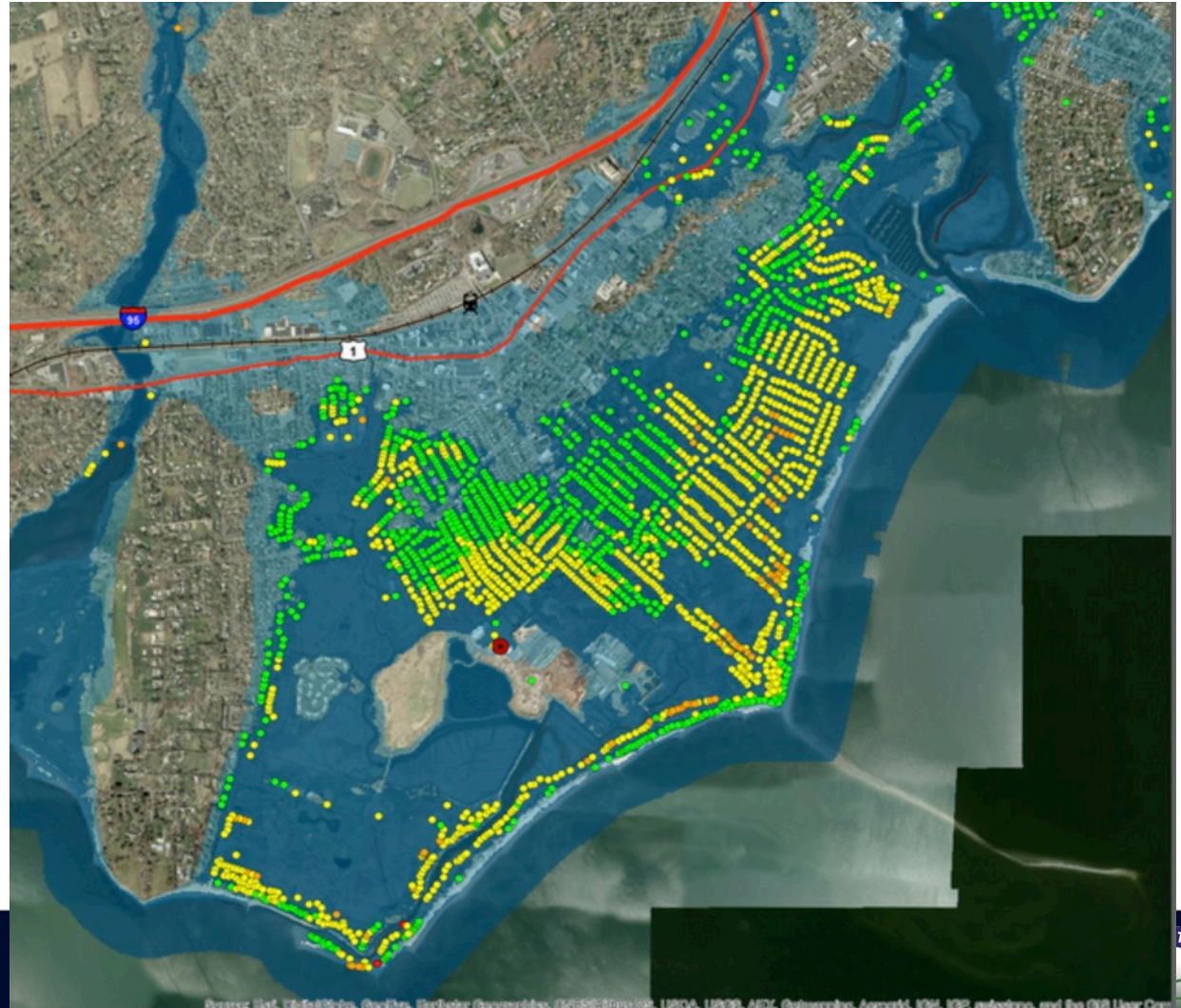
National Disaster Resilience Competition

\$1 Billion to Recover with Resilience

Regional Vulnerability Assessment:
New Haven & Fairfield Counties



- Mapped all Connecticut Coastal Municipalities
- Fairfield
 - 1-95
 - Metro-North
 - Wastewater Treatment
 - FEMA Sandy damage
 - Category 3 Hurricane
 - Sandy Storm Surge



