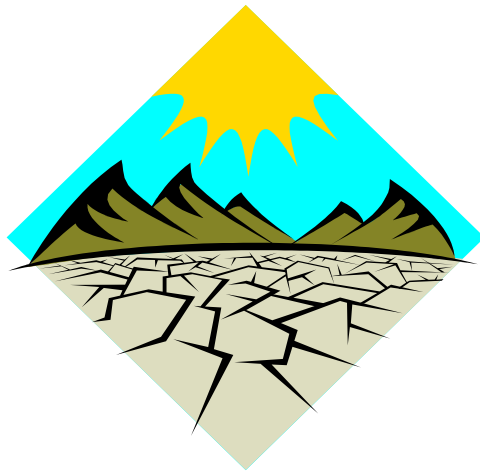


SOUTHEASTERN CONNECTICUT HAZARD MITIGATION PLAN UPDATE AND “RESILIENT CONNECTICUT 2.0”

Presentation for the Eastern Connecticut
Water Utility Coordinating Committee



November 16, 2022



RESILIENT
Land & Water

WHY ARE WE HERE?

- The Connecticut Institute for Resilience and Climate Adaptation (CIRCA) is expanding *Resilient Connecticut*
- What is *Resilient Connecticut*?
- What are the ways that water utilities can be involved?

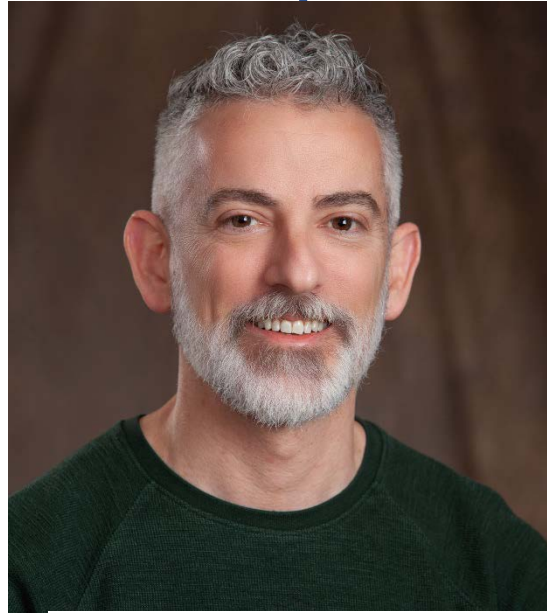
- SCCOG is updating its multi-jurisdiction hazard mitigation plan (the 4th edition)
- What is a hazard mitigation plan?
- What are the ways that water utilities can be involved?

These efforts are being combined to leverage resources and labor, and ensure that climate adaptation is part of the hazard mitigation plan

MEET THE PLANNING TEAM



Mary Buchanan, PhD



David Murphy, PE, CFM



Victoria Vetre, CFM



Connecticut Institute for Resilience
and Climate Adaptation

RESILIENT
Land & Water



**HAZARD MITIGATION
PLAN UPDATE**

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

Authority

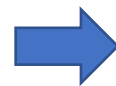
- Disaster Mitigation Act of 2000

Goal of Disaster Mitigation Act

- Promote hazard mitigation *actions to reduce losses and reduce risks*

Eligibility for Mitigation Grant Programs

- Building Resilient Infrastructure and Communities (BRIC)
- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)



DEMHS issued its application process in September, with **applications due in December**

HMGP funds available from the COVID and Storm Ida disasters, with **applications due in January**

PURPOSE AND NEED FOR HAZARD MITIGATION PLAN

What is a Natural Hazard?

- An extreme natural event that poses a risk to people, infrastructure, and resources.



What is Hazard Mitigation?

- Actions we take now that reduce or eliminate long-term risk to people, property, and resources from natural hazards and their effects.



WHICH HAZARDS DO WE ADDRESS?

Extreme and Severe Storms

- Hurricanes and Tropical Storms
- Tornadoes and High Wind Events
- Severe Winter Storms

Sea Level Rise

- Coastal Flooding
- Shoreline Change

Changing Precipitation

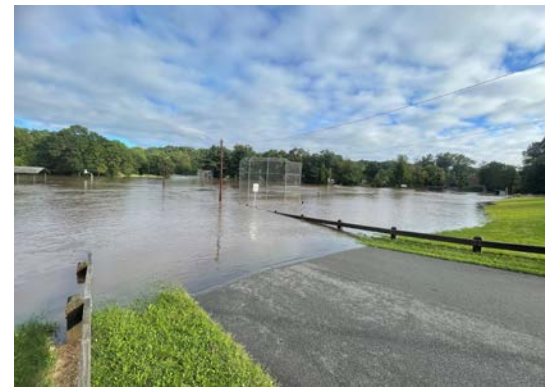
- Riverine and Pluvial Floods
- Droughts
- Dam Failure

Rising Temperature

- Extreme Heat
- Wildfires

Earthquakes

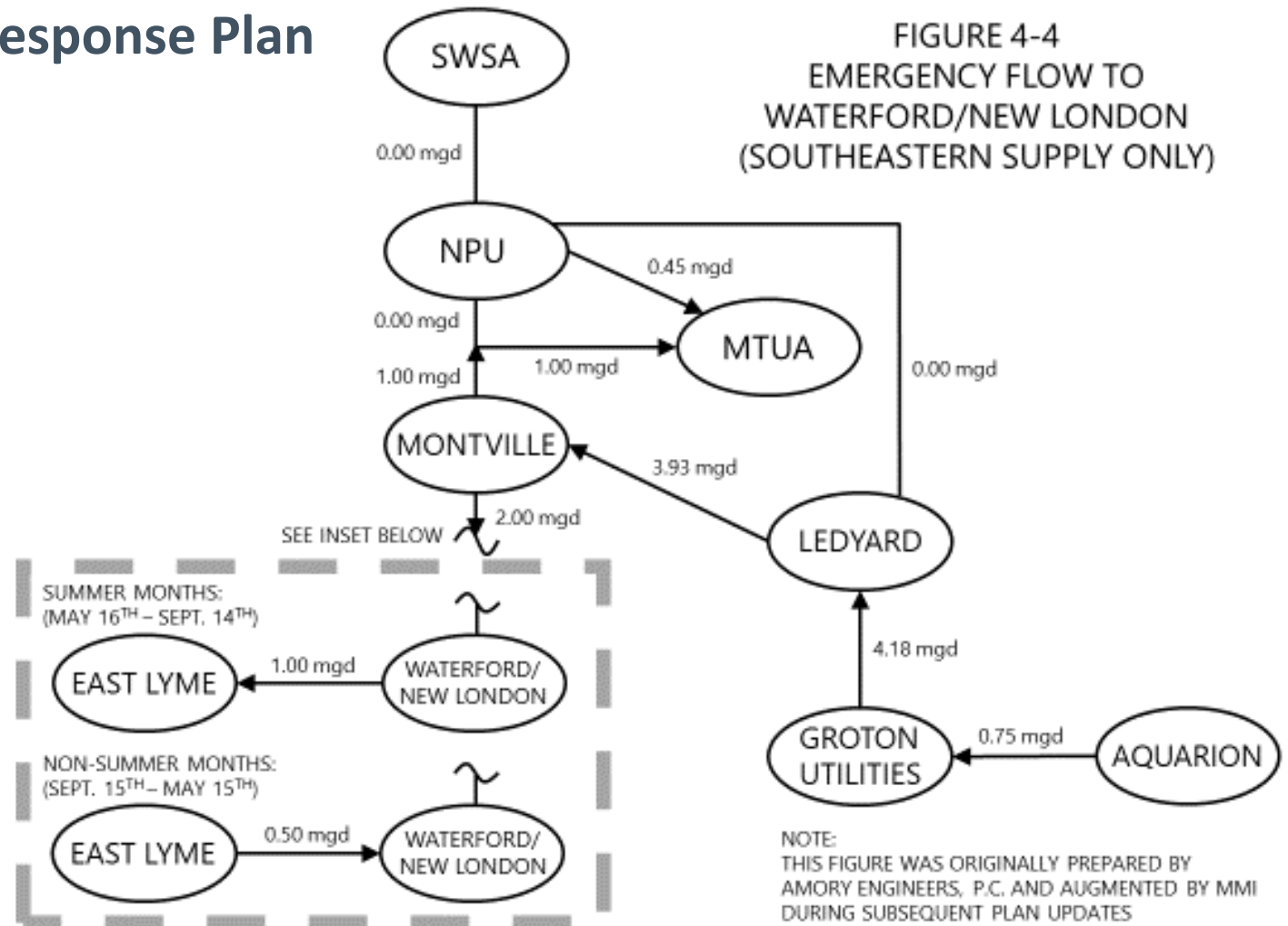
- Not affected by climate change, but addressed in the plan as always



