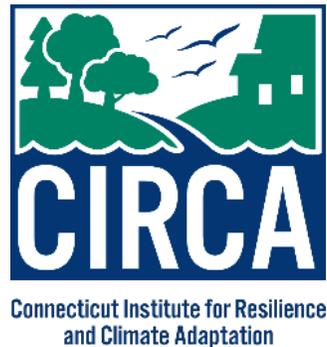


CONFRONTING CLIMATE CHANGE IMPACTS IN YOUR COMMUNITY



Council of Small Towns
October 19, 2023

RESILIENT
Land & Water
Sustainable Solutions, Stream to Shoreline



David Murphy, PE, CFM
Principal of Resilient Land And Water
Director of Resilience Engineering, CIRCA

AGENDA

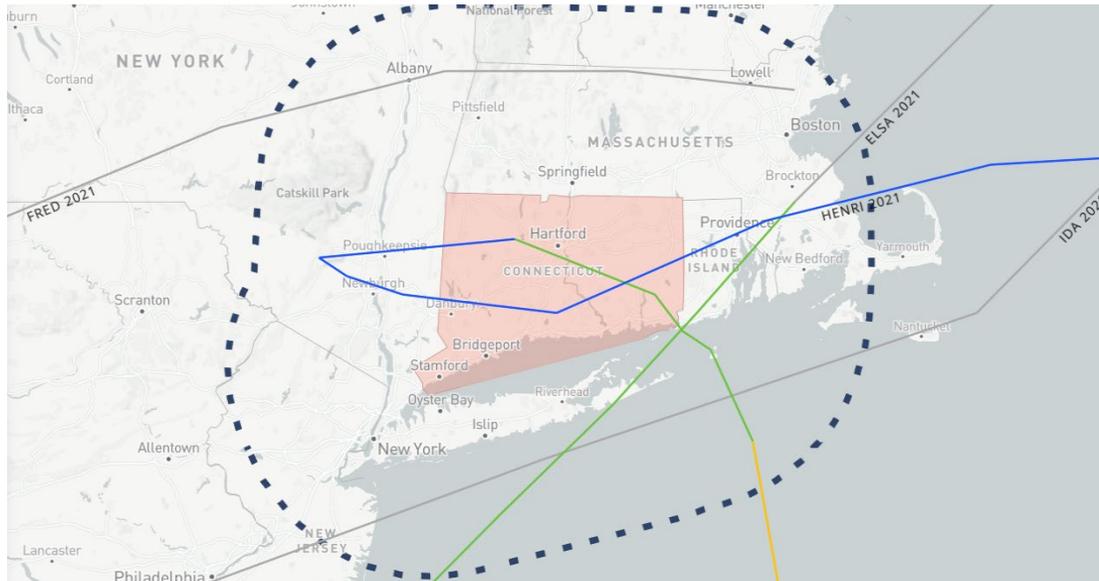
- Climate Change Challenges for Small Towns in Connecticut
- Guidance from the State and Others
- *Resilient Connecticut*: Reporting from the Front Lines
- Shopping from Your Hazard Mitigation Plan or Hazard Mitigation and Climate Adaptation Plan
- Review of Grant Programs
- Summary



CLIMATE CHANGE CHALLENGES FOR SMALL TOWNS

Summer 2021

- TS Elsa – up to 5”
- Extratropical Storm Fred – up to 2”
- TS Henri – up to 4”
- Extratropical Storm Ida – up to 8”



CLIMATE CHANGE CHALLENGES FOR SMALL TOWNS

CT LOCAL WEATHER INVESTIGATIONS NBC CT RESPONDS VIDEO ENTERTAINMENT NBC CT NEWSLETTERS TRAFFIC 57

FIRST ALERT WEATHER

Round of Storms Cause Flooding, Damage to Parts of the State

Published July 17, 2021 • Updated on July 18, 2021 at 8:55 am



0:47 / 2:05

A bridge in Ashford has collapsed because of the severe storms that passed through time.

Trending Stories

- NEW HAVEN**
Cleaning Underway After Bed Bugs Reported at Union Station
- MYSTIC**
Man Accused of Driving 104 MPH in a 25 MPH Zone in Mystic
- MEDIA**
Anchor Don Lemon Out at CNN
- NEWINGTON**
Numerous Gunshots Fired Into Occupied Newington Home: PD

Josh Cingranelli @WeatherJosh · Follow

Newent Rd in Lisbon is flooded as rainfall totals exceed 5 inches in this area. **#nbcct**



THE REGISTER CITIZEN

Peter Yankowski, Jesse Leavenworth, Staff Writers
July 10, 2023 | Updated: July 10, 2023 3:11 p.m.



1 of 20

Crews work on a section of Route 272 in Norfolk, Conn., on Monday, July 10, 2023, after heavy rains washed out a section of the road.

CT INSIDER

NEWS

Six Connecticut families cut off from roads after two bridges collapse in Scotland, officials say

Josh LaBella, Jesse Leavenworth, Staff writers
Sep. 15, 2023



GUIDANCE FROM THE STATE

- Number of days above 90 degrees to increase from 5 to 25 days
- Number of heat wave days expected to increase tenfold
- Average annual precipitation expected to increase 8%
- Number of days with heavy precipitation to rise from 3 to 5 days
- Maximum one-day precipitation to increase

RISING TEMPERATURES & PRECIPITATION IN CONNECTICUT

Information from the Governor's Council on Climate Change

Indices are tools used to track trends and projections in local climate. Extreme indices help quantify impacts of a warming climate on weather measurements. Many of these common indices have been increasing due to climate change.

Annual counts of certain indices (defined below) in CT are to the right. Gray bars indicate today's and black 2050 values.

- By 2050, average temperatures are expected to increase about 5°F, with increases thereafter dependent on emissions choices now.
- Average precipitation is expected to increase about 8% (4 inches/year).
- Indices of hot weather, summer drought, and extreme precipitation, are expected to increase.

Index	Current (Gray)	2050 (Black)
Frost Days	124	85
Heat Wave Days	6	60
Tropical Nights	4	48
Summer Days	81	118

TEMPERATURE & PRECIPITATION RECORD FOR CT SINCE 1895

Current Trends:

Since 1895, Connecticut's annual average temperature has been increasing by 0.3°F per decade, or 3°F warmer in 2020. Seasonal averages have also been increasing, with winter experiencing the greatest increase. Observations show more warming along the southern coast and eastern half of the state.

Predictions:

According to high CO₂ emission scenarios (RCP 8.5) for the future, average temperatures in Connecticut are predicted to rise 5°F (± 1°F) by 2050 and continue rising thereafter. The largest temperature increase is expected in summer and fall.

Precipitation across Connecticut has been increasing by 0.17 inches per decade since 1985, with the largest increases in fall.

Present & Future Extreme Indices:

Heat/Cold Indices:

- Frost Days (annual number of days when the daily minimum is below 32°F) to drop from 124 to 85.
- Heat Wave Days (6 or more consecutive days with daily maximum temperature above the 90th percentile.) to rise from 4 to 48.
- Tropical Nights (annual number of days when the daily minimum is above 68°F) to rise from 10 to 40.
- Summer Days (annual number of days when the daily maximum temperature is above 77°F) to rise from 81 to 118.
- Number of Days above 90°F (annual number of days with maximum temperatures above the threshold value) to rise from 5 to 25.

Wet/Dry Indices:

- Number of days with more than 1 inch of precipitation to rise from 12 to 14.
- Number of heavy precipitation days to rise from 3 to 5.
- Fraction of heavy precipitation to rise from 15% to 20%.
- Maximum 1-day precipitation to rise (27%) from 2.8 to 3.5 inches.
- Maximum 5-day precipitation to rise (20%) from 4.5 to 5.4 inches.

Predictions:

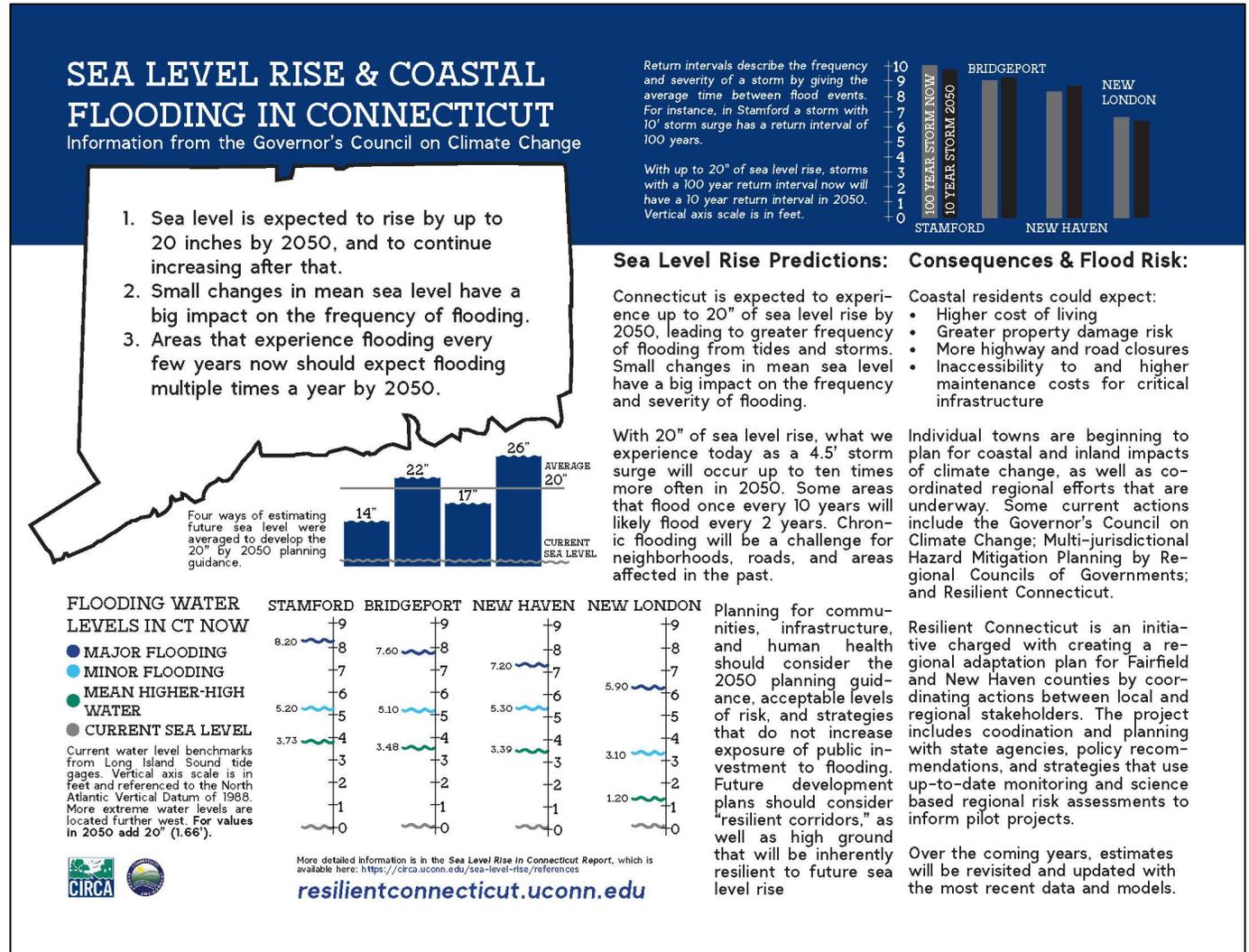
In the same scenario, average annual precipitation is expected to increase about 8% (4 inches per year), with much occurring in winter and spring. In a warmer Connecticut, precipitation will increase because of evaporation and the water cycle.