SAFR Connecticut Connections Regional Coastal Resilience Concept



Prepared for State of Connecticut by Parsons Brinkerhoff

NORTHEAST REGIONAL CORRIDOR

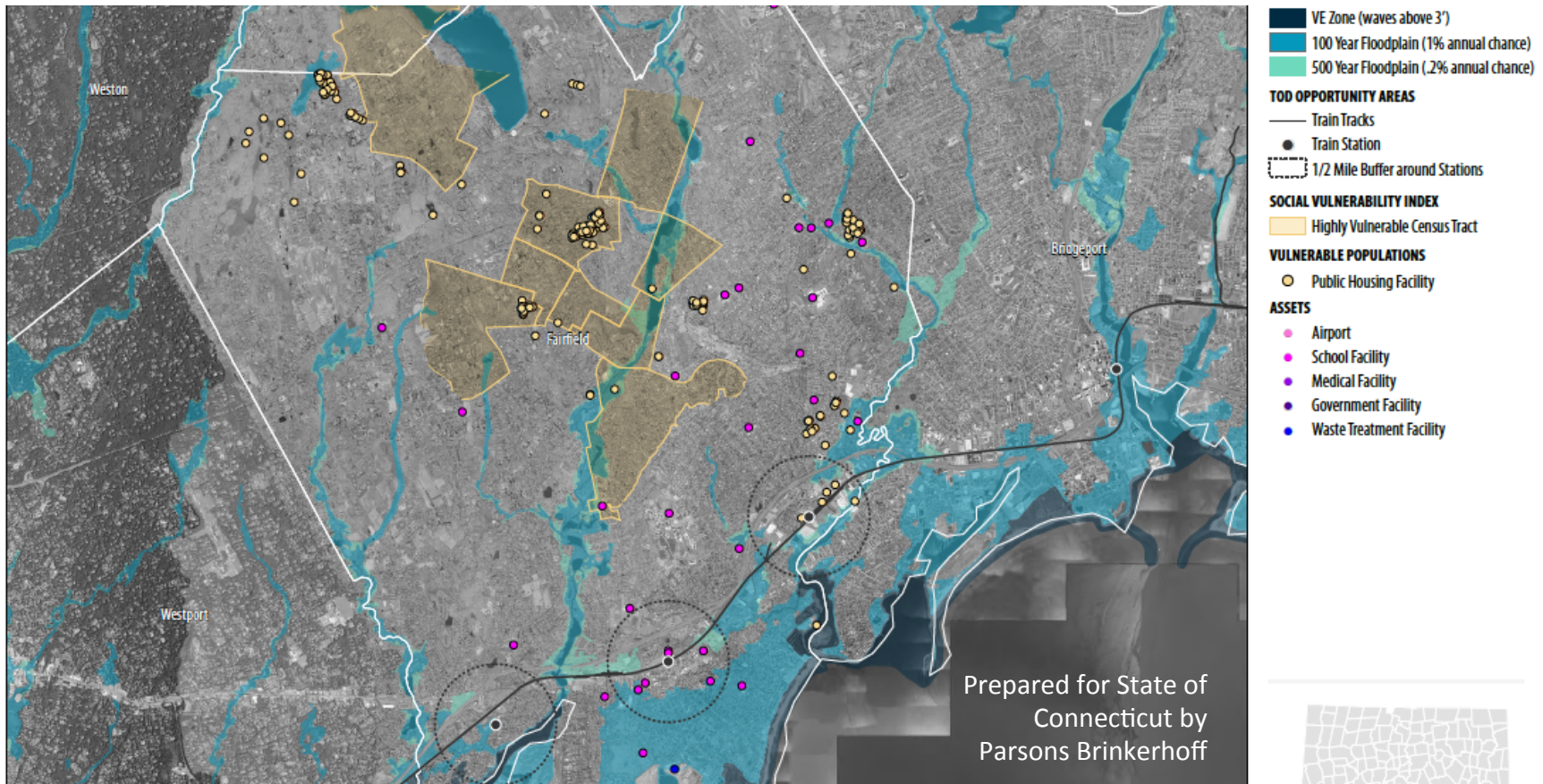
WB unattributed w/ Yale ARCADIS

Legend
○ NYC REGIONAL RAIL STOP
— NYC REGIONAL RAIL CORRIDOR





CT Resilience Academy - Design Charrette: Resilient TOD in Fairfield



CT Resilience Academy - Design Charrette: Resilient TOD in Fairfield



GOALS

- Infrastructure that can support development
- Alternative modes of transportation
- Housing diversity
- Connectivity between commercial and residential areas

STRATEGIES

- Zoning
- Green infrastructure
- Complete streets
- Community engagement

PROJECTS

- Resilient corridor
- Rooster River flood control
- Complete streets/connectivity
- Relocation of East Line trunk sewer
- Infill development
- Leverage links

Prepared for State of Connecticut by
Parsons Brinckerhoff

What can I do?

- Participate in public meetings about town planning
- Attend Resilient Bridgeport open houses and design charrettes
- Bring your family to Norwalk Aquarium resilience exhibits
- Plan for the future of your home before, during and after storms
 - Home elevation and flood proofing
 - Buy flood insurance
 - Understand potential future risks to your property and community
 - Listen to your emergency managers
 - Have a shelter in place or evacuation plan