EXAMPLE OF SUCCESS RELATED TO WATER UTILITIES

Intra-Regional Water Supply Response Plan

- Interconnected Municipal Water Systems, Aquarion, and Mohegan Tribe
- This is an example of hazard mitigation because it can help reduce drought losses and other hazard losses



An aerial photograph of a coastal town, likely in Connecticut, showing significant flooding. The water has inundated the streets and yards, surrounding several houses and a marina. In the foreground, a large wooden dock with several white buoys is visible. A large black and white boat is docked on the left. In the background, more houses and a church steeple are visible across the flooded area. The sky is overcast and grey.

INTRODUCTION TO
RESILIENT CONNECTICUT

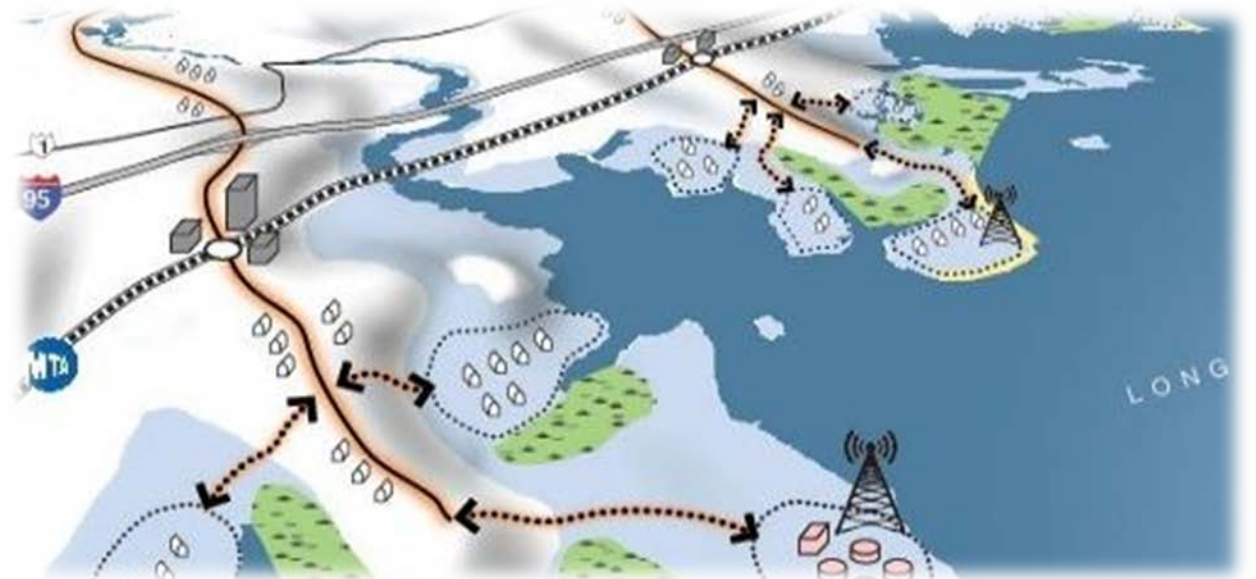
WHAT IS *RESILIENT CONNECTICUT*?

Resilient Connecticut 1.0 was funded by the National Disaster Resilience Competition and focused on regional resilience and adaptation planning for flooding and extreme heat in Fairfield and New Haven Counties.

- Emphasized transit-oriented development, affordable housing, critical infrastructure, and regional assets.
- Developed Social Vulnerability Index (SVI), Climate Change Vulnerability Index (CCVI), Zones of Shared Risks (ZSR), and Resilience Opportunity Areas (ROARs)

Resilient Connecticut 2.0 extends this effort using State funds.

- Increases flexibility to address the climate concerns unique to other regions.
- SCCOG is an active partner in the deployment of the program in southeastern Connecticut



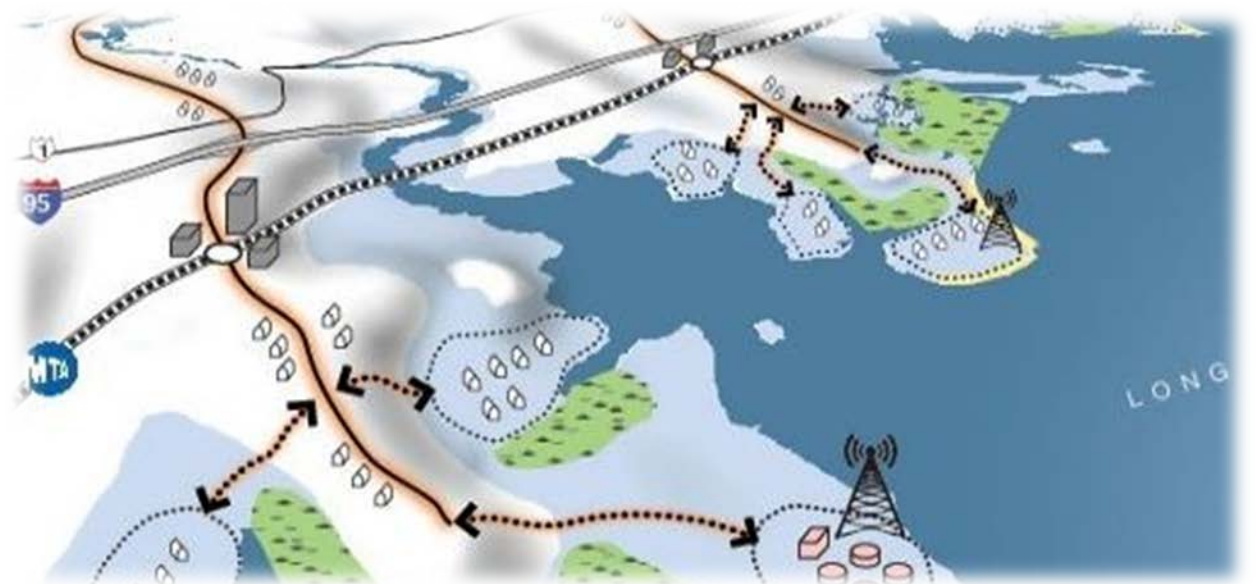
WHAT IS *RESILIENT CONNECTICUT*?