More detailed information is in the [Connecticut Physical Climate Science Assessment Report](https://circa.uconn.edu/ct-climate-science) which is available here: <https://circa.uconn.edu/ct-climate-science>

resilientconnecticut.uconn.edu

GUIDANCE FROM THE STATE

- The upper and lower bounds of projected sea level rise diverge, but confidence is high for a planning threshold of 20 inches by 2050
- State statutes require using this figure for planning
- This is a **planning threshold**, not a projection
- Number of days of sunny day flooding will increase tenfold



GUIDANCE FROM OTHERS

4TH National Climate Assessment

- The dominant trend in precipitation throughout the Northeast has been towards increases in **rainfall intensity**.
- Further increases in rainfall intensity are expected, with **increases in precipitation expected during the winter and spring with little change in the summer**.
- Monthly precipitation in the Northeast is projected to be about **1 inch greater for December through April** by end of century (2070–2100).
- Although future projections of major floods remain ambiguous, more intense precipitation events have increased the risk of some types of inland floods.

NOAA NCEI State Climate Summaries

- Annual precipitation has been highly variable, with a slight increase since 1895.
- **Increases in the frequency and intensity of extreme precipitation events are projected, as are increases in winter and spring precipitation.**
- Increases in total precipitation and in the number of extreme precipitation events may increase inland flooding risks.

GUIDANCE FROM OTHERS

4TH National Climate Assessment

- The dominant trend in precipitation throughout the Northeast has been towards increases in **rainfall intensity**.
- Further increases in rainfall intensity are expected, with **increases in precipitation expected during the winter and spring with little change in the summer.** 
- Monthly precipitation in the Northeast is projected to be about **1 inch greater for December through April** by end of century (2070–2100).
- Although future projections of major floods remain ambiguous, more intense precipitation events have increased the risk of some types of inland floods.

**Summer
precipitation is
already
challenging
enough!**

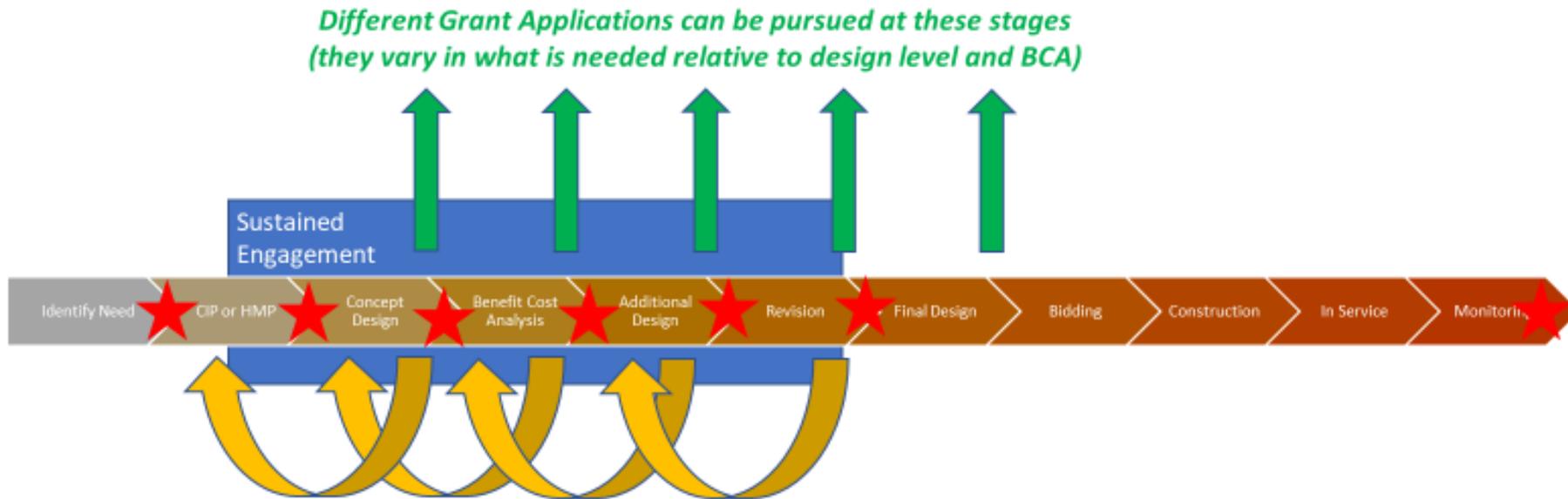


WHAT ABOUT CASCADING IMPACTS?

- **Rising Temperatures** – Longer and more frequent heat waves; less respite from heat at night
- **Changing Precipitation** – Flashy droughts and more intense rainfall causing floods, washouts, and dam overtopping
- **Severe Storms** – More intense wind and rain events, heavier wet snowfall (though we will have fewer snowy days)
- **Sea Level Rise** – Higher daily high tides, more damaging king tides, more damaging storm surges when they occur, and shoreline change
- **Wildfires** – Potentially more risk during dry spring and flashy drought conditions
- **Invasive Species** – Conditions favorable for species shifting northward, changing forests and aquatic ecosystems
- **Harmful Algal Blooms** – Increasing temperatures will affect internal circulation in lakes while intense precipitation washes more nutrients into lakes

HOW CAN WE FOCUS AND WHAT CAN WE DO?

- CIRCA and the Governor’s Office on Climate Change (GC3) said to focus on:
 - Extreme heat, flooding, and environmental justice
- Executive Order 21-3 of December 16, 2021:
 - A loose recognition of the State’s climate resilience “project pipeline”



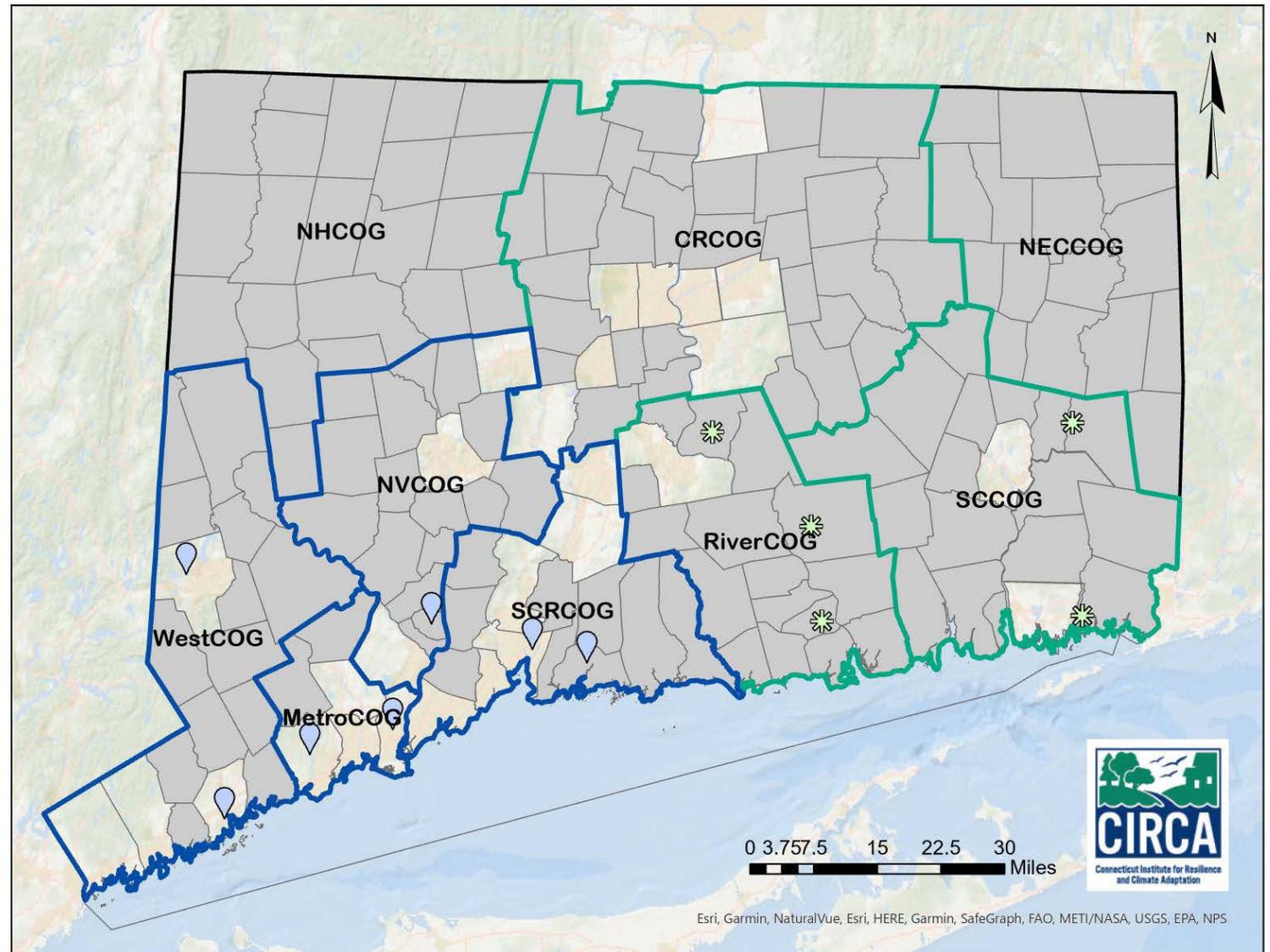
Taking a step backward is possible and often will occur, in practice, along a project pipeline

But how do we identify the projects for the project pipeline?

★ CIRCA interventions and value added possible

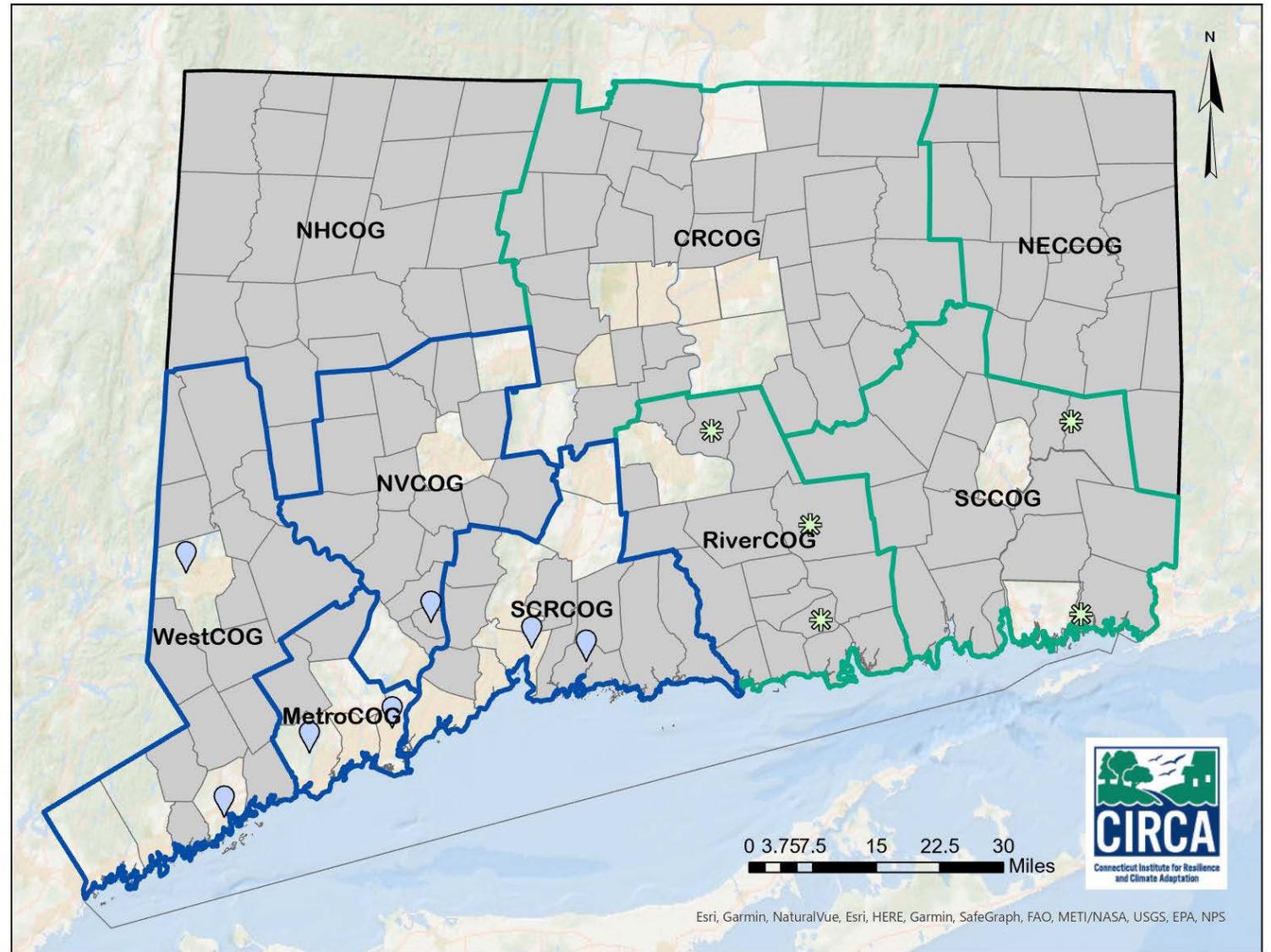
CIRCA'S RESILIENT CONNECTICUT PROGRAM

- Version 1.0 (blue boundary) was piloted in southwestern CT
 - Spatial databases were used to identify areas of unmet climate adaptation needs
 - Where do flood, extreme heat, and social vulnerabilities overlap with regional assets and critical infrastructure?
 - Which challenges are not being addressed?



