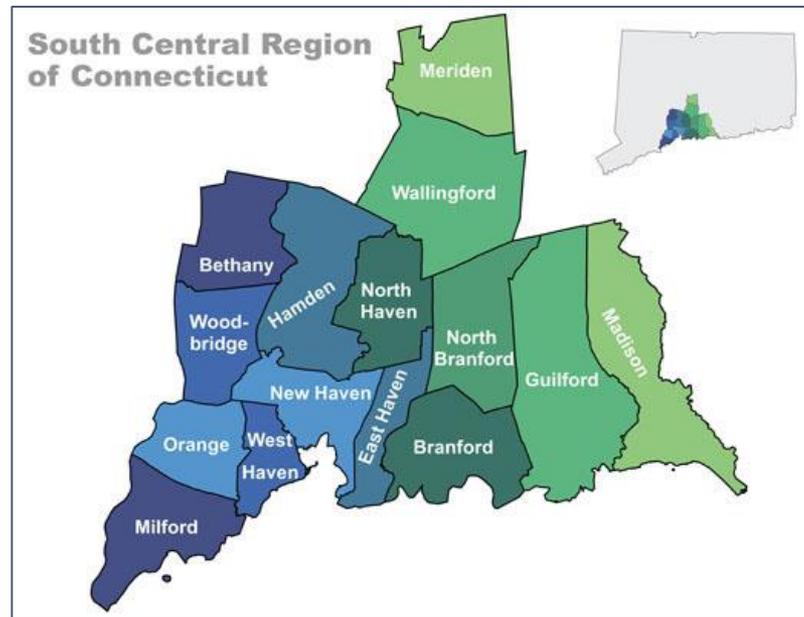


SCRCOG Case Studies:

Regional Framework for Coastal Resilience and
Regional Drinking Water Study



Eugene Livshits, Senior Regional Planner

Rebecca Andreucci, Transportation Planner

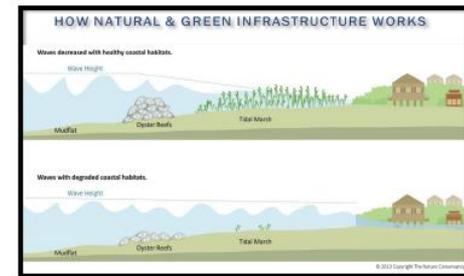
Southern Connecticut Regional Framework for Coastal Resilience

1. Background
2. Structure
 - a) Regional/Municipal Partnerships
3. Components
 - 1) Natural/Green Infrastructure Assessment
 - 2) Municipal Engagement/Workshops
 - 3) Conceptual Design
 - 4) Regional Coastal Resiliency Framework
4. Legal, Policy and Regulatory Assessment

What is Green and Natural Infrastructure?

“Green infrastructure is an application that provides communities and environmental benefits such as improved water and air quality and reduced flood or erosion risk through the use of natural processes that sometimes incorporate preexisting or new engineered systems. Green infrastructure can be applied at a variety of scales, involve various ecological systems, and provide multiple benefits such as improved habitat, cost savings and social gains.”

“At a landscape level, this means protecting and restoring natural areas and their ecosystem services which include stormwater runoff, infiltration, storm surge buffering, and pollution reductions.”



“At the site-specific scale, this can also mean designing and constructing systems that mimic nature and provide these same functions and benefits, often including living shoreline and wetland approaches versus concrete, rock, and pipes for stabilization and drainage purposes.”