Resilient Connecticut 1.0 was funded by the National Disaster Resilience Competition and focused on regional resilience and adaptation planning for flooding and extreme heat in Fairfield and New Haven Counties.

- Emphasized transit-oriented development, affordable housing, critical infrastructure, and regional assets.
- Developed Social Vulnerability Index (SVI), Climate Change Vulnerability Index (CCVI), Zones of Shared Risks (ZSR), and Resilience Opportunity Areas (ROARs)

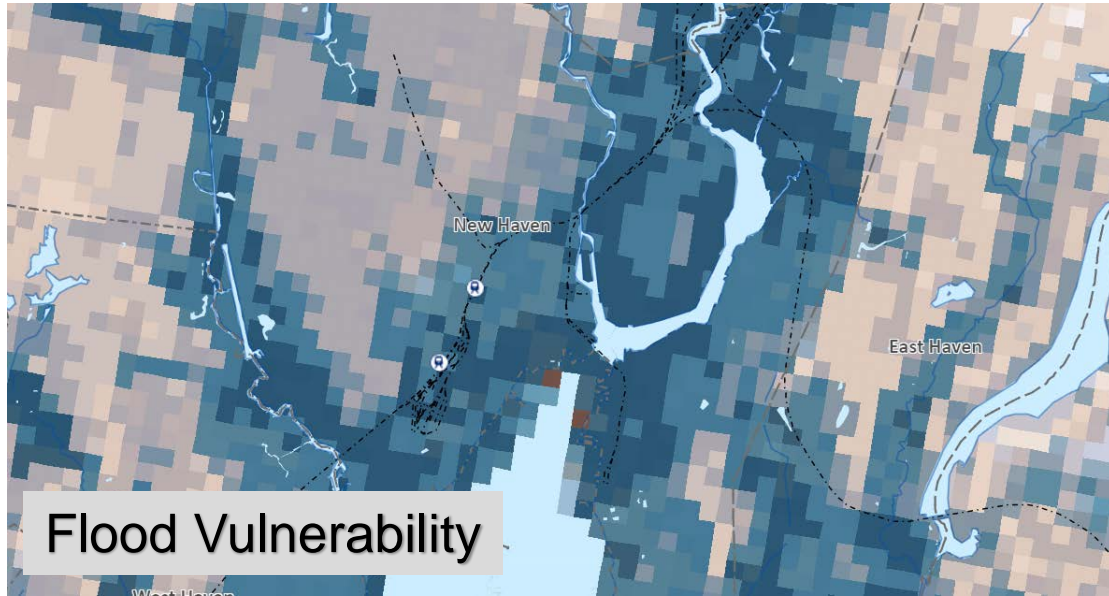
Resilient Connecticut 2.0 extends this effort using State funds.

- Increases flexibility to address the climate concerns unique to other regions.
- SCCOG is an active partner in the deployment of the program in southeastern Connecticut

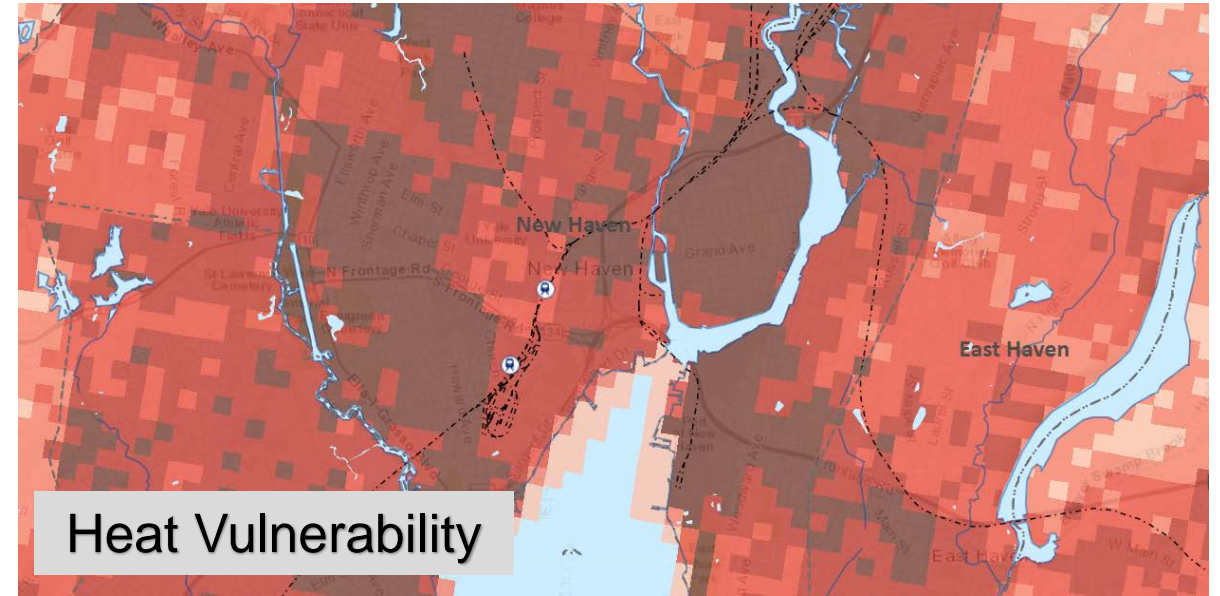


RESILIENT CONNECTICUT 1.0

- A Climate Change Vulnerability Index (CCVI) was developed in the pilot area



Flooding can be coastal, riverine, or pluvial (heavy rain)