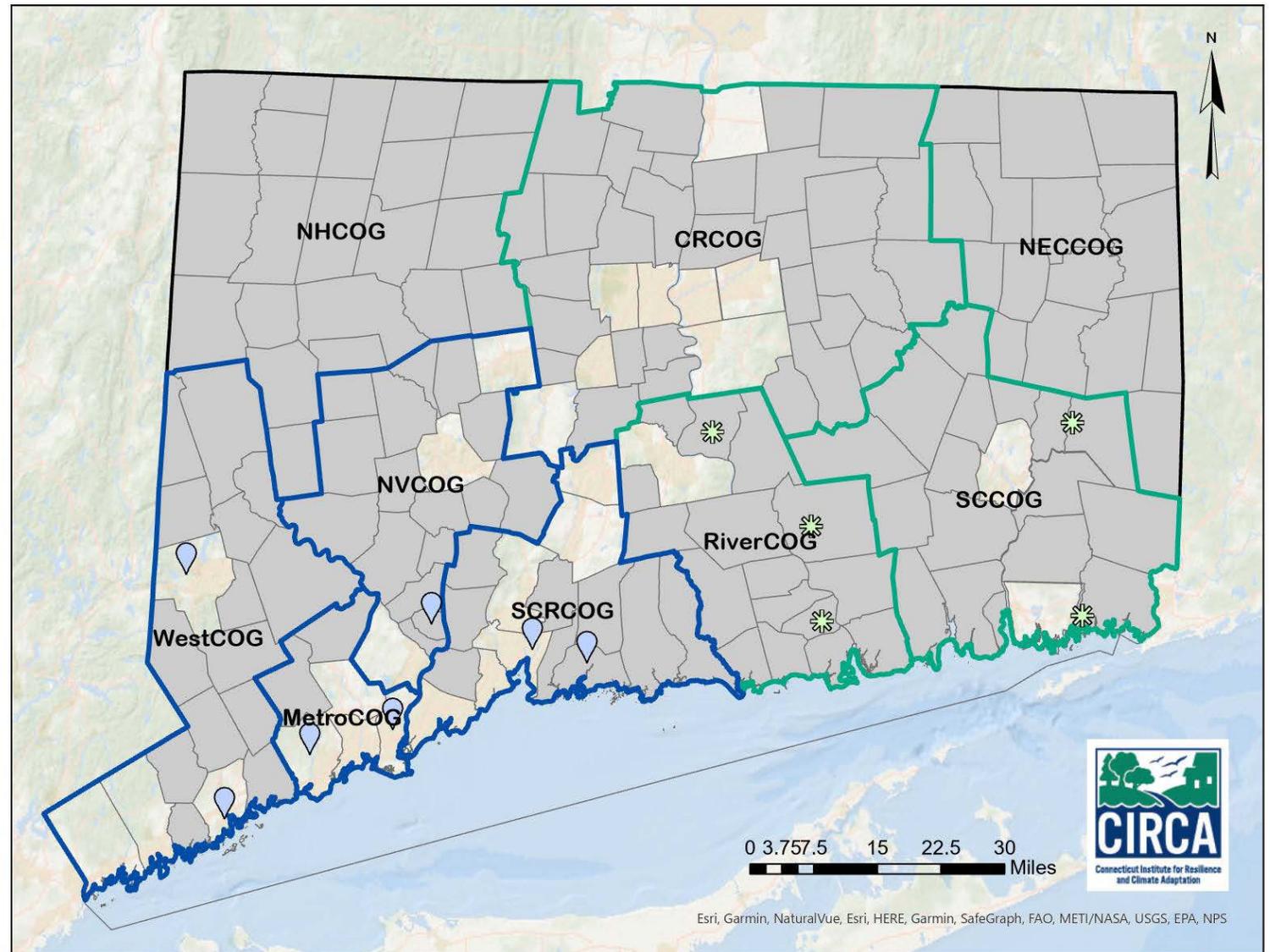
CIRCA'S RESILIENT CONNECTICUT PROGRAM

- Two of the seven studies/concepts are in small towns
 - Ansonia: green infrastructure concepts, cooling center advice, resilience hub ideas
 - Branford: flood barrier for key flood pathway into Meadow Street area



CIRCA'S RESILIENT CONNECTICUT PROGRAM

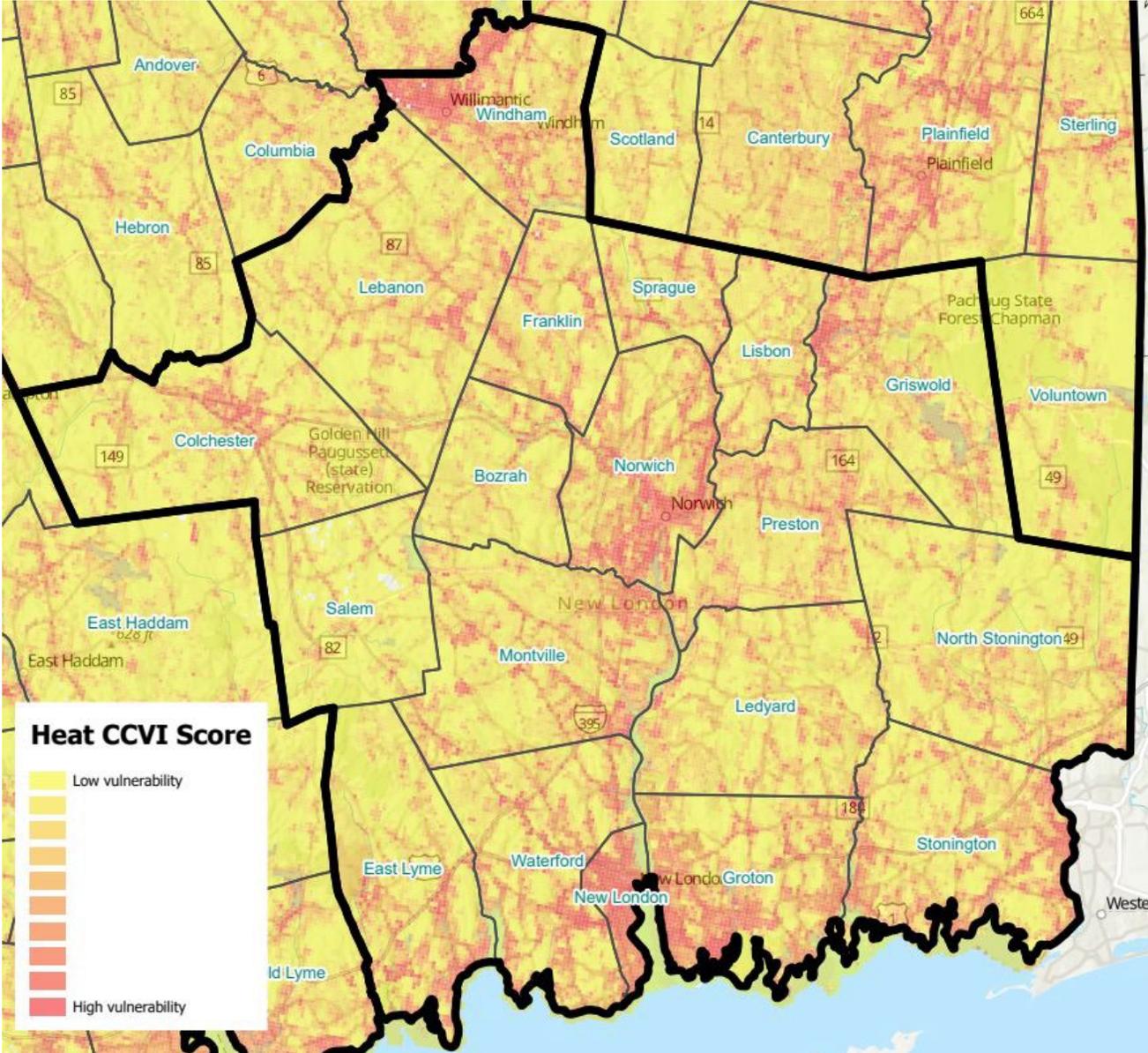
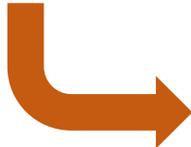
- Version 2.0 (green boundary) was deployed in RiverCOG, SCCOG, and CRCOG
 - We asked each town to describe the biggest climate-driven challenges
 - Where do these challenges co-locate with overlapping flood, heat, and social vulnerabilities?
 - Which challenges are not being addressed?



CIRCA'S RESILIENT CONNECTICUT PROGRAM

- Extreme Heat Climate Change Vulnerability Index (CCVI)

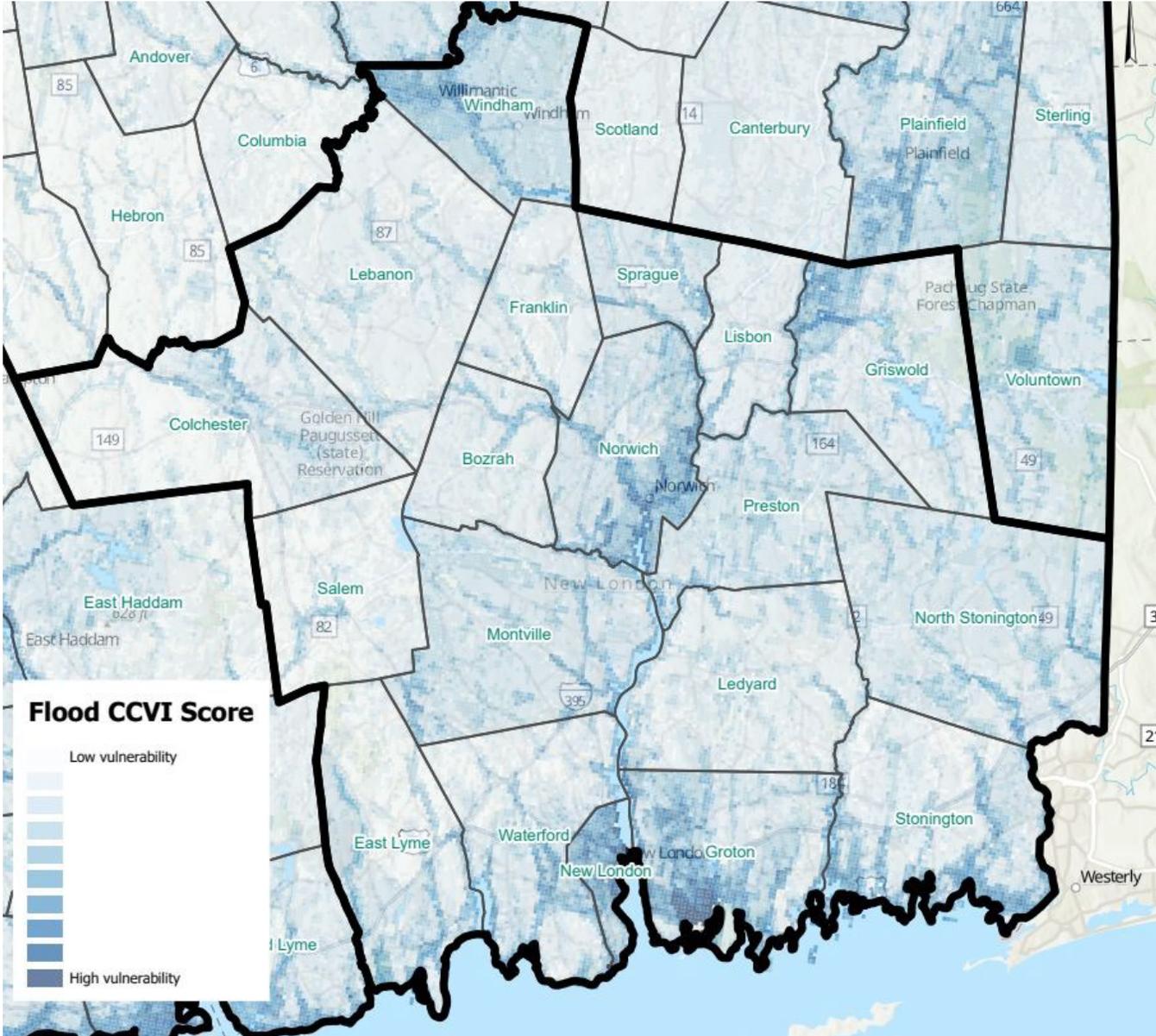
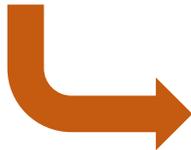
- Exposure
- Sensitivity
- Adaptive Capacity