Coastal Sites



Madison

Inland Sites



West Haven



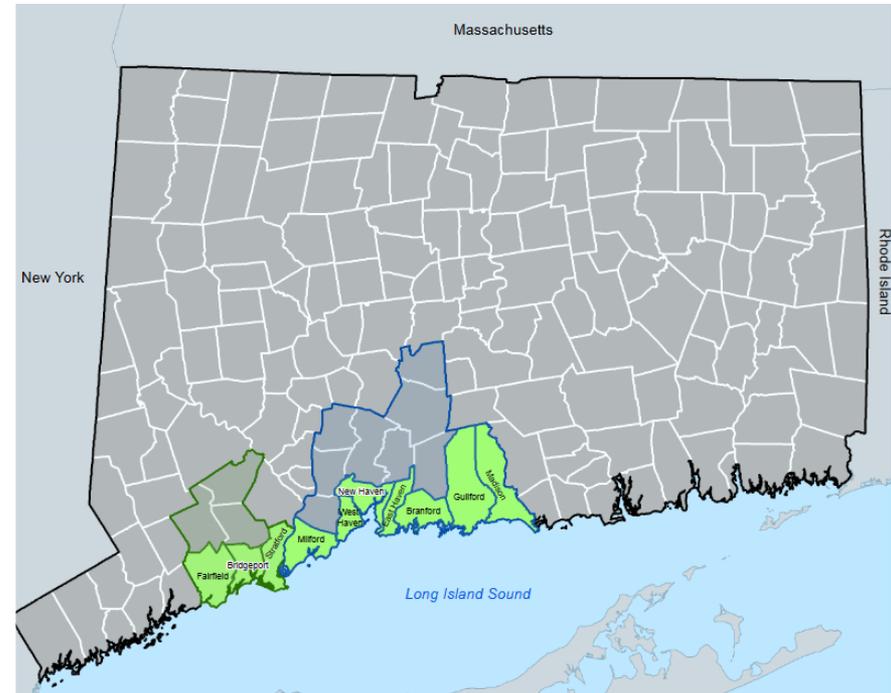
Stratford



Fairfield

Background

1. The project was funded through a Department of the Interior Hurricane Sandy Coastal Resiliency Competitive Grant and administered by NFWF .
 - In response to the significant level of exposure and vulnerability to the infrastructure, environment, and socio-economic assets from extreme weather events and a changing climate.
2. The project was developed through a partnership between the SCRCOG, MetroCOG and TNC and the Ten Coastal Communities.
 - Fairfield, Bridgeport, Stratford, Milford, West Haven, New Haven, East Haven, Branford, Guilford, and Madison
3. The objective of the project was to prioritize resilience opportunities across the project area through the use of green and natural infrastructure using where appropriate and feasible.
 - To enhance existing natural resources, improve public amenities, and reduce risk from hazards over immediate and longer term planning horizons.



Structure



Natural/Green Infrastructure Assessment

1. Initial Inventory of Coastal and Riverine Projects and Plans
2. Opportunity Assessment of Coastal and Riverine Projects
3. Field/On-Site Assessments
4. Data Development
5. Regional Natural/Green Infrastructure Assessment
6. Coordination with Local Coastal Resilience Plans

And where we may need new bank protection, we could try green or hybrid methods



Branford



Bridgeport



Stratford



New Haven



Milford



West Haven

12

Some coastal roads will need to be elevated



Guilford



Guilford



Branford



Milford



Stratford



West Haven

19

Municipal Engagement/Workshops

1. Stakeholder/Municipal Meetings
2. SeaSketch Workshop
3. Field/Site Visits
4. Collaborative dialogue to define risk and resilience opportunities

Regional Framework for Coastal Resilience in Southern CT High Priority Projects

Field Visits – February 5th & 19th 2016

Town of Madison

Project #1003 Madison Surf Club Dune Restoration
Project Type: Coastal Natural Infrastructure
Objective: Dune
Strategy: Restore

Description: This project site is located at the Surf Club Town Beach (13 Surf Club Road) in Madison, CT. There is roughly 1,050 linear feet of beach along this section of shoreline. Roads, residential homes, businesses, a golf course, and athletic fields are located in proximity to the site to the north and east. This low-lying area was critically impacted by storm surge and flooding from both Irene and Sandy. The two weather systems breached a portion of the dune and deposited sand into the tidal wetland to the rear of the site. Many nearby homes, businesses and roads, especially Parker Avenue to the east were flooded. The town took immediate action by adding additional sand to repair the 300 foot breach to reduce frequent tidal flooding that constantly exacerbated the issue well after the storms. This 300 foot gap is still vulnerable to future weather events and state officials have denied the towns request to remove sand from the tidal wetlands. Ultimately, this project consists of restoring the dune system and providing flood protection at a critical gap. Without a dune structure, future storm surges will continue to erode the breach and flood out nearby residential areas, facilities, roads, and businesses.