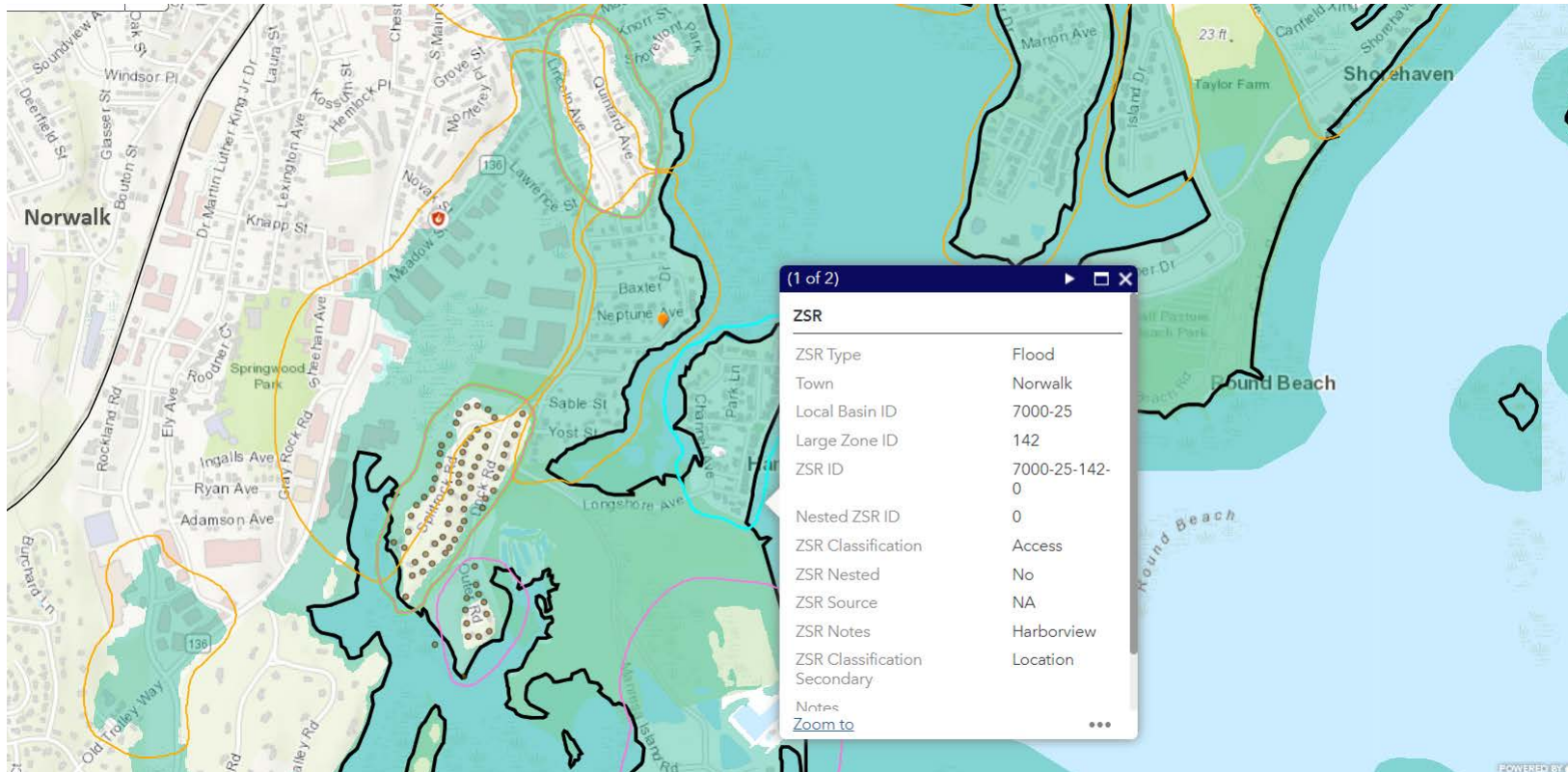


Considers where extreme heat is more likely as well as inability to seek respite

$$\text{Vulnerability} = \frac{\text{Sensitivity X Exposure}}{\text{Adaptive Capacity}}$$

RESILIENT CONNECTICUT 1.0

- “Zones of Shared Risk” were delineated to better represent risk profiles



- Types of Flood and Erosion-Based ZSRs
 - Location
 - Proximity
 - Access
 - Natural Systems
 - Underpasses
 - Single Point
 - Sewersheds

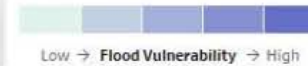
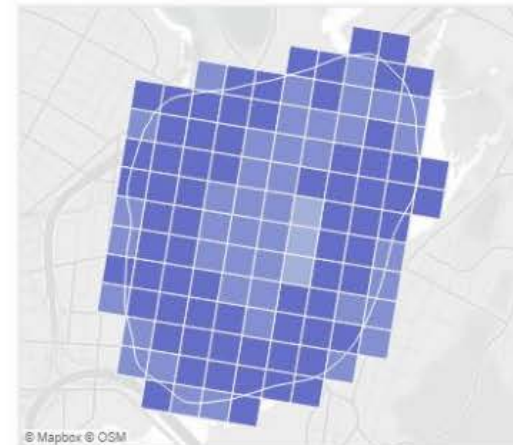
RESILIENT CONNECTICUT 1.0

- CIRCA and its Consultant Identified Overlapping Climate-Driven Challenges...

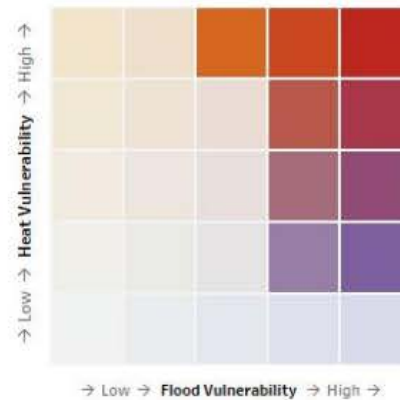
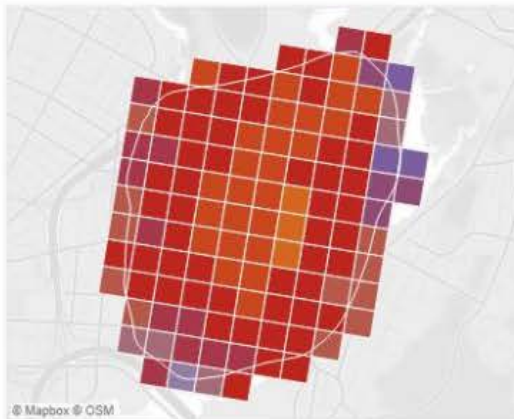
Zone of Shared Risk:
5200-00-392-89
Town: **New Haven**



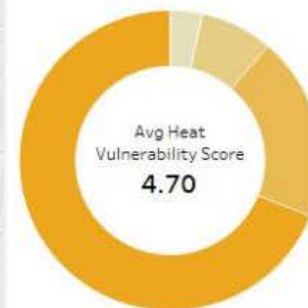
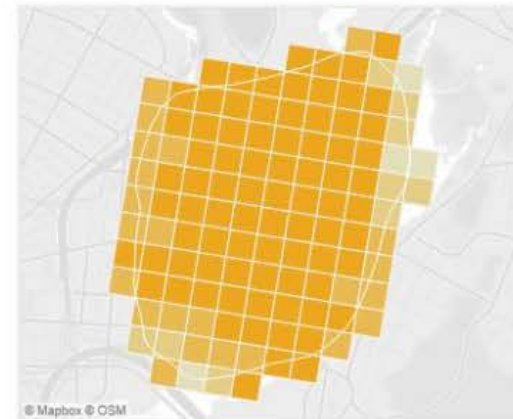
Flood Vulnerability



