New Planning and Visualization Tools for Sea Level Rise
“Municipal Resilience Planning Assistance Project” was funded through the State of Connecticut Department of Housing CDBG-Disaster Recovery Program and the US Department of Housing and Urban Development.

Combined science, policy, and planning at the state and local levels to address vulnerable communities along Connecticut’s coast and inland waterways to climate change.

Developed tools for municipalities to assess vulnerable infrastructure to inundation by river flow, sea level rise, and storm surge in the next 25-50 years.

https://circa.uconn.edu/projects/municipal-resilience-planning/
Resilient Connecticut, HUD National Disaster Resilience Grant
Zones of Shared Risk

Municipal Scale: Zones of Shared Risk

- **Access** – ability to enter/exit area
- **Location** – low-lying/vulnerable lands
- **Proximity** – adjacency to vulnerable lands
- **Natural Protection** – risks to lands that provide natural protection

**At-risk Access Zones**
- TW – Tidal Wetlands
- OQ – Old Quarry
- SH – Sachem’s Head
- WR – West River
- MP – Mulberry Point
- SA – Seaside Avenue
- SV – Soundview Road
- NR – Neck Road

**Examples:**
- RT. 146 Example: Access
- SH Example: Proximity
- TW Example: Natural Protection
- SA Example: Location
- NR Example: Location

Guilford Community Coastal Resilience Plan | November 18, 2014
Visualizations

Barrier beach with housing

Peninsula and impounded marsh

Inland marsh with housing

Understanding flood risks & SLR

Resilience Corridors, Zones of Shared Risk, & multifunctional

Technical Analysis of Impediments, Wetlands and flooding

CONNECTICUT INSTITUTE FOR RESILIENCE AND CLIMATE ADAPTATION
Barrier Beach Development Planning

A barrier beach is a small, elevated area of land along the edge of coastal land, usually crowned by a single, cavity-backed dune. This coastal feature, known for its many benefits, is challenging because it is both inherently complex and requires active management to remain healthy and functional. By using a combination of barrier beach management techniques, including regular monitoring, maintenance, and community engagement, barrier beaches can be preserved as vital coastal ecosystems, while enhancing coastal resilience and adaptation.

Elevating buildings can cause policy conflicts when the required height exceeds zoning or code limits, leading to variances on a case-by-case basis. Municipalities should consider alternative ordinances to accommodate these increased building heights.
Differentiating hurricanes from nor'easters

Understanding the impact of sea level rise (SLR) over time

Understanding the combined impact of SLR and storms
Flood Height
Elevated flood levels
The water level of a particular storm will rise

Time Scale
INCREASED FREQUENCY
A Storm that would occur every 10 years on average occurs roughly every 2 years.
Coastal features subject to constant wave and wind energy likely took many years to reach a type of steady state. When modified, the forces remain, often pressuring the site back towards stability. The result is that areas heavily altered are usually the most impacted by storm events. Fighting this rebound effect can be extremely difficult and expensive.

Ocean Beach in New London is one such case. In the 1934 aerial, notice the number of homes built on the beach. The hurricane of 1933 washed over the barrier beach and destroyed and damaged many of the homes, evident in this photo taken by the Air Guard right after the hurricane. Today it is the home of Ocean Beach Park.

See the same area from a different perspective (below). The left is just after the 1938 hurricane and the right is today. The houses have been replaced by a recreational area. The sand spit is now a jettty built by the US Army Corps of Engineers.
Barrier Beach Development Planning
Long isolated low-lying road
Zones of shared risk: Isolated Housing area with one egress
Potential for septic failure and a lack of options for sewage. Demand on municipality to provide services to homeowners.
Flooding from the front and from behind. Houses can be raised (and are in many cases) but raising the road is costly and requires upkeep and periodic repair as flooding will occur from both sides.
Consider valuable ecology and access issues. Also, potential location for tide gate. Consider impacts from a flood investment and flood impact perspective.
Resilience Corridor Development Planning

Resilience Corridor Development Planning

Critical Facilities located in hurricane-prone areas are prone to both sea-level rise and short-term and long-term flooding. Experience from Hurricane Sandy and future storms reveals the need to build barriers around critical facilities and elevating dry retail to areas from urban water. Since failure is not an option, even in the face of hurricanes, stormwater basin heights need to be substantial.

Resilience Corridors utilize existing roads to maximize access to high ground, with roads leading from low-lying areas to higher ground. Resilience Corridors are one of several strategies to enhance the flood resiliency of low-lying areas near the coast. In addition to providing access for emergency response, they can help shape development planning and neighborhood development strategies.

Some areas do not typically benefit from resilience development, thus serving as good locations for new development. Sites in these areas often benefit from resilience development at a lower cost. Therefore, focusing on these areas appropriately means the corridor is heterogeneous but still built to withstand future storm events.
Multifunctional Benefits for Investment in Resiliency
Flood Gate Development Planning

The risk of flooding on waterways and properties along the coast is an ongoing concern. Water levels over Natural Flood Plains, when significant, can lead to properties that are not normally at risk from floodwater. The proximity to tidal wetlands and the impact of climate change above these areas often make such properties potential flood risk areas. Smart Flood Gates can impede the effects of storm events by controlling the flow of water across surrounding areas, thus minimizing the potential for flooding. Flood Gates can help protect essential infrastructure, such as roads and buildings, from floodwaters. Floodplains adjacent to tidal flooding, such as barrier islands and estuary wetlands, can offer some protection but are not a complete solution. A comprehensive strategy that includes floodplain management and hazard reduction can contribute to reducing the impact of flooding. Planning for flood risk involves understanding the historical flood levels in an area and incorporating this knowledge into future development plans. The understanding of past flood events and their impacts is essential for effective planning decisions and lessens the necessity for immediate action.
Conclusion

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Talk Outline (clean up and/or remove)

1) Review State of CT challenges and opportunities and need for coordinated communication
2) Projections to the state - TASK 9 WORK AND POLICY AND PLANNING PAPERS and the way that visualization is situated in the grant (specific tools) >
3) Discuss zones of shared risk / Resilience Corridor

4) Example one – barrier beach issue (zones of shared risk definition)
   a. Understanding the hurricane impact vs. nor’easters
   b. Pressure of raising homes on the municipalities (services and utilities)
   c. Broader value for town? Or individual homes – how to prioritize.

5) Example two – Resilience Corridor
   a. Critical facility – need to address hurricanes – dry egress is a near term
   b. Define multifunctional benefits for investment in resiliency for the utility/infrastructure
   c. Value of a resilience corridor as a raised egress. Functions like a spine providing dry egress
   d. Homeowners can raise and have access while allowing wetland function to occur
   e. Roll out methodology using a zones of shared risk approach
   f. Give and take (built environment and water) (giving and taking of wetland) (wetland takings and mitigation)

6) Example three – impounded marsh and housing and the importance of field observations
   a. Importance of understanding constrictions (wave height, elevation of road)
   b. Capacity of wetland volume (reduces flood risk) define value for flood abatement
   c. Wetland function considerations

7) Value of visualization as a tool for understanding the tradeoffs and challenges and for understanding the technical risks.
8) Feedback regarding the value of the visualizations and the content provided.
9) Next steps – vulnerability assessment as a tool to define typological conditions