Credit: Milone and MacBroom

Town Guilford

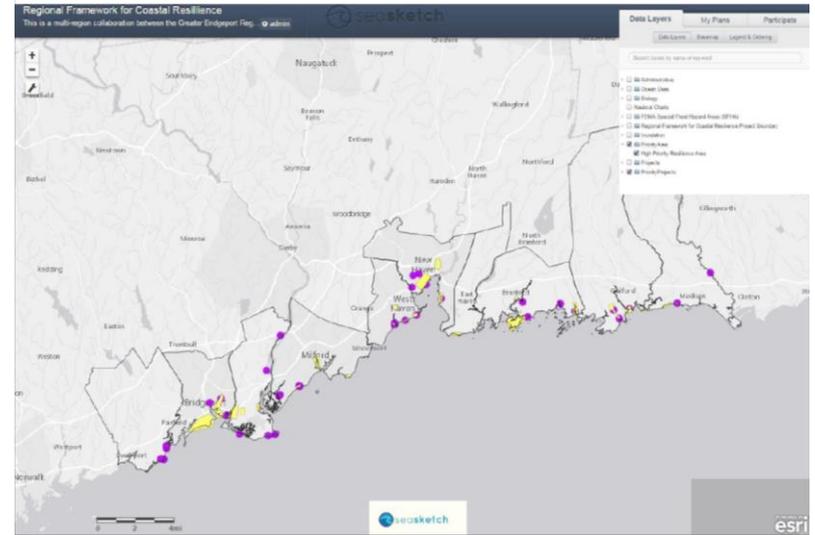
Project #901 Chittenden Beach and West River Living Shoreline Project
Project Type: Coastal Natural Infrastructure
Objective: Living Shoreline
Strategy: Create

Description: The Chittenden Beach Project is located toward the southern end of the newly renovated park and athletic fields at 40 Field Road. There is a walkway that extends over the marsh and down towards the small semi-circle beach. The Project area is just south of the Guilford Yacht Club and immediately next to the mouth of the West River. The surrounding area is extremely low-lying with most of the area contained in FEMA's flood hazard zones. The entire area did suffer a significant amount of damage from Sandy. This multi-component project in the town of Guilford has been recommended as a living shoreline. "A Living Shoreline is a shoreline with management approaches that use natural elements, such as vegetation, to protect shorelines from erosion, provide or enhance habitat and water quality and preserve the natural processes and connections between riparian, intertidal and subaqueous areas" (Guilford CCR Plan). Ideally, this living shoreline project would focus on a few components including the installation of an offshore breakwater or some type of hybrid structure for wave attenuation at this high energy site. The second component would focus on reconstructing a new groin at the mouth of the West River towards Chaffinch Island Point. Another would be replacing sediment behind a rocky sill and planting more marsh grass along this half-moon shaped section of beach in an effort to nourish, restore, and stabilize the tidal marsh. The outcome of the project will help mitigate future erosion and provide further flood protection of nearby critical infrastructure.