Combined Vulnerability



Heat Vulnerability

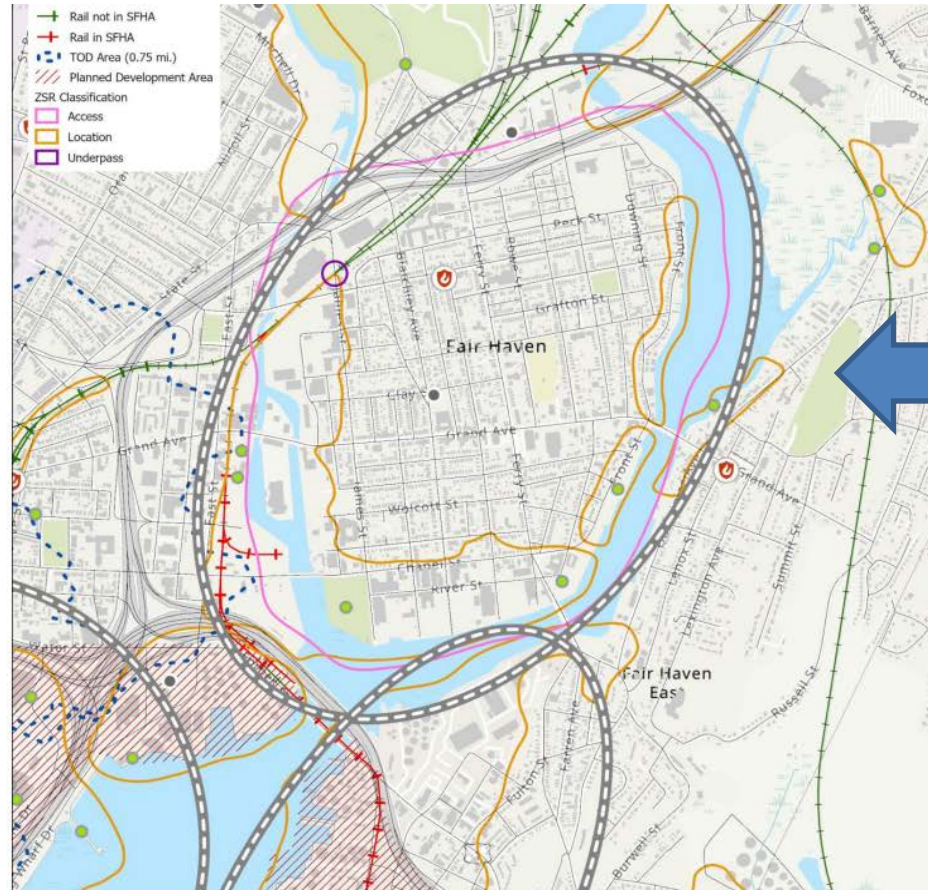


RESILIENT CONNECTICUT 1.0

- And These Challenges were Recognized as Opportunities to Address Unmet Needs...

Name: Fair Haven/Mill River
Location: New Haven

Considerations	Characteristics of Area
Flood Vulnerability	●●●●●
Heat Vulnerability	●●●●●
Social Vulnerability	●●●●●
<p>Zones of shared risk along the Mill River and Quinnipiac River merge with a zone of shared risk drawn around Fair Haven (for isolation risks) to highlight an opportunity area centered on Fair Haven. While TOD does not overlap with Fair Haven, it is present just west of the Mill River. Numerous resilience opportunities may be available as the City promotes and supports redevelopment in the Mill River and Fair Haven areas. Care should be taken to enhance livability in Fair Haven and connectivity to surrounding areas.</p> <p>Fair Haven is entirely high heat vulnerable. This is attributed primarily to the high social sensitivity present here, combined with dense housing, high amounts of pavement, and disconnected green space for shade.</p>	
Fire station Public works School	Substation Coastal access

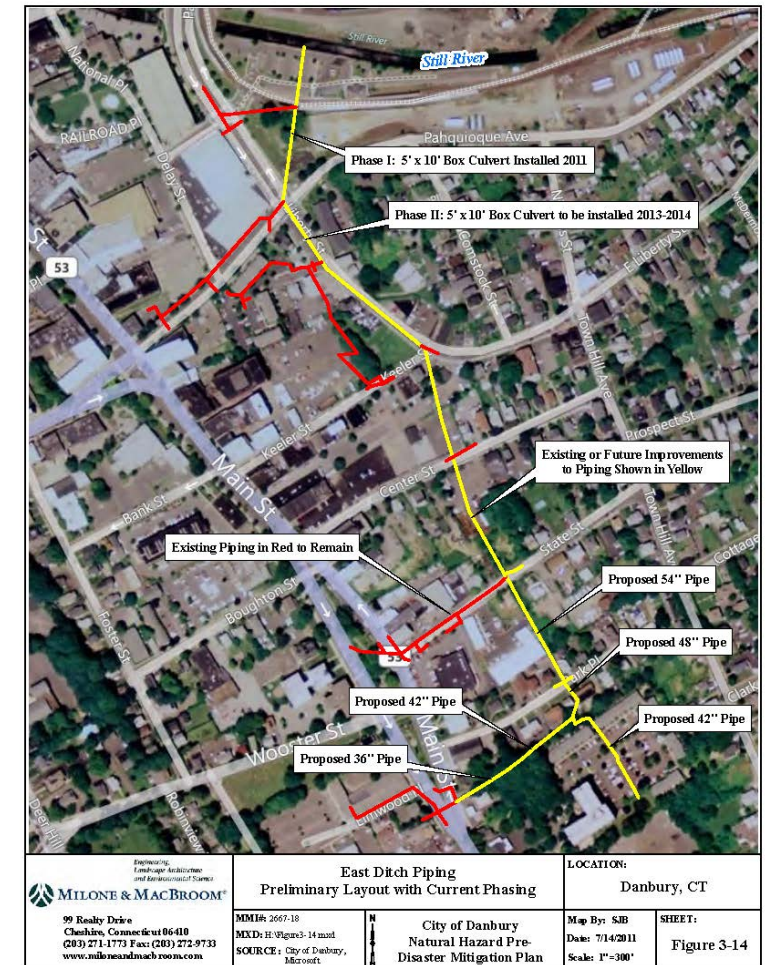


- Overlapping
 - Social vulnerability
 - Flood vulnerability
 - Heat vulnerability
 - Regional assets
 - Infrastructure
 - Critical facilities
 - Historic resources
 - TOD potential

RESILIENT CONNECTICUT 1.0

- And Some of These Regional Opportunity Areas are Proceeding to Concept Design

- ✓ Danbury – Flood mitigation through stream daylighting and identification of cooling center
- ✓ Norwalk – Resilient corridors and heat mitigation in South Norwalk
- ✓ Fairfield – Addressing flooding railroad underpasses and advancing green infrastructure
- ✓ Stratford – Re-envisioning flood solutions for the South End
- ✓ Ansonia – Heat mitigation and TOD connectivity across river
- ✓ Branford – Using railroad grade for flood protection
- ✓ New Haven – Egress through areas of flood risk and heat mitigation for Fair Haven