CIRCA'S RESILIENT CONNECTICUT PROGRAM

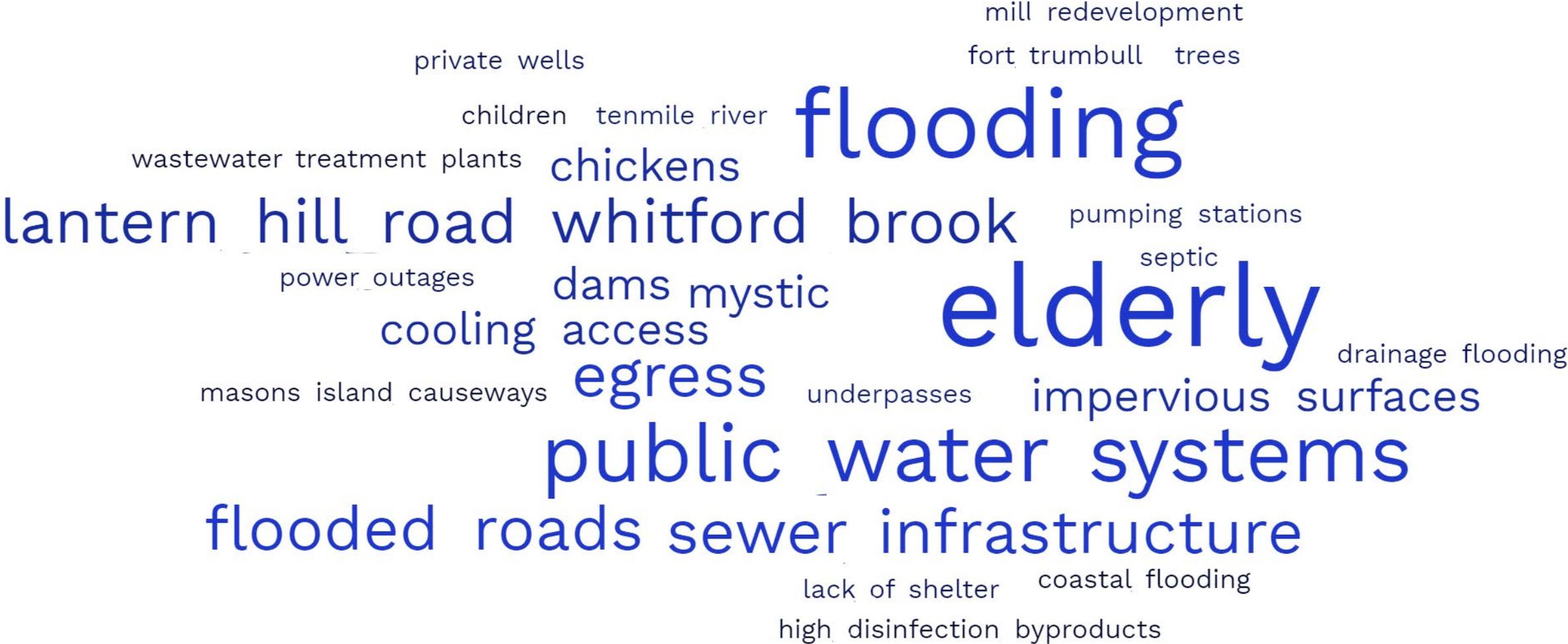
- Flood Climate Change Vulnerability Index (CCVI)

- Exposure
- Sensitivity
- Adaptive Capacity



CIRCA'S RESILIENT CONNECTICUT PROGRAM

"WHAT ARE YOUR CLIMATE-RELATED CONCERNS?"



CIRCA'S RESILIENT CONNECTICUT PROGRAM

"WHAT ARE YOUR CLIMATE-RELATED CONCERNS?"

SCCOG Town	Climate Concern #1	Climate Concern #2	Climate Concern #3
Bozrah	Livestock and chickens	Fitchville Dam condition	
Colchester	Vulnerable seniors (heat & flood)	Tree trimming/removal budget	Stream crossings
East Lyme	Water and sewer infrastructure	Limited egress in some areas	
Franklin	Drought impacts to agriculture	Drought impacts to private wells; lack of public water systems	Stream crossings
Griswold & Jewett City	Vulnerable seniors (heat & flood)	Lake Road septic systems	
Lebanon	Chicken farms	Tenmile River cutting off road	
Ledyard	Lantern Hill Road/Whitford Brook	Cooling center needs generator	
Lisbon	Newent Road flooding in 2022	Vulnerable seniors (heat)	Droughts
Montville	Expand public water systems	Stream crossings	Age restricted housing clusters
New London	Flooding related to drainage systems	Fort Trumbull development	Urban forestry interests
North Stonington	Lack of shelter inside the town	Private wells / lack of extensive PWSs	Lantern Hill Road/Whitford Brook
Preston	Power outages from storms	Water and sewer expansion	
Salem	Having appropriate response capabilities	Livestock and chickens	Stream crossings
Sprague	Senior housing AC does not run on generator	Paper Mill, Versailles Dams owned by town	Water and sewer infrastructure
Stonington Town	Mystic density, flooding, etc.	Three WWTPs	Masons Island & other causeways
Stonington Borough	Direct coastal flooding	Limited egress for Borough	WWTP
Waterford	Elderly and access to cooling	Areas that can be cut off by flooding	
Windham	Lack of standby power for town facilities	Willimantic Reservoir/WTP challenges	

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"WHAT ARE YOUR CLIMATE-RELATED CONCERNS?"

RiverCOG Town	Climate Concern #1	Climate Concern #2	Climate Concern #3
Chester	Chester Creek corridor	Private dams	Dock Road elevation
Clinton	Sea level rise affecting septic systems	Private dams	
Cromwell	FD and PD flooded in 2021	Underpasses that flood	Shadow Brook and Cromwell Creek
Deep River	Fire house next to Deep River	School is regional shelter; access risks	
Durham	Microgrid for town center	Hosting migrants from shoreline	
East Haddam	Sucker Brook corridor, Goodspeed, and WWTP	Rural road challenges	
East Hampton	Algal blooms closing Pocotopaug beach	Critical facilities next to Pocotopaug Creek	Private wells not running during outages
Essex	Ferry Street flooding	Bridges along Falls River	Choke point at Route 9
Haddam	Convert school to cooling center	Move DPW from floodplain	
Killingworth	Washouts into PWS reservoirs	Making the regional shelter more resilient	
Lyme	None!		
Middlefield	Flooding at small and blocked culverts	Debris in Coginchaug River floodplain	
Old Lyme	Sewer system expansions in beach communities	Swan Brook flooding and beach outfall	Underpasses and low roads
Old Saybrook	Coordinating many private beach actions	Underpasses that flood	Making "the loop" more resilient
Portland	Critical facilities that flood downtown	Fairground flooding and erosion	
Westbrook	Clearing clogged creeks	Wrights Pond Dam	Stormwater outfalls in tidal waters

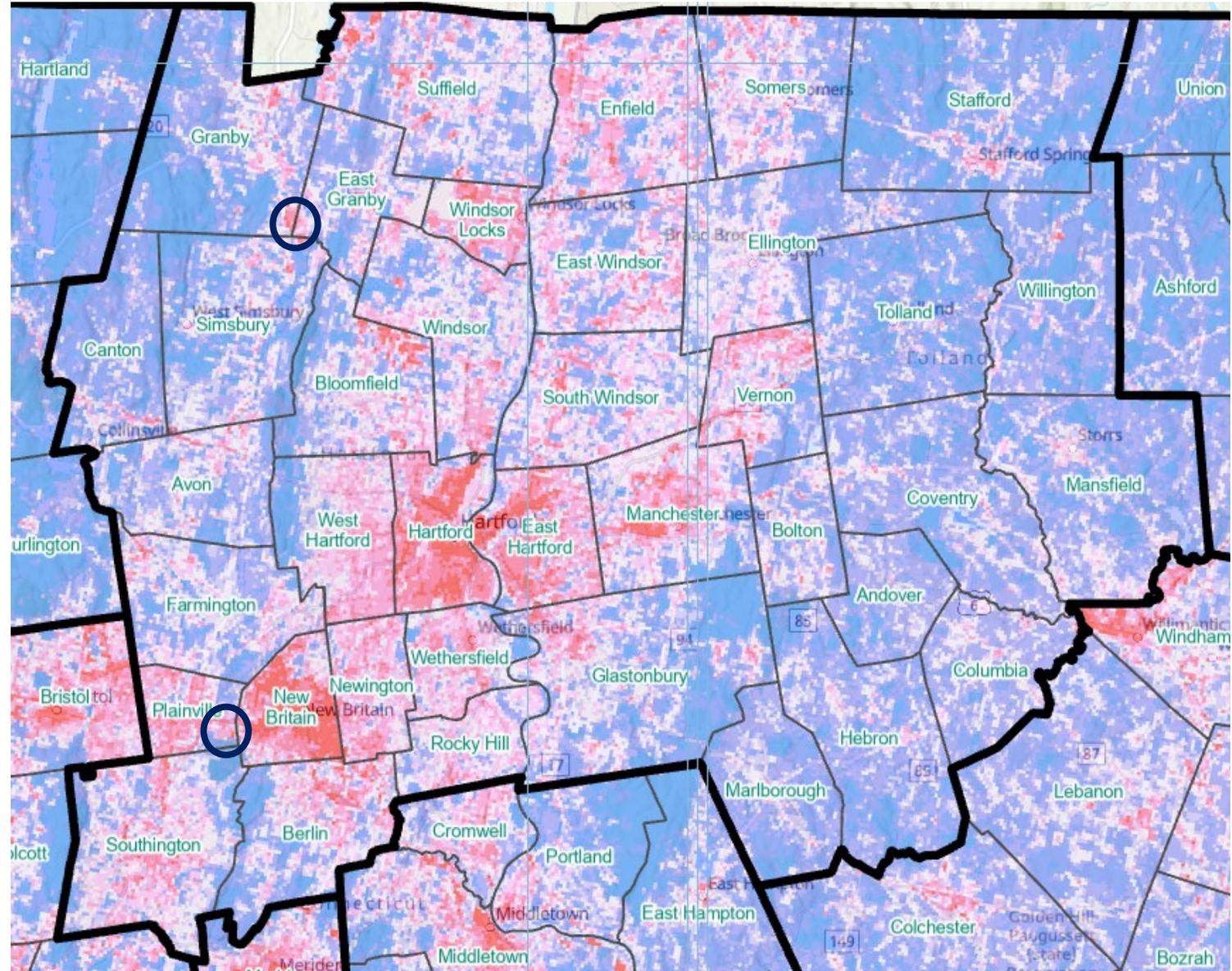
CIRCA'S RESILIENT CONNECTICUT PROGRAM

- Climate Change Vulnerability Index (CCVI) for heat

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

Interesting areas are visible:

- Nurseries and extraction industries



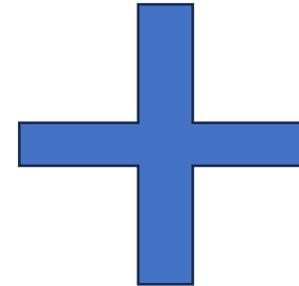
CIRCA'S RESILIENT CONNECTICUT PROGRAM

"WHAT ARE YOUR CLIMATE-RELATED CONCERNS?"