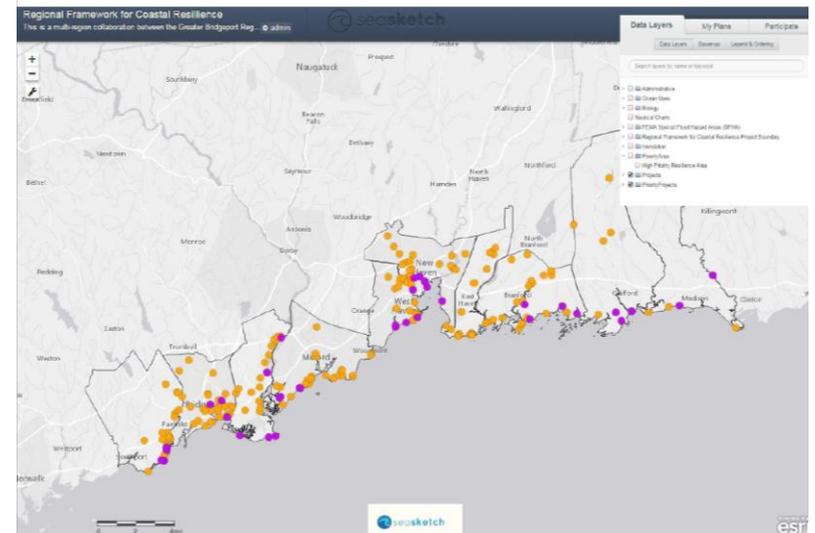


Credit: Milone and MacBroom

Municipality-Identified Projects & Most Concerned Areas



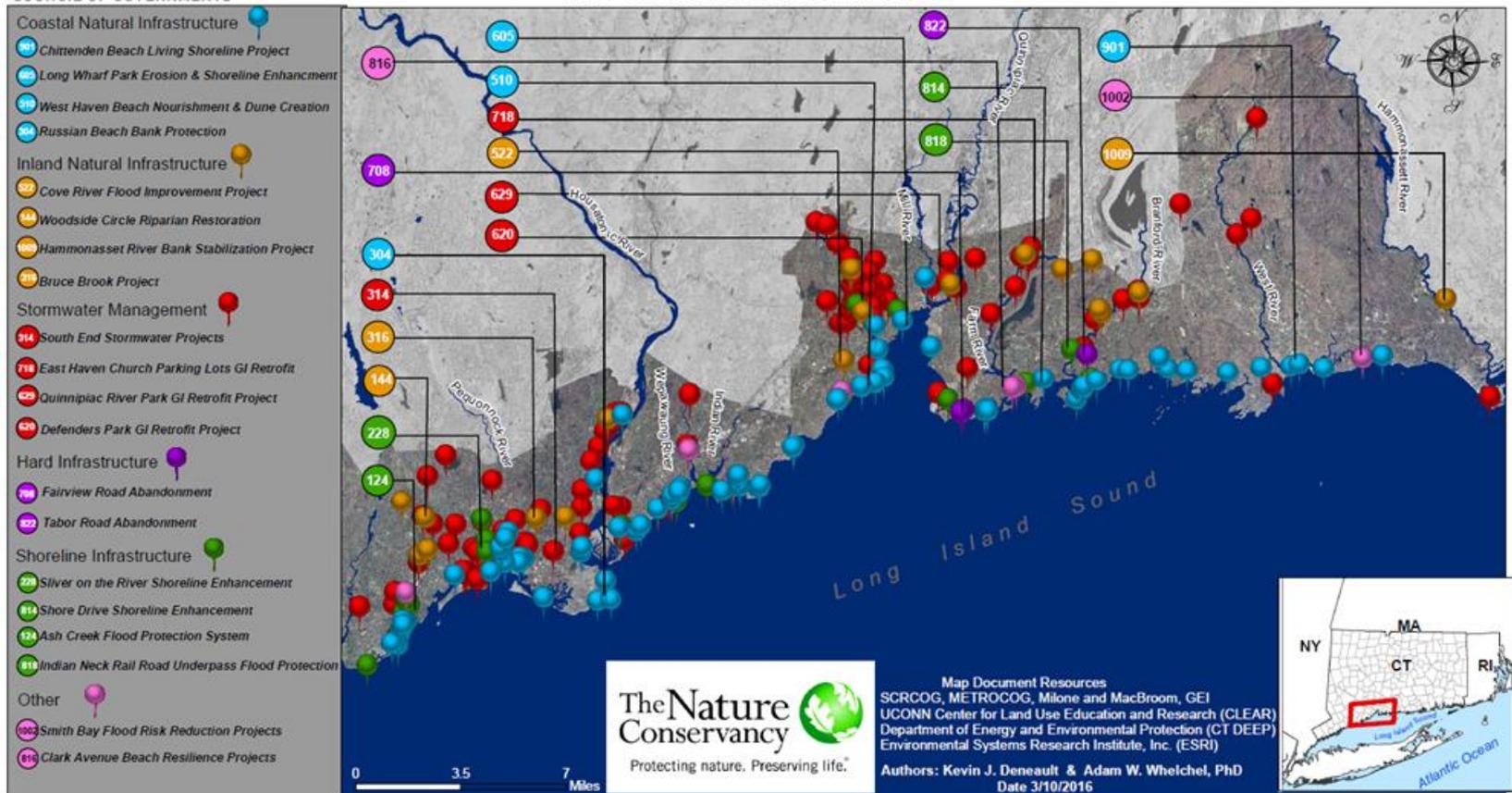
Municipality-Identified Projects & All Regional Framework Projects



Regional Coastal Resiliency Framework



Southern Connecticut Regional Framework for Coastal Resilience



Legal, Policy and Regulatory Assessment

1. Legal, Policy, and Regulatory Resilience Inventory
2. Legal, Policy, and Regulatory Opportunities
 - Case Studies

Coastal Resiliency Strategies

Coastal Land Use <ul style="list-style-type: none"> • Coastal Zoning Districts • Coastal Site Plan Review • Coastal Setbacks • Natural Protective Barrier Protection • Flood and Erosion Control Structures 	Open Space <ul style="list-style-type: none"> • Transferable Development Rights • Cluster Development • Open Space Set-Asides • Financial Mechanisms
Transportation Resiliency <ul style="list-style-type: none"> • Highway Stormwater Sewer Capacity • Green Infrastructure in Highway Design • Highway Elevation • Highway Abandonment and Decommissioning 	Flood Hazard Mitigation <ul style="list-style-type: none"> • Suitability of Building Lots • Defining Flood-prone Areas • Enhanced Building Requirements • Stormwater and Low-Impact Development

Table 1. Coastal zoning districts by municipality.

Municipality	Coastal District(s)	Type
Branford	Coastal Management	Overlay
Bridgeport	Mixed Use - Waterfront	Zoning
East Haven	—	—
Fairfield	Beach	Zoning
Guilford	Coastal Area	Overlay
Madison	—	—
Milford	Beach Erosion Zone	Zoning
	Boating Business	Zoning
	Waterfront Design	Zoning
New Haven	Coastal Management District	Overlay
	Light Industry - Marine	Zoning
	Marine	Zoning
Stratford	Coastal Area Management	Overlay
	Coastal Industrial	Zoning
	Waterfront Business	Zoning
West Haven	Waterfront Design	Zoning

Table 7. Stormwater peak flow offset requirements.