RESILIENT CONNECTICUT 1.0

- A few public water system opportunity areas were identified

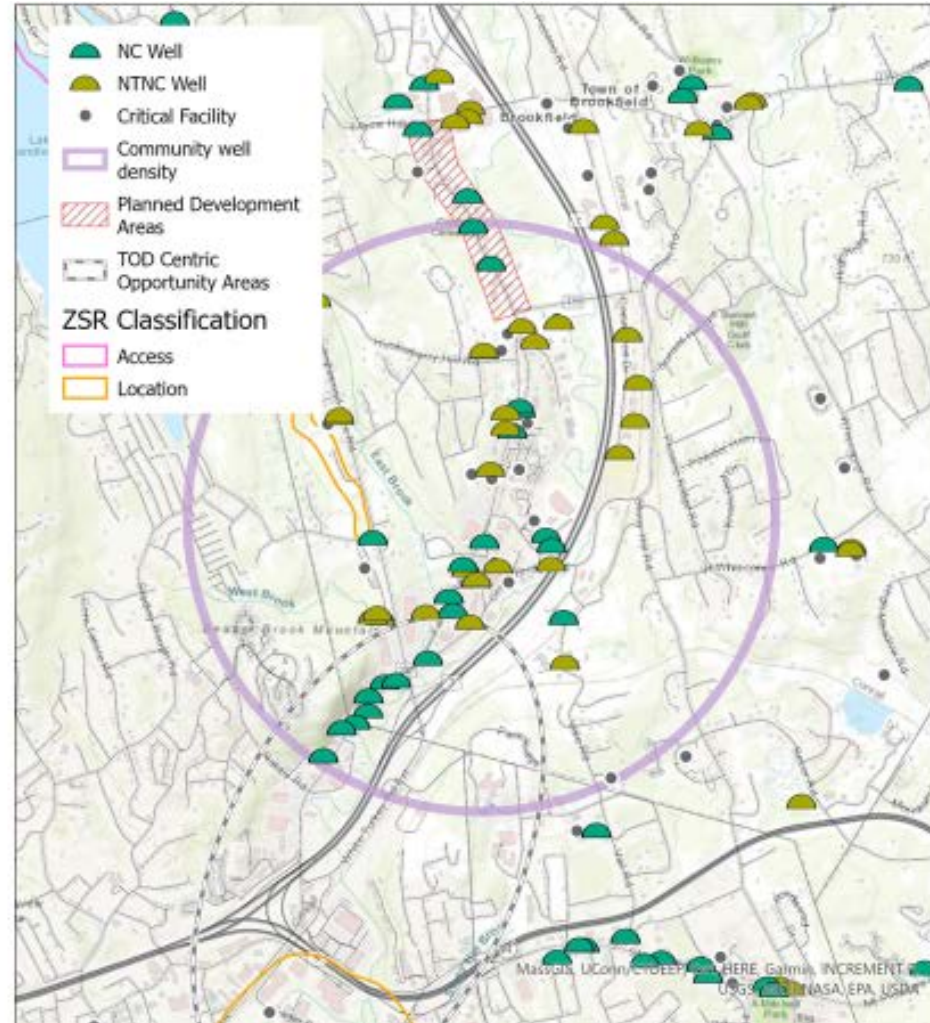
Resilient Connecticut Phase II Regional Adaptation/Resilience Opportunity Areas

Name: Federal Road
Location: Brookfield

Considerations	Characteristics of Area
Flood Vulnerability	●●●○○
Heat Vulnerability	●●○○○
Social Vulnerability	●●●○○

The Town of Brookfield and Aquarion Water Company have taken steps to expand Aquarion's water system and connect individual properties with non-transient non-community and transient non-community wells, but numerous wells and small water systems remain present. With increasing flood and heat risks possible due to variable flood and heat vulnerabilities along the heavily developed Route 7 corridor, individual wells and water systems could be adversely impacted over time. The opportunity area includes many of the non-transient non-community and transient non-community wells.

High density of public water supply wells in areas of flood and heat vulnerability.



- Overlapping
 - Social vulnerability
 - Flood vulnerability
 - Heat vulnerability
 - Clusters of wells with flood and/or drought risk

RESILIENT CONNECTICUT 1.0

- A few public water system opportunity areas were identified

Resilient Connecticut Phase II

Regional Adaptation/Resilience Opportunity Areas

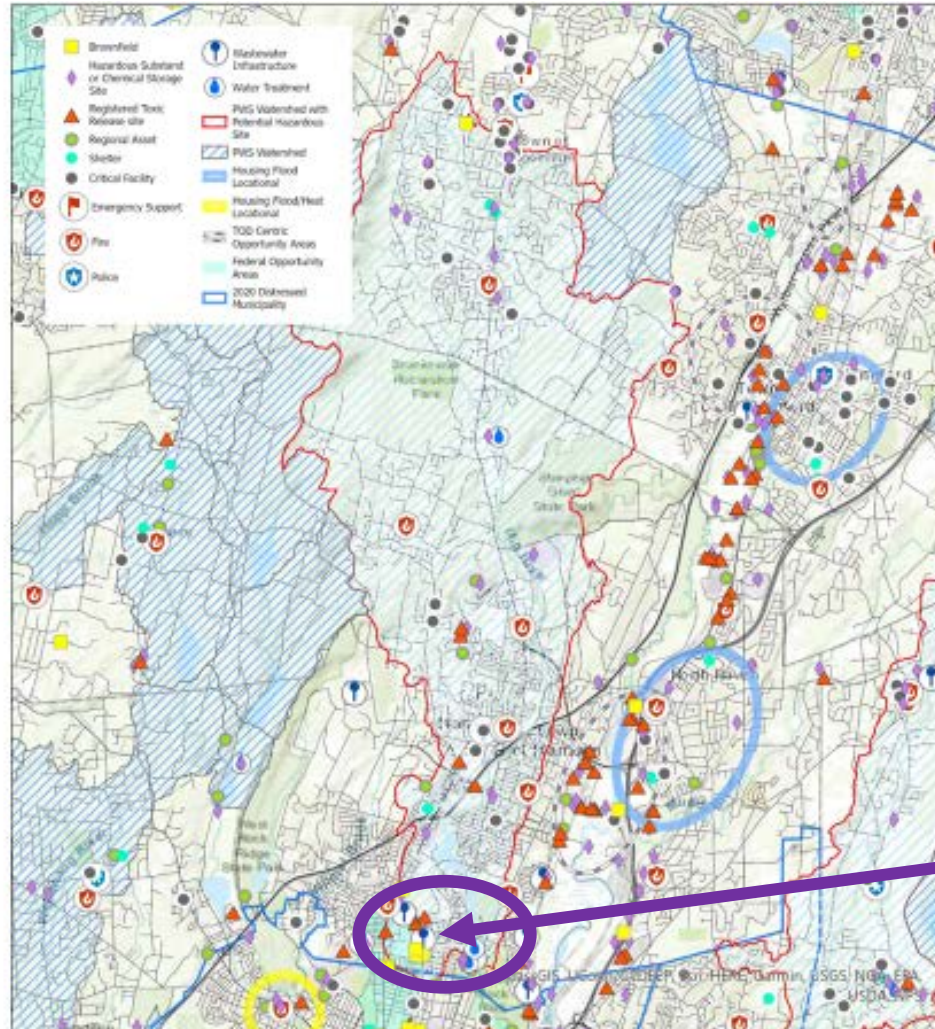
Name: Lake Whitney Watershed

Location: Cheshire/Hamden/North Haven

Considerations	Characteristics of Area
Flood Vulnerability	● ● ○ ○ ○ ○
Heat Vulnerability	● ● ○ ○ ○ ○
Social Vulnerability	● ● ○ ○ ○ ○

The Lake Whitney watershed has several sites of potential concern throughout its 23,000 acres. While overall flood vulnerability is low to moderate throughout the watershed, some potential toxic substance sites are situated along the Mill River, Willow Brook, and within direct proximity to Lake Whitney, presenting potential concerns in the event of a flood that causes a release or spill. Notwithstanding the source protection programs in place at the State and local levels, the presence of the potential releases in the watershed suggest an opportunity for advancing resilience to climate impacts such as more intense or frequent floods.

Public water supply watershed with potential risk of toxic releases from land uses that have flood vulnerability.



- Overlapping
 - Social vulnerability
 - Flood vulnerability
 - Heat vulnerability
 - Pollution sources

CIRCA is working with Hamden to scope a study here that would reduce flooding into Lake Whitney

WHAT IS *RESILIENT CONNECTICUT*?

Resilient Connecticut 1.0 was funded by the National Disaster Resilience Competition and focused on regional resilience and adaptation planning for flooding and extreme heat in Fairfield and New Haven Counties.