CRCOG Town	Climate Concern #1	Climate Concern #2	Climate Concern #3
Andover	Stream crossings	Generators for critical facilities	Limited egress for senior housing
Avon	Critical facilities in a floodplain	Tree management	Generators for critical facilities
Berlin	TBD	TBD	TBD
Bloomfield	Drainage-related flooding	Generator for cooling center	Maintenance of Park River flood control systems
Bolton	Power outages from storms	Stream crossings (access for Mark Anthony Lane)	DEEP-owned and privately owned dams
Canton	Tree management	Microgrid for critical facilities	Dams
Columbia	Stream crossings	Stormwater infrastructure	Limited egress for specific subdivision
Coventry	Harmful algal blooms in Coventry Lake	Tree management	Stream Crossings and Stormwater Management
East Granby	Generators for critical facilities	"Wind corridor"	Stream crossings
East Windsor	Generators for critical facilities	Stream crossings	Agricultural fields (tobacco)
Ellington	Stream crossings	Generators for critical facilities	Limited egress for specific neighborhood
Farmington	Riverbank stabilization	Stream crossings	Backup Emergency Operations Center
Granby	Riverbank stabilization	Power outages from storms	Tree management
Hebron	Water quality	Private wells	Sewer system
Mansfield	Power outages from storms	Road flooding/washouts	Public water and sewer systems
Marlborough	Stream crossings	Tree management	Vulnerable populations (elderly)
Newington	Stream crossings over railroad	Stormwater infrastructure	Hotels that people are living in
Plainville	Power outages from storms	Unpredictable high-density short-duration storms	WWTP
Rocky Hill	Shelter capacity	Vulnerable populations (assisted living, elderly)	Road elevation (Beach Rd)
Simsbury	Riverbank stabilization	Stream crossings	Stormwater infrastructure
Somers	Power outages from storms	Stream crossings	Tree management
South Windsor	Stream crossings	Power outages from storms	Generators for critical facilities
Stafford	Stream crossings	Generators for critical facilities -- elderly housing	Fire station in floodplain
Suffield	Limited egress for specific neighborhood	Power outages from storms	Sewer system
Tolland	Unpaved roads	Stream crossings	Geographically-influenced winter weather
Vernon	Stormwater management	Generators for critical facilities	Sewer system
Wethersfield	Stream Crossings and Stormwater Management	Generators for critical facilities	Hotels that people are living in
Willington	Stream crossings	Generators for critical facilities	Treetop debris on ground
Windsor	Erodible soils with increasing precipitation		
Windsor Locks	Stream Crossings and Stormwater Management	Location of many critical regional assets and infrastructure	Hotels that people are living in

CIRCA'S RESILIENT CONNECTICUT PROGRAM

Challenges
Extreme heat and relative lack of cooling centers where elderly and other populations are located
A shift to use of regional shelters in lieu of local shelters
Affordable housing in areas of high flood , heat , and social vulnerabilities
TOD at risk of flooding
Redevelopment of former industrial buildings/brownfields in flood zones
Relatively high impervious surfaces leading to heat and flooding
Road washouts and pollution sources due to flooding in water supply watersheds
Wastewater treatment plants and sewer pumping stations in flood zones
Critical facilities with flood vulnerability
Roads located along streams with numerous at-risk crossings
Agricultural land uses at risk to heat , flood , and cascading impacts
Septic systems in areas of flood and sea level rise
Small water systems and numerous private wells that are not drought tolerant



Factors to Overlay and Index
Regional Assets
Critical Facilities
Resilient Corridors
Transit Hubs / TOD
Historic Resources
Housing for Vulnerable Populations
WWTPs
Sewersheds upstream of at-risk pumping stations
Public Water Supply Watersheds
Public Water Supply Wells
Privately Owned Dams
Brownfields
Septic Systems
Livestock and chicken operations
Farms and nurseries
Recreational Assets

CIRCA'S RESILIENT CONNECTICUT PROGRAM

Potential Climate Adaptation and Resilience Opportunity Areas in the Lower Connecticut River Valley Region

Draft: March 29, 2023

ROAR Name What is a ROAR? A ROAR is a complex climate adaptation and Resilience Opportunity Area with potentially unmet needs related to two climate change threats: flooding and extreme heat. Each of these ROARs is generally positioned where flood vulnerability is moderate to high and heat vulnerability is moderate to high.	Location These are the primary municipalities where the ROARs are located.	These are some of the assets "counted" to identify ROARs. Many were provided by RiverCOG in a GIS layer, while some assets and resources were taken from other lists and maps. See the reverse side of this sheet for a key.									
		Critical Facilities	Regional Assets	Historic Resources	Wastewater Treatment Plants	Existing Affordable Housing	Transit Oriented Development	Building Elevations in EJ Flood Zones	"Resilient Corridor" Potential	Septic Systems	Public Water Supply Wells
Downtown to South Farms	Middletown	●	●	■		■	■	■	■	■	■
Old Saybrook Center/TOD	Old Saybrook	●	●	■		■	■	■	■	■	■
Portland Center	Portland	●	●	■		■	■	■	■	■	■
Pickett Lane Area	Durham	●	●	■		■	■	■	■	■	■
Clinton Center	Clinton	●	●	■		■	■	■	■	■	■
Westbrook Center	Westbrook	●	●	■		■	■	■	■	■	■
Mile Lane	Middletown	●	○	■		■	■	■	■	■	■
Pocotopaug Creek	East Hampton	●	○	■		■	■	■	■	■	■
Chester Center	Chester	●	●	■		■	■	■	■	■	■
East Haddam Center	East Haddam	●	●	■	■	■	■	■	■	■	■
Deep River Center	Deep River	●	●	■	■	■	■	■	■	■	■
Old Lyme Center	Old Lyme	●	●	■		■	■	■	■	■	■
Plains Road Corridor	Essex	●	●	■		■	■	■	■	■	■
Higganum	Haddam	●	○	■		■	■	■	■	■	■
River Road Area	Cromwell	●	●	■		■	■	■	■	■	■
Mattabassett District WWTP	Cromwell	●	●	■		■	■	■	■	■	■
Portland WWTP	Portland	●	●	■	■	■	■	■	■	■	■
Route 154 Loop	Old Saybrook	○	●	■		■	■	■	■	■	■

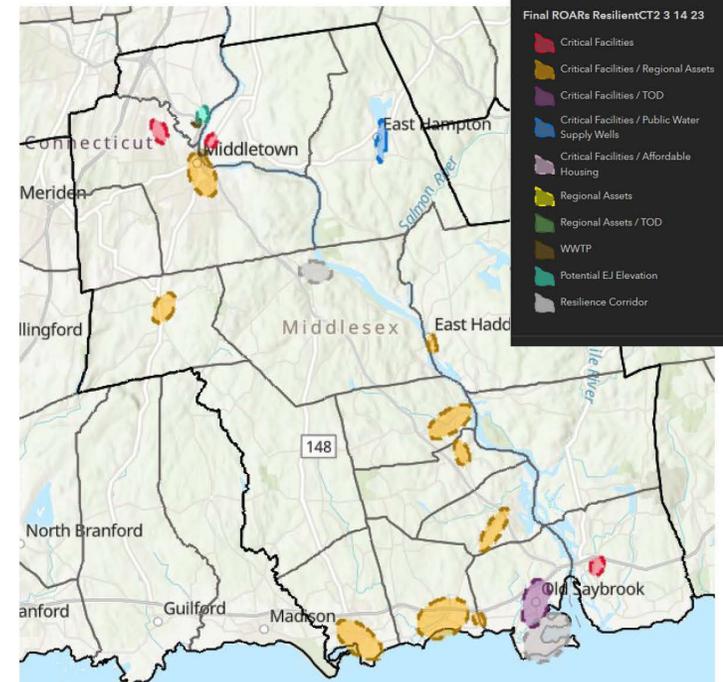
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●	>10 Critical Facilities or Regional Assets
●	6-10 Critical Facilities or Regional Assets
●	3-5 Critical Facilities or Regional Assets
●	1-2 Critical Facilities or Regional Assets
○	Critical Facilities or Regional Assets not present

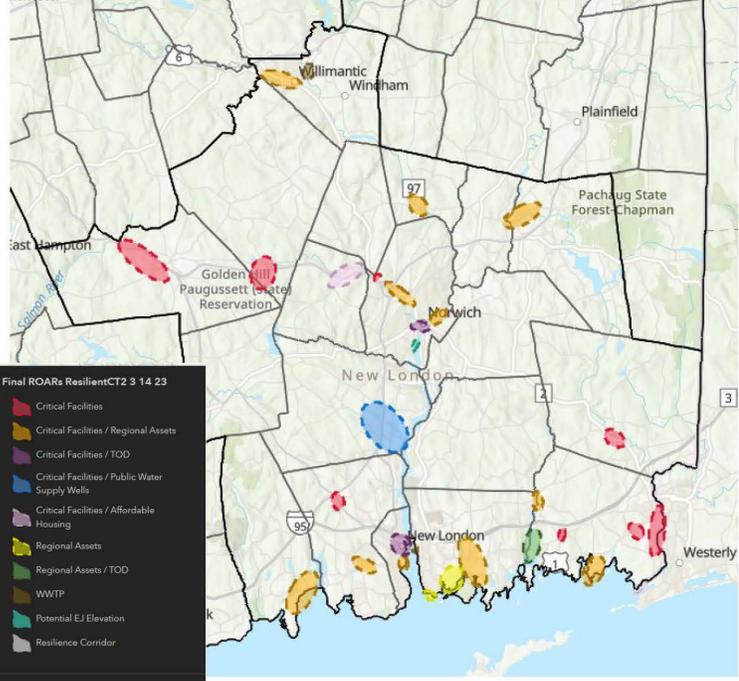
CIRCA'S RESILIENT CONNECTICUT PROGRAM

Potential Climate Adaptation and Resilience Opportunity Areas in Southeastern Connecticut
 Draft: March 15, 2023



ROAR Name What is a ROAR? A ROAR is a complex climate adaptation and Resilience Opportunity Area with potentially unmet needs related to two climate change threats: flooding and extreme heat. Each of these ROARs is generally positioned where flood vulnerability is moderate to high and heat vulnerability is moderate to high.	Location These are the primary municipalities where the ROARs are located. Some of the ROARs span two municipalities.	These are some of the assets "counted" to identify ROARs. Many were provided by SCCOG in a GIS later, while some assets and resources were taken from other lists and maps. See the reverse side of this sheet for a key.								
		Critical Facilities	Regional Assets	Historic Resources	Wastewater Treatment Plants	Existing Affordable Housing	Transit Oriented Development	Building Elevations in EJ Flood Zones	"Resilient Corridor" Potential	Septic Systems
Willimantic Downtown	Windham	●	●	■		■			■	■
Downtown New London	New London	●	●	■		■			■	■
Fitchville	Bozrah	●	●	■		■			■	■
Uncasville	Montville	●	●	■		■			■	■
Jewett City	Jewett City and Griswold	●	●	■		■			■	■
Poquonnock Bridge	Town of Groton	●	●	■		■			■	■
Stonington Borough	Stonington Borough	●	●	■		■			■	■
Civic Triangle	Waterford	●	●	■		■			■	■
North Stonington	North Stonington	●	○	■		■			■	■
Baltic	Sprague	●	●	■		■			■	■
Downtown Norwich	Norwich	●	●	■		■			■	■
Mystic	Towns of Groton and Stonington	●	●	■		■			■	■
Norwichtown	Norwich	●	●	■		■			■	■
High School Area	Town of Stonington	●	●	■		■			■	■
Niantic	East Lyme	●	●	■		■			■	■
Pawcatuck	Town of Stonington	●	●	■		■			■	■
Greenville	Norwich	●	○	■		■			■	■
Colchester	Colchester	●	○	■		■			■	■
Southern Lebanon	Lebanon	●	○	■		■			■	■
Beach and Avery Point	City of Groton	●	●	■		■			■	■
City of Groton WWTP	City of Groton	●	●	■		■			■	■
Fort Trumbull	New London	●	●	■		■			■	■
Airport	Town of Groton	●	●	■		■			■	■
Old Mystic	Towns of Groton and Stonington	●	●	■		■			■	■
Yantic	Norwich	●	○	■		■			■	■
Willimantic WWTP	Windham	●	●	■		■			■	■
Route 85 and DPW	Waterford	●	○	■		■			■	■
Aquarion WTP	Town of Stonington	●	○	■		■			■	■
Thamesville	Norwich	○	○	■		■			■	■