Municipality	Peak flow offset requirement
Branford	No increase from 100-year storm
Bridgeport	No increase under any conditions 10% reduction for some districts up to 50 year storm
East Haven	No increase in "urban" stormwater
Fairfield	—
Guilford	No increase from 2-year storm
Madison	No increase from 100-year storm
Milford	
New Haven	No increase from "various storm events"
Stratford	No increase from 25-year storm Town engineer may require no increase from 50- or 100-year storm
West Haven	—

Regional Drinking Water Study

- *Climate Adaptation and Resiliency Planning for Protection of Public Drinking Water*
- Goal: develop useful climate information for SCRCOG/RWA; transfer that information to other COGs & CT water utilities to enhance resiliency of public water supplies



Research Objectives

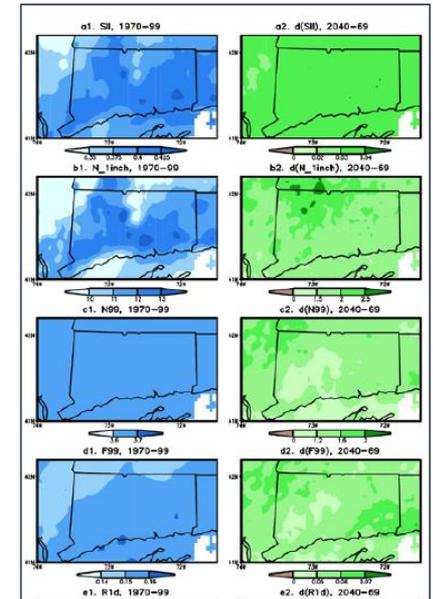
1. Literature review and survey of CT water utilities to learn what is already being done to plan for effects of climate change on drinking water quantity and quality
2. Identify potential climate related risks and thresholds
3. Translate climate information to inform ongoing regional and utility planning efforts
4. Develop a “how to” guide, lessons learned, and webinar to broadly disseminate and share results in collaboration with CIRCA for use by other water utilities



Current Water
Utility
Approaches &
Observations

Historical
Trends of
Water Quality
& Quantity

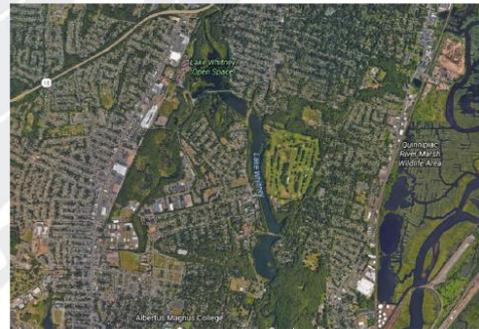
Future
Predictions
through
Climate
Modeling



Preliminary Findings

- Increase in percentage of annual precipitation that comes from extreme events– from 15.5% to 22% by mid-century
- More severe and frequent summer droughts
- Increased temperature + reduced summer rainfall =
 - Increased algal growth
 - Increased stress on water treatment process

Rising Temperatures May Impact Algae and Cyanobacteria Growth in Connecticut Drinking Water Supply Reservoirs



Cristina Mullin

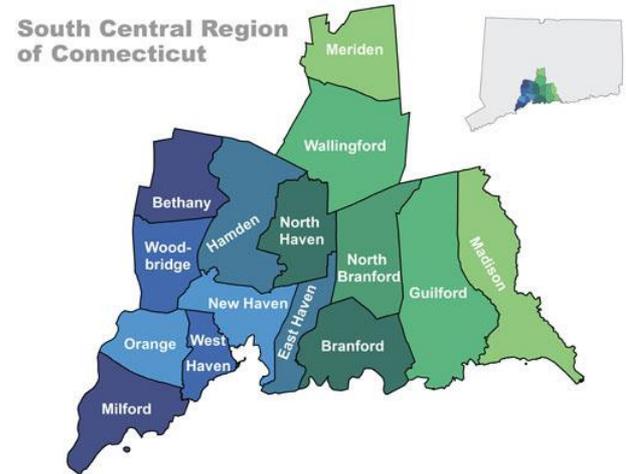
April 27, 2017

UConn

Additional Resources

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<https://scrcog.org/regional-planning/coastal-resilience/>

<https://maps.coastalresilience.org/connecticut/>