- Emphasized transit-oriented development, affordable housing, critical infrastructure, and regional assets.
- Developed Social Vulnerability Index (SVI), Climate Change Vulnerability Index (CCVI), Zones of Shared Risks (ZSR), and Resilience Opportunity Areas (ROARs)

Resilient Connecticut 2.0 extends this effort using State funds.

- Increases flexibility to address the climate concerns unique to other regions.
- SCCOG is an active partner in the deployment of the program in southeastern Connecticut





COMBINING EFFORTS

Sunday Offerings At Mystic Seaport Museum

SCHEDULED TOURS & DEMONSTRATIONS

10:00AM - 11:00AM
11:00AM - 12:00PM
12:00PM - 1:00PM
1:00PM - 2:00PM
2:00PM - 3:00PM
3:00PM - 4:00PM

PLANNING

10:00AM - 11:00AM
11:00AM - 12:00PM
12:00PM - 1:00PM
1:00PM - 2:00PM
2:00PM - 3:00PM
3:00PM - 4:00PM

WHAT ELSE IS HAPPENING TODAY?

10:00AM - 11:00AM
11:00AM - 12:00PM
12:00PM - 1:00PM
1:00PM - 2:00PM
2:00PM - 3:00PM
3:00PM - 4:00PM

MASTERS POLICY: Masts are not to be used as a support for any other structure. Masts are not to be used as a support for any other structure. Masts are not to be used as a support for any other structure.

MYSTIC SEAPORT MUSEUM | MAP & GUIDE

Need to know what is happening today at the Museum? Stop by an information kiosk to find out.

- Exhibits with signal flags are staffed by professional educators and craftspersons.
- National Historic Landmark vessels.
- Especially for children.
- Demos

Map Labels: RIVER EXPLORATION, VILLAGE, KIDS ACTIVITY ZONE, GALLERY ROAD, BEAR CENTRAL, NORTH ENTRANCE, PARKING, MASTERS POLICY, MASTERS POLICY, MASTERS POLICY.

COMBINING PROGRAMS TO BENEFIT THE REGION

Hazard Mitigation Plan Update

Through the Hazard Mitigation Plan, SCCOG and its consultants:

- **engage** with municipalities and tribes to identify concerns and priorities
- **assess** community vulnerabilities and asset
- **identify** opportunities to reduce losses
- **develop** hazard mitigation projects for FEMA funding



Resilient Connecticut

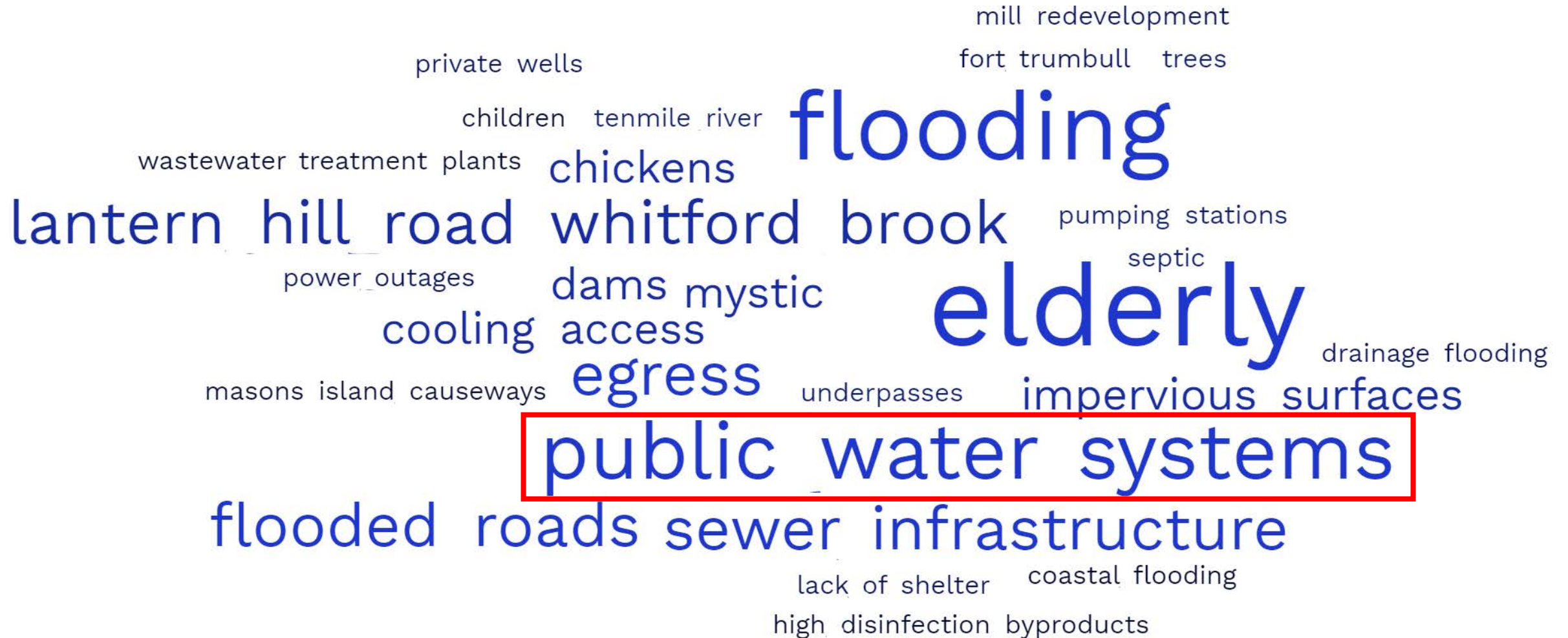
Through *Resilient Connecticut*, CIRCA and its partners:

- **engage** with municipalities and tribes to identify concerns and priorities
- **assess** community vulnerabilities and assets
- **identify** opportunities for increased resilience
- **develop** pilot projects to directly fund



**A Combined
Hazard
Mitigation and
Climate
Adaptation
Plan for
Southeastern
Connecticut**

“WHAT ARE YOUR CLIMATE-RELATED CONCERNS?”