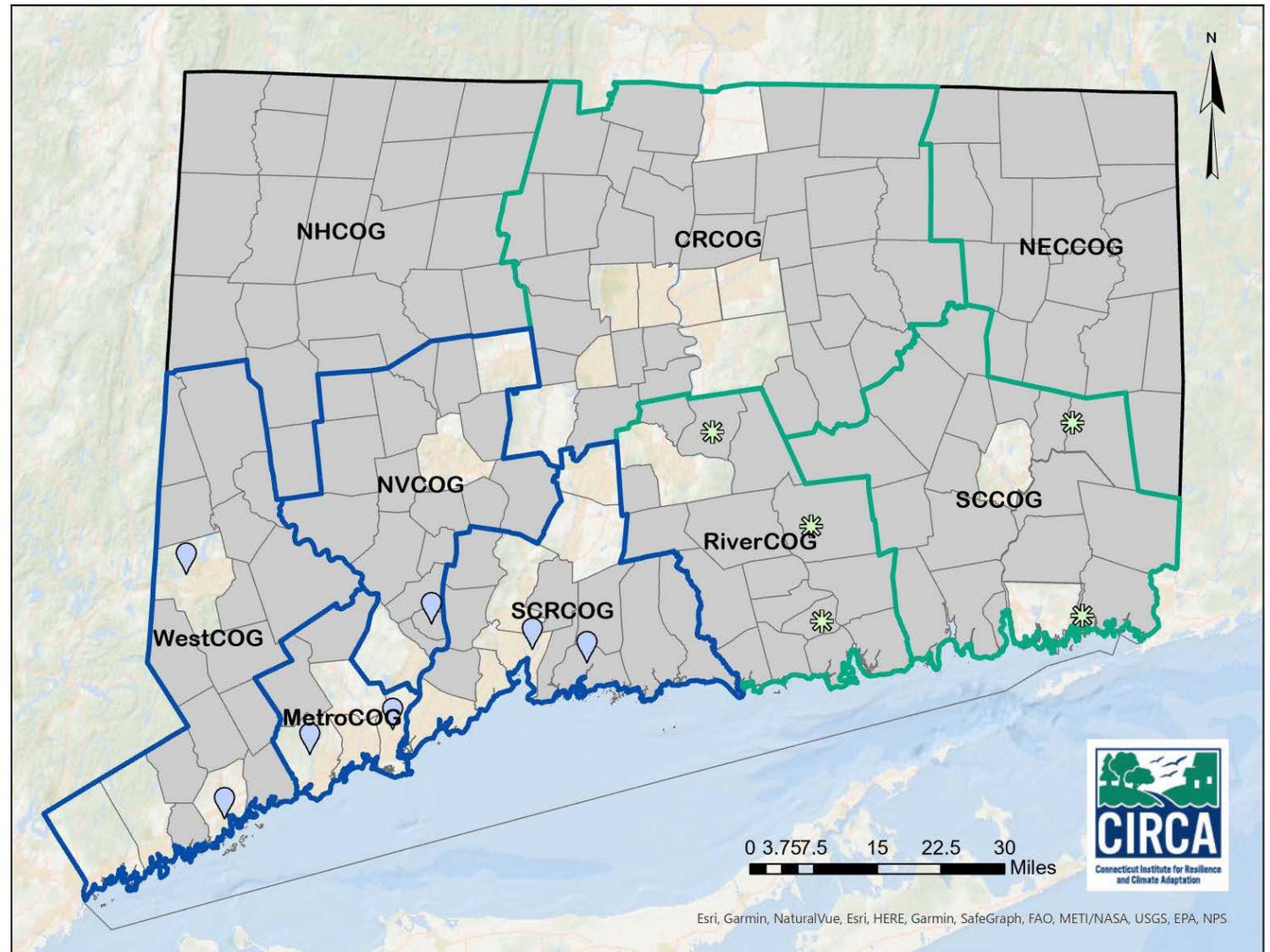
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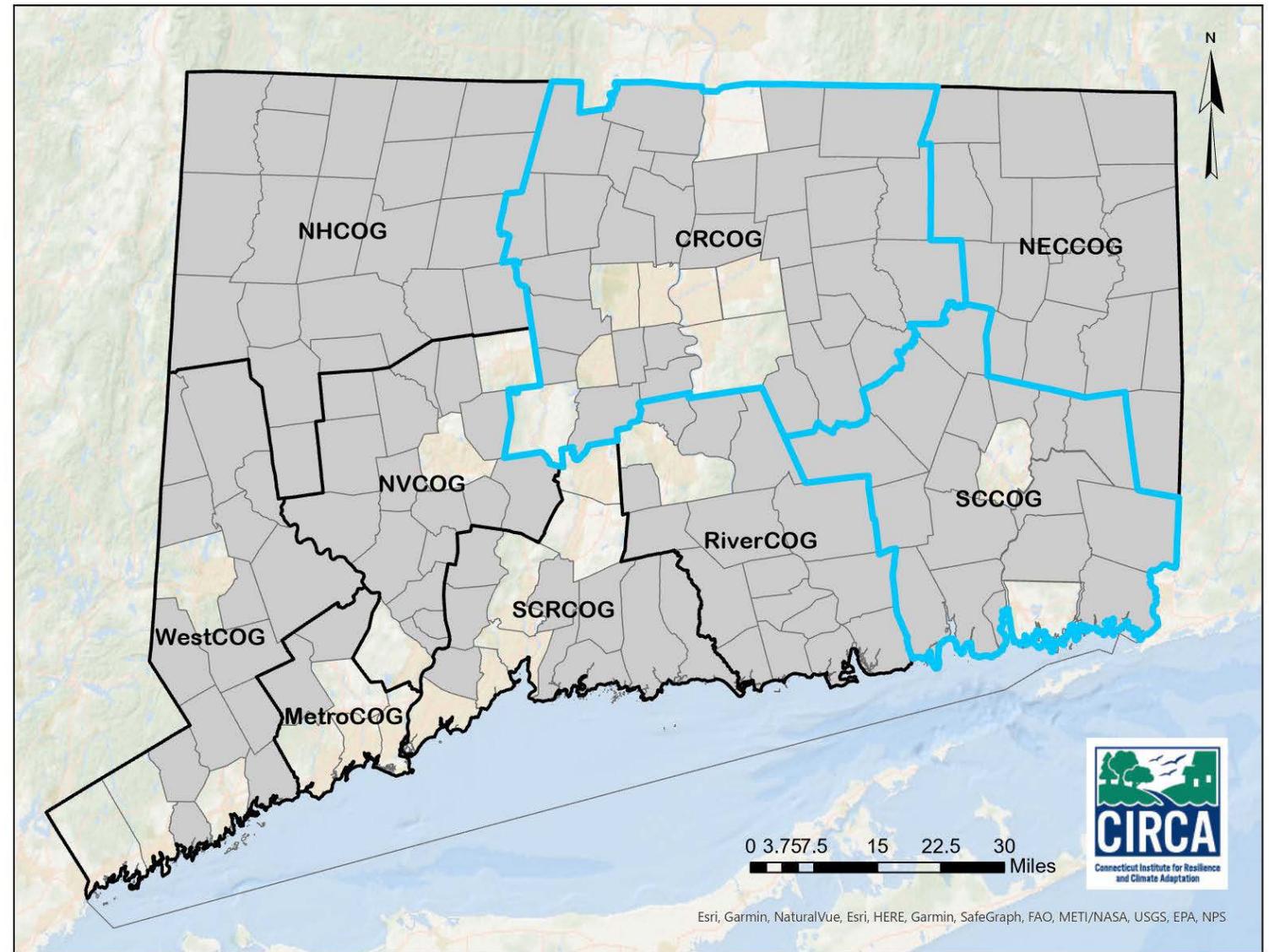
CIRCA'S RESILIENT CONNECTICUT PROGRAM

- The five most likely studies/concepts are in small towns, and are scheduled to begin soon
 - Portland: flooding of cooling center and PD
 - East Haddam: flooding of Goodspeed facilities and WWTP
 - Essex: flooding of roads
 - Jewett City: flooding of housing and sewer P.S.
 - Mystic: numerous challenges



SHOPPING FROM HAZARD MITIGATION PLANS

- All municipalities are part of COG-based multi-jurisdiction plans
- SCCOG and CRCOG are covered with new “hazard mitigation **and** climate adaptation” plans that were developed in parallel with *Resilient Connecticut* and deployment of DCRF

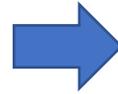


SHOPPING FROM HAZARD MITIGATION PLANS

Hazard Mitigation Plan Update

Through the Hazard Mitigation Plans, the COGs and 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



**Combined
Hazard
Mitigation and
Climate
Adaptation
Plans for
SCCOG and
CRCOG**

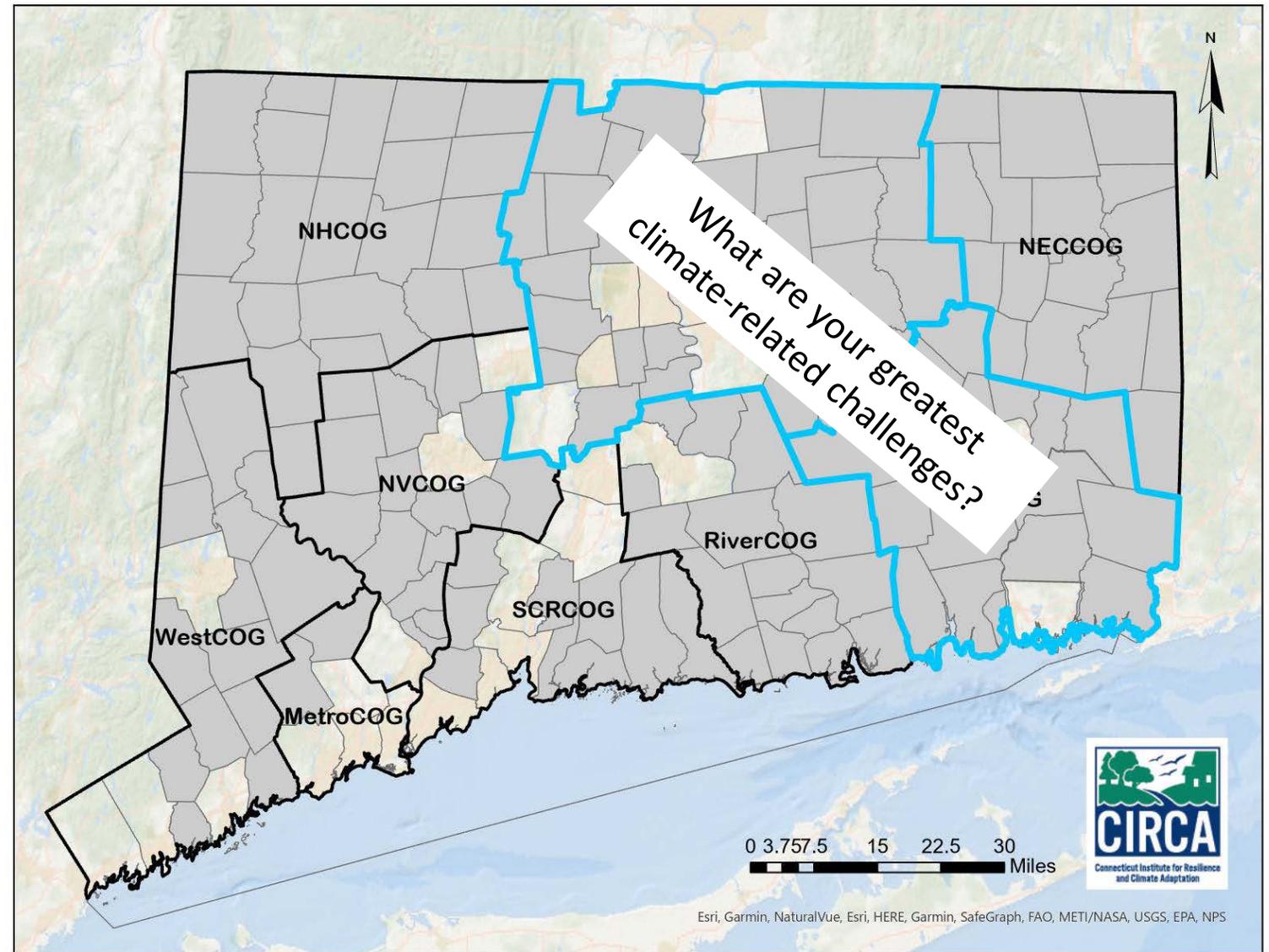
SHOPPING FROM HAZARD MITIGATION PLANS

- The question changed from:

What would you do with unlimited hazard mitigation funds?