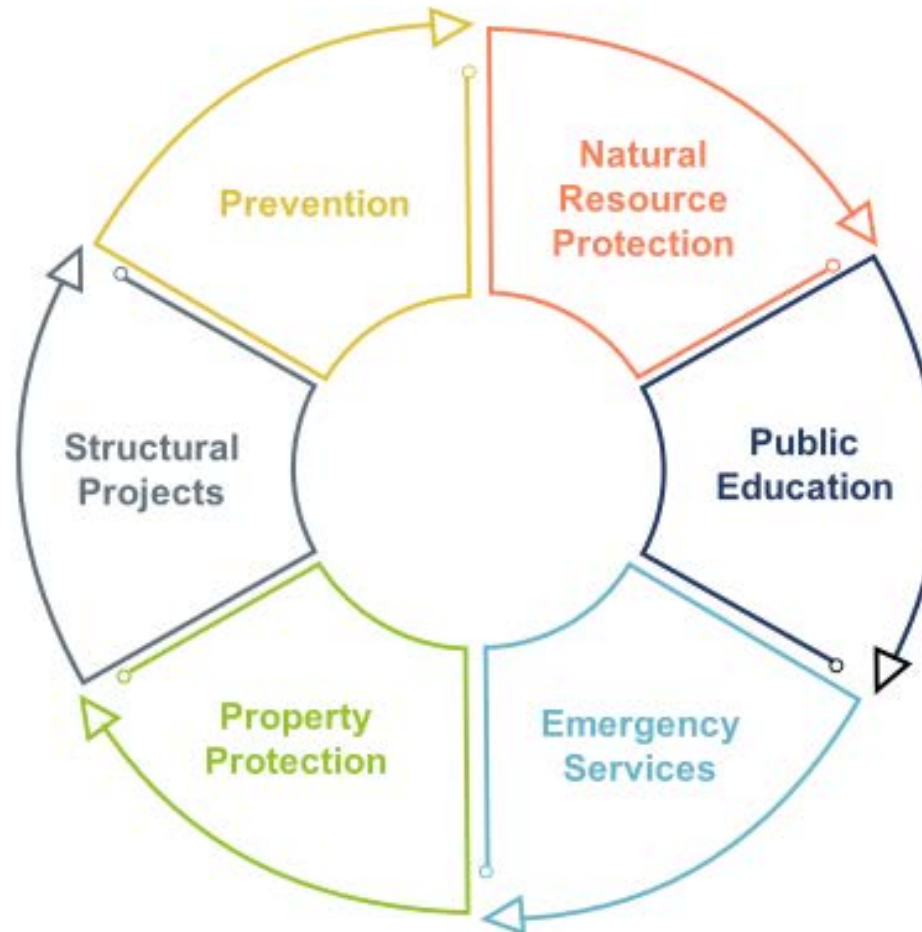
REVIEW OF DRAFT HMCAP ACTIONS

- All actions are found within **six goals**:
 1. Ensure that critical facilities are resilient, with special attention to shelters and cooling centers.
 2. Reduce **flood and erosion** risks, even as climate change affects the frequency and severity of events, by reducing vulnerabilities and consequences.
 3. Address risks associated with **extreme heat events**, especially as they interact with other hazards.
 4. Invest in resilient corridors to ensure that people and services are accessible during floods and that development along corridors is resilient over the long term.
 5. Reduce losses from other hazards that are affected by climate change.

REVIEW OF DRAFT HMCAP ACTIONS

- All actions are found within **seven categories**: the standard six + 1 new category

+ Water and
Wastewater
Utility
Projects



Structural Project



Property Protection through Elevation

REVIEW OF DRAFT HMCAP ACTIONS

Community	#	Mitigation Actions and Strategies for CROG Communities	Hazard Mitigation and Climate Adaptation Goal	Category of Action	Responsible Department	Approximate Cost	Potential Funding Sources
Franklin	FR5	Partner with Norwich Public Utilities to expand the public water system further north into the town to help reduce drought risks to properties with private wells.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP, NPU CIP Budget
Franklin	FR6	Partner with Windham Water Works to expand the public water system further south into the town to help reduce the drought risks to properties with private wells.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP,WWW CIP Budget
Ledyard	LD7	Complete final segments of planned water system expansions to address drought resiliency and make critical facilities more resilient.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Water & Sewer	>\$1M	DWSRF; Municipal CIP Budget
Lisbon	LI5	Extend public water systems from NPU and Jewett City Water Company to reduce drought impacts to properties currently served by private wells; and to provide fire protection.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP; NPU CIP Budget
MPTN	MP5	Complete drinking water system upgrades and replace system components to reduce TTHM levels in the water supply.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Tribal Utilities	>\$1M	Tribal Utility Funds; EPA Grants
Montville	MV8	Extend public water systems to reduce drought impacts to properties currently served by private wells; and to provide fire protection.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Water & Sewer	>\$1M	DWSRF; Municipal CIP Budget

REVIEW OF DRAFT HMCAP ACTIONS

Community	#	Mitigation Actions and Strategies for CRCOG Communities	Hazard Mitigation and Climate Adaptation Goal	Category of Action	Responsible Department	Approximate Cost	Potential Funding Sources
North Stonington	NS16	Extend fire protection to future at-risk areas through public water systems or the installation of dry hydrants.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP
North Stonington	NS17	Extend the existing public water systems to adjacent areas served by private wells to reduce drought risks to private properties and critical facilities.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP
North Stonington	NS18	Secure funding for construction of a water tower near the fire department that could be used for firefighting response, or water needs during drought.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; STEAP
Preston	PR6	Extend public water supply along Route 2 to reduce drought risks to critical facilities, essential facilities, and private properties.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; Municipal CIP Budget; MPTN Utility Funds
Preston	PR7	Extend fire protection to the former State Hospital property as this remains an at-risk area.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; NPU CIP Budget

REVIEW OF DRAFT HMCAP ACTIONS

Community	#	Mitigation Actions and Strategies for CROG Communities	Hazard Mitigation and Climate Adaptation Goal	Category of Action	Responsible Department	Approximate Cost	Potential Funding Sources
Windham	WD5	Execute FEMA HMA BRIC grant for scoping related to flood mitigation, water quality, and other resiliency needs for the Willimantic Reservoir, dam, and treatment facility.	More than one goal	More than one category	Windham Water Works	\$100,000 - \$500,000	FEMA HMA Scoping
Windham	WD5A	Evaluate feasibility of hydropower operations at Willimantic Reservoir dam.	More than one goal	More than one category	Windham Water Works	\$50,000 - \$100,000	DEEP Climate Resilience Fund
Windham	WD5B	Identify funding sources and partner agencies to evaluate sedimentation challenges in the Willimantic Reservoir associated with releases from Mansfield Hollow Dam.	More than one goal	Water & Wastewater Utility Projects	Windham Water Works	\$10,000 - \$25,000	LISFF; DWSRF
Windham	WD5D	In the lifespan of this HMCAP (before 2027), conduct at least one set of meetings with UConn and CWC about potential interconnections in Mansfield.	More than one goal	Water & Wastewater Utility Projects	Windham Water Works	\$0 - \$10,000	WWW Operating Budget
SCCOG	COG3	Assign to the Regional Water Supply Management team an action item to review potential for water system expansions in the region, with initial focus areas of Franklin and Montville.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Executive Director	\$0 - \$10,000	SCCOG Regional Services Funds

OPEN DISCUSSION

- Where do you see intersections of assets and **flood-related challenges?**
- Where do you see intersections of assets and **drought-related challenges?**
- Where do you see intersections of assets and **extreme heat-related challenges?**
- Does your utility face any examples of unique climate driver typologies and challenges? Examples:
 - ✓ Flashy droughts
 - ✓ Harmful algal blooms
 - ✓ Vulnerable populations at risk
 - ✓ Critical facilities that are owned by you
 - ✓ Clusters of critical facilities that are served by you
 - ✓ Numerous river and stream crossings in public water supply watersheds
 - ✓ Redevelopment pressures in service areas

NEXT STEPS

- In the short term, provide comments for the Southeastern Connecticut HMCAP
- In the medium term (winter 2022-2023), let us know if you have ideas for:
 - Service area communities located in southeastern Connecticut
 - Public water supply watershed communities in southeastern Connecticut or serving southeastern Connecticut (i.e., Ashford is in the watershed for Windham Water Works' Willimantic Reservoir; and Ashford experienced road washouts in summer 2021)

CONTACT INFORMATION

David Murphy, PE, CFM

- david.2.murphy@uconn.edu
- dmurphy@resilientlandandwater.com

Mary Buchanan, PhD

- mary.buchanan@uconn.edu

Victoria Vetre, CFM

- vvetre@resilientlandandwater.com



Connecticut Institute for Resilience
and Climate Adaptation

RESILIENT
Land & Water