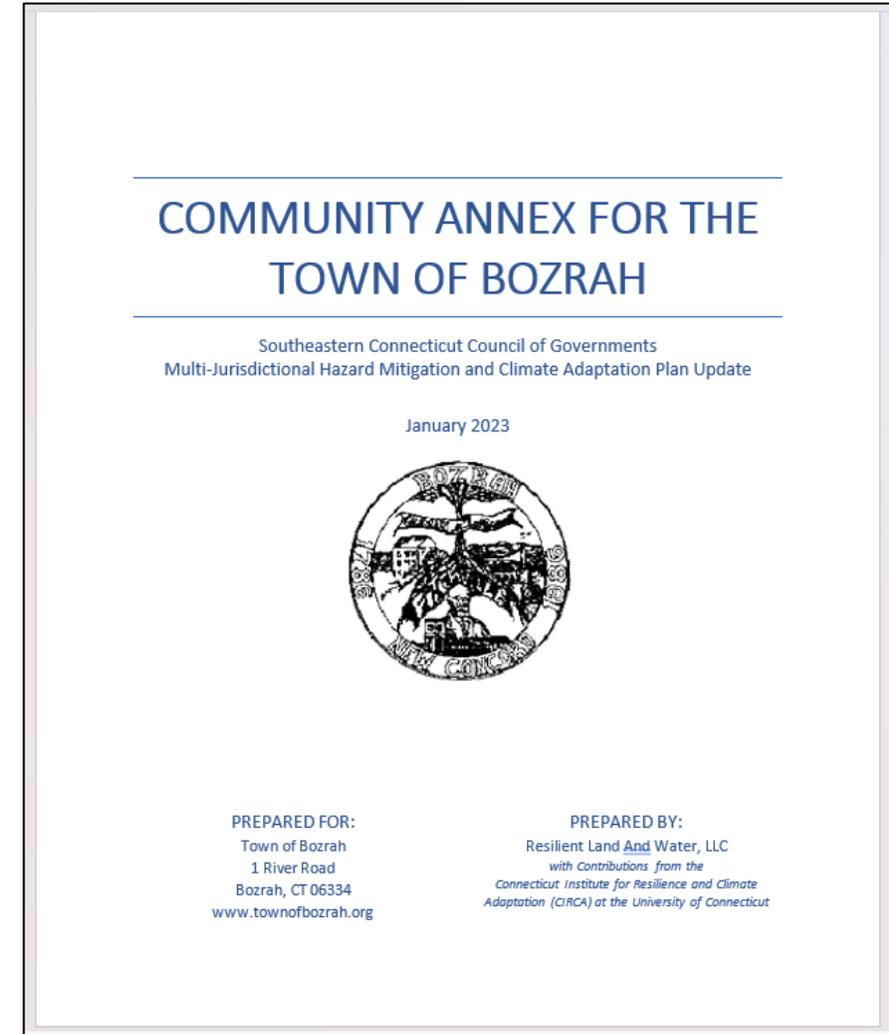
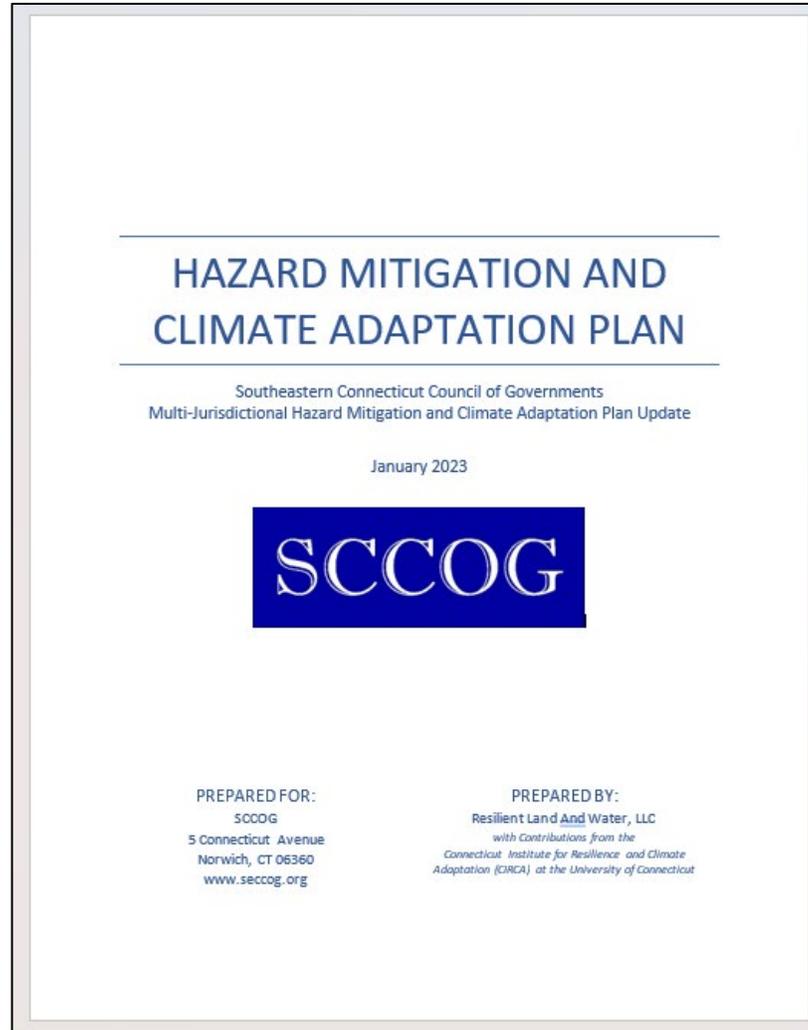
to

What are your greatest climate-related challenges to address?



SHOPPING FROM HAZARD MITIGATION PLANS

- The first combined hazard mitigation and climate adaptation plan in the state



SHOPPING FROM HAZARD MITIGATION PLANS

- New summary sheets can provide ideas

Climate Change Summary Sheet for Town of Bozrah

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Flooding: The Yantic River flows through the town and poses risk to Stockhouse Road. Trading Cove Brook in the southeastern corner of the town is also a concern. The Town is concerned with dam conditions throughout Bozrah.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Flooding: Partner with CT DEEP's Dam Safety team to deliver a unified message to dam owners that inspections and risk communication are necessary. Target year 1 for working with DEEP and year 2 for the messaging to dam owners.</p>

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Extreme Heat: The Town has increasing concerns about the effects of extreme heat events on chicken and other agricultural and livestock operations. Avian flu and other health-related cascading impacts of extreme heat events.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Extreme Heat: Partner with chicken farms and other facilities to develop reliable, drought-resilience water supplies and standby power that is capable of operating cooling equipment.</p>

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Others: The Town wishes to address remaining needs related to critical facilities that are needed to help address impacts of climate change.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Others: Pursue American Red Cross certification to make Fields Memorial School the primary shelter and a cooling center, and additional certifications for the back-up shelters which include both Bozrah Moose Lodge 950 (alternate shelter) and the Volunteer Fire Company.</p>

Climate Change Summary Sheet for Town of Windham

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Flooding: The wastewater treatment plant (WWTP) and a sewer pumping station are at risk of future riverine flooding which is projected to continue or worsen even with an upstream flood control dam in place.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Flooding: Compare elevations of WWTP assets and the pumping station to the base flood elevations associated with the Natchaug River and Willimantic River plus applicable freeboard (likely two feet); and determine if funds should be set aside for resiliency projects.</p>

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Extreme Heat: The Town has a large socially vulnerable population that cannot be without access to viable cooling centers. The Town Hall and Senior Center, which are cooling centers, need standby power such as generators.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Extreme Heat: Acquire generators for the Town Hall and the Community Center/Rec Center/Senior Center. Ensure that cooling centers are accessible using transit or alternate transportation options.</p>

<p>What are the Town's Top Climate Change Concerns?</p>	<p>Others: The Town's water utility, Windham Water Works, has a complex set of climate change challenges related to sedimentation, water quality, the reservoir dam, and power redundancies.</p>
<p>Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?</p>	<p>Others: Execute the FEMA BRIC Scoping Grant for Windham Water Works and determine appropriate next steps for climate resiliency strategies, whether related to sediment removal, dam and intake modifications, or other needs.</p>

SHOPPING FROM HAZARD MITIGATION PLANS

- How to shop from actions

The goals are new

The types are the same

Many funding sources are new

PERSISTS criteria are new

STAPLEE criteria are not new

Community	Action Number	Hazard Mitigation and Climate Adaptation Actions	Hazard Mitigation and Climate Adaptation Goal	Type of Action	Responsible Department	Approximate Cost Range	Potential Funding Sources	Timeframe	Community Priority	PERISTS Criteria										Weighted STAPLEE Criteria										Column1					
										Permittable	Equitable	Realistic	Safe	Innovative	Scientific	Transferable	Sustainable	Total PERISTS Score	Social Benefit	Social Cost	Technical Benefit	Technical Cost	Administrative Cost	Administrative Benefit	Political Cost	Political Benefit	Legal Cost	Legal Benefit	Economic Cost		Economic Benefit	Environmental Cost	Environmental Benefit	Total STAPLEE Score	
Bozrah	BZ1	Pursue the American Red Cross-certification to make Fields Memorial School the primary shelter and a cooling center, and additional certifications if needed for the back-up shelters which include both Bozrah Moose Lodge 950 (alternate shelter) and the Volunteer Fire Company.	Ensure that critical facilities are resilient, with special attention to shelters and cooling centers.	Preparedness & Emergency Response	Office of the Chief Elected Official	\$50,000 - \$100,000	Municipal Operating Budget	7/2023 - 6/2025	High	3	3	3	3	0	0	2	2	16	2	0	1	0	0	1	1	1	0	1	0	0	1	0	0	4	64
Bozrah	BZ2	Acquire standby power for Town Hall and Senior Center, especially given their importance as cooling centers; and secure reliable transportation options for people to access these cooling centers.	Ensure that critical facilities are resilient, with special attention to shelters and cooling centers.	Preparedness & Emergency Response	Office of the Chief Elected Official	\$100,000 - \$500,000	FEMA HMA; Other Preparedness Grants; STEAP	7/2023 - 6/2025	High	3	3	3	3	0	0	2	2	16	2	0	2	0	1	1	1	1	0	1	0	0	1	0	0	6	96
Bozrah	BZ3	Partner with chicken farms and related facilities to develop reliable, drought-resilience water supplies and standby power that is capable of operating cooling equipment.	Address risks associated with extreme heat events, especially as they interact with other hazards.	Preparedness & Emergency Response	Office of the Chief Elected Official	\$100,000 - \$500,000	USDA/NRCS; STEAP	7/2023 - 6/2026	High	3	2	3	3	1	1	2	2	17	1	0	1	0	1	1	1	1	0	0	0	1	1	2	0	6	102
Bozrah	BZ4	Partner with chicken farms and related facilities to develop emergency response plans that describe how to manage extreme heat events, droughts, power outages, and avian	Address risks associated with extreme heat events, especially as they interact with other hazards.	Preparedness & Emergency Response	Office of the Chief Elected Official	\$0 - \$10,000	USDA/NRCS; SCCOG funds	7/2023 - 6/2026	High	3	2	3	3	1	1	3	2	18	1	0	1	0	1	1	1	1	0	0	0	1	0	2	0	8	144
Bozrah	BZ5	Install a snow fence along areas with snow drift related challenges including along Brush Hill Road and Wawecus Road.	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.	Structural Projects	Public Works	\$10,000 - \$25,000	Municipal CIP Budget	7/2023 - 6/2024	Low	3	2	3	3	0	0	0	3	14	1	0	1	0	1	1	1	1	0	0	0	0	1	0	0	2	28
Bozrah	BZ5	Consider flood mitigation study along Yantic River to characterize risks to properties and Stockhouse Road.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Property Protection	Office of the Chief Elected Official	\$50,000 - \$100,000	FEMA HMA Scoping Study; DEEP Climate Resilience Fund; CIRCA Resilient Connecticut	7/2024 - 6/2025	Low	3	2	3	3	2	2	0	3	18	1	0	1	0	1	1	1	1	0	0	0	1	1	2	0	6	108
Bozrah	BZ7	Partner with CT DEEP's Dam Safety team to deliver a unified message to dam owners that inspections and risk communication are necessary. Target year 1 for working with DEEP and year 2 for the messaging to dam owners.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Preparedness & Emergency Response	Emergency Management	\$0 - \$10,000	Municipal Operating Budget	7/2023 - 6/2025	Medium	3	2	2	3	0	0	0	2	12	1	0	1	0	1	1	1	1	0	0	0	0	2	0	6	72	
		Require floodplain manager and land use staff to take free	Reduce flood and erosion risks by reducing																																

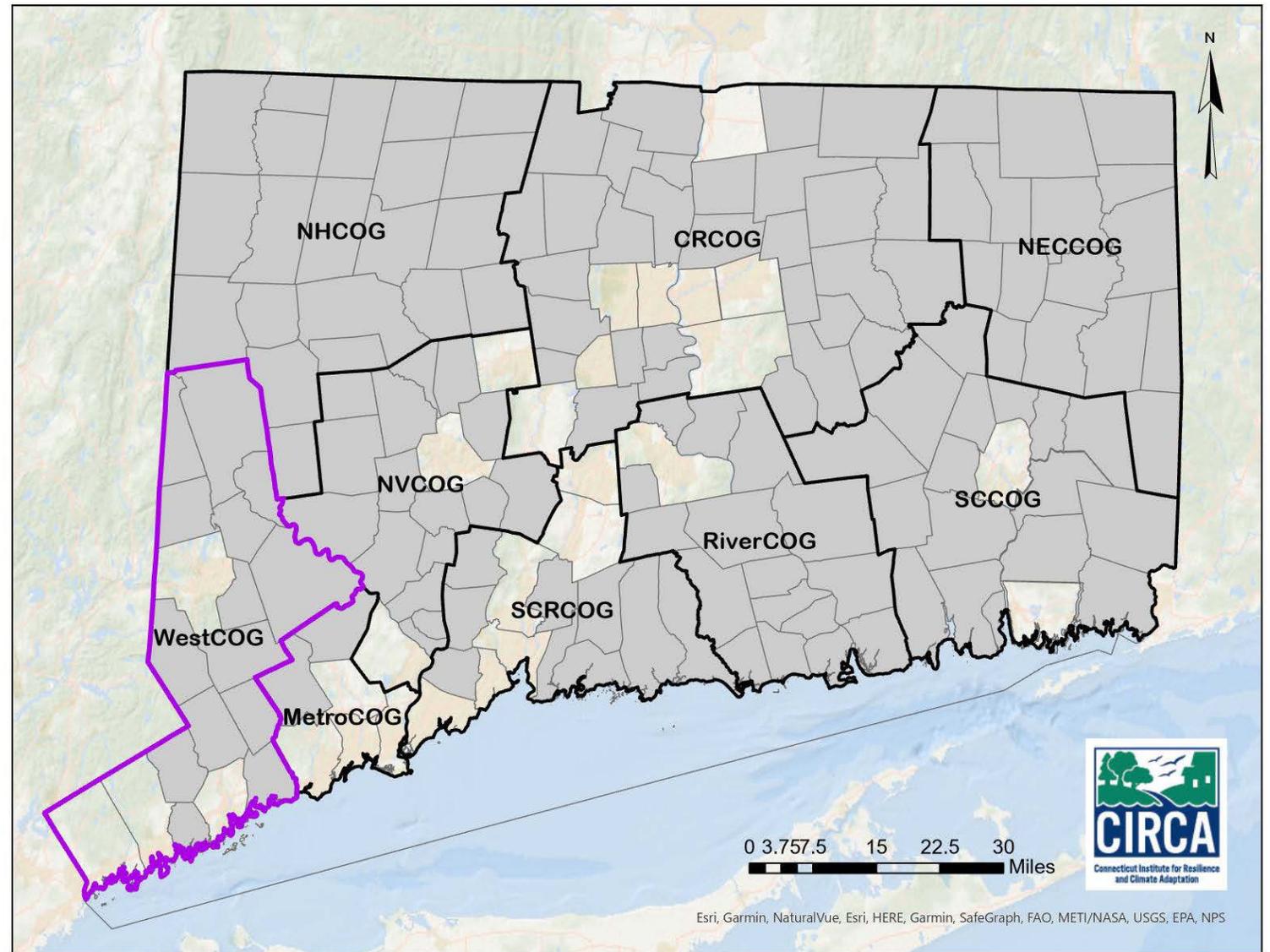
SHOPPING FROM HAZARD MITIGATION PLANS

- Funding sources listed

Acronym or Name	Description
CIRCA MRG	Connecticut Institute for Resilience and Climate Adaptation (CIRCA) Municipal Resilience Grant
CWSRF	Clean Water State Revolving Fund
DEEP Climate Resilience Fund	DEEP Climate Resilience Fund - new for 2022-2023; anticipated for 2023-2024
DWSRF	Drinking Water State Revolving Fund
EPA 319	Environmental Protection Agency (EPA) grants through Section 319 water quality programs
HHMP	Rehabilitation Of High Hazard Potential Dam Grant Program
HMA	Hazard Mitigation Assistance
BRIC	Building Resilient Infrastructure and Communities
FMA	Flood Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
IJA	Infrastructure Investment and Jobs Act
AOP	National Culvert Removal, Replacement, and Restoration Grants (Culvert AOP Program)
BIP	Bridge Investment Program
BBFP	Buses and Bus Facilities Program
RFPBR	Restoring Fish Passage through Barrier Removal Grants - may have been 2022 only
SLCGP	State and Local Cybersecurity Grant Program
LISFF	Long Island Sound Futures Fund
LOTICIP	Local Transportation Capital Improvement Program
Municipal CIP Budget	Municipal Capital Improvement Program or equivalent local program
Municipal Operating Budget	Staff time or operational budgets
NOAA/NFWF	National Oceanic and Atmospheric Administration (NOAA) grants administered by the National Fish and Wildlife Foundation
NPU	Norwich Public Utilities
Save the Sound	Save the Sound is a resource for partnering to seek grant funds; Save the Sound also has some funding available
seCTer	Southeastern Connecticut Enterprise Region
SHPO	State Historic Preservation Office
STEAP	Small Town Economic Assistance Program
Transit District	The local transit district (this can vary from community to community, such as Southeast or Windham Region)
USDA/NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
WWW	Windham Water Works

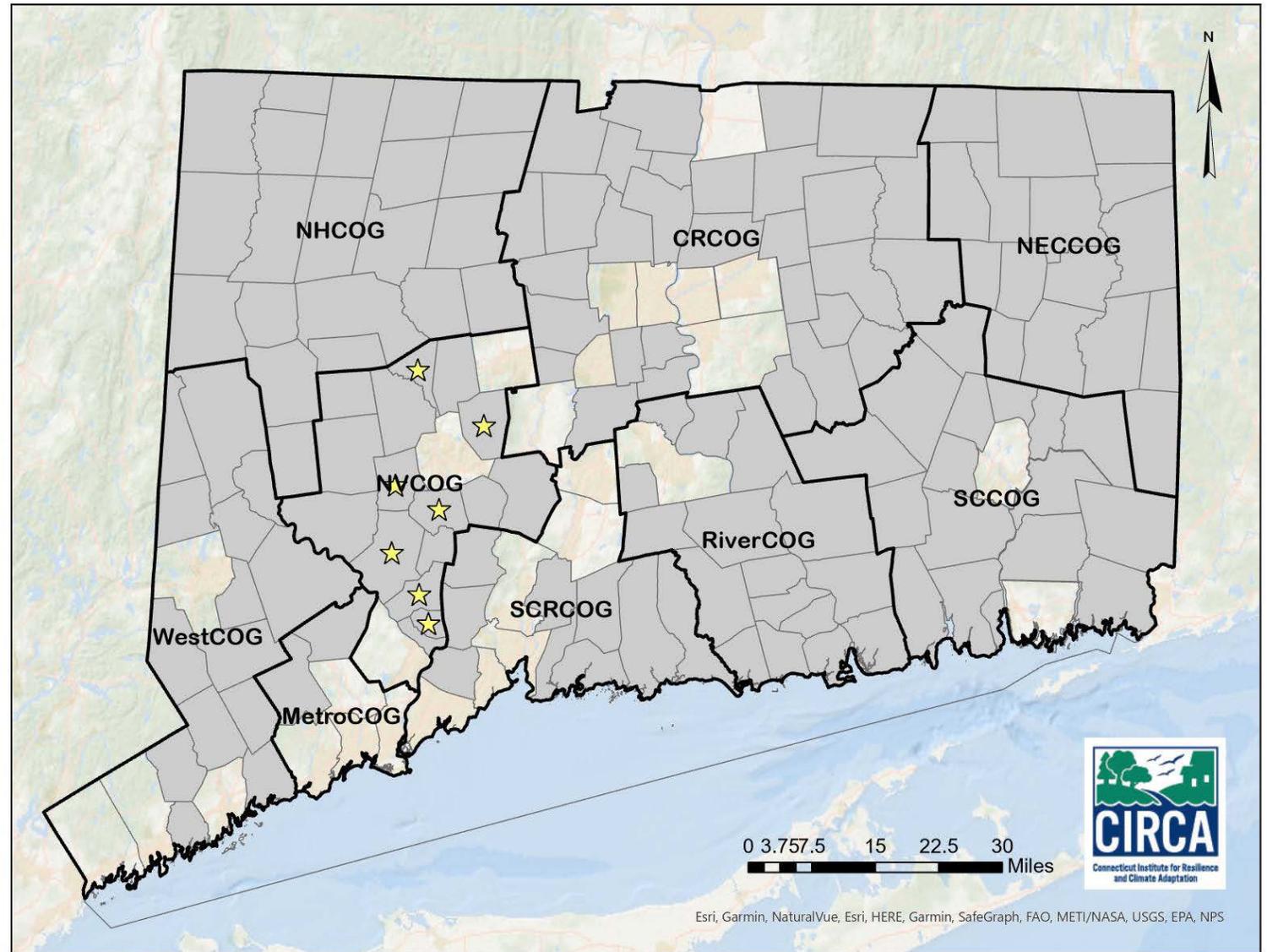
FEMA HAZARD MITIGATION ASSISTANCE (HMA)

- All municipalities with an **active** hazard mitigation plan are eligible
- FEMA HMA grants just opened last week!
- Applications are due to DEMHS in 12/23 or 1/24
- WestCOG has a grant development program that is accepting requests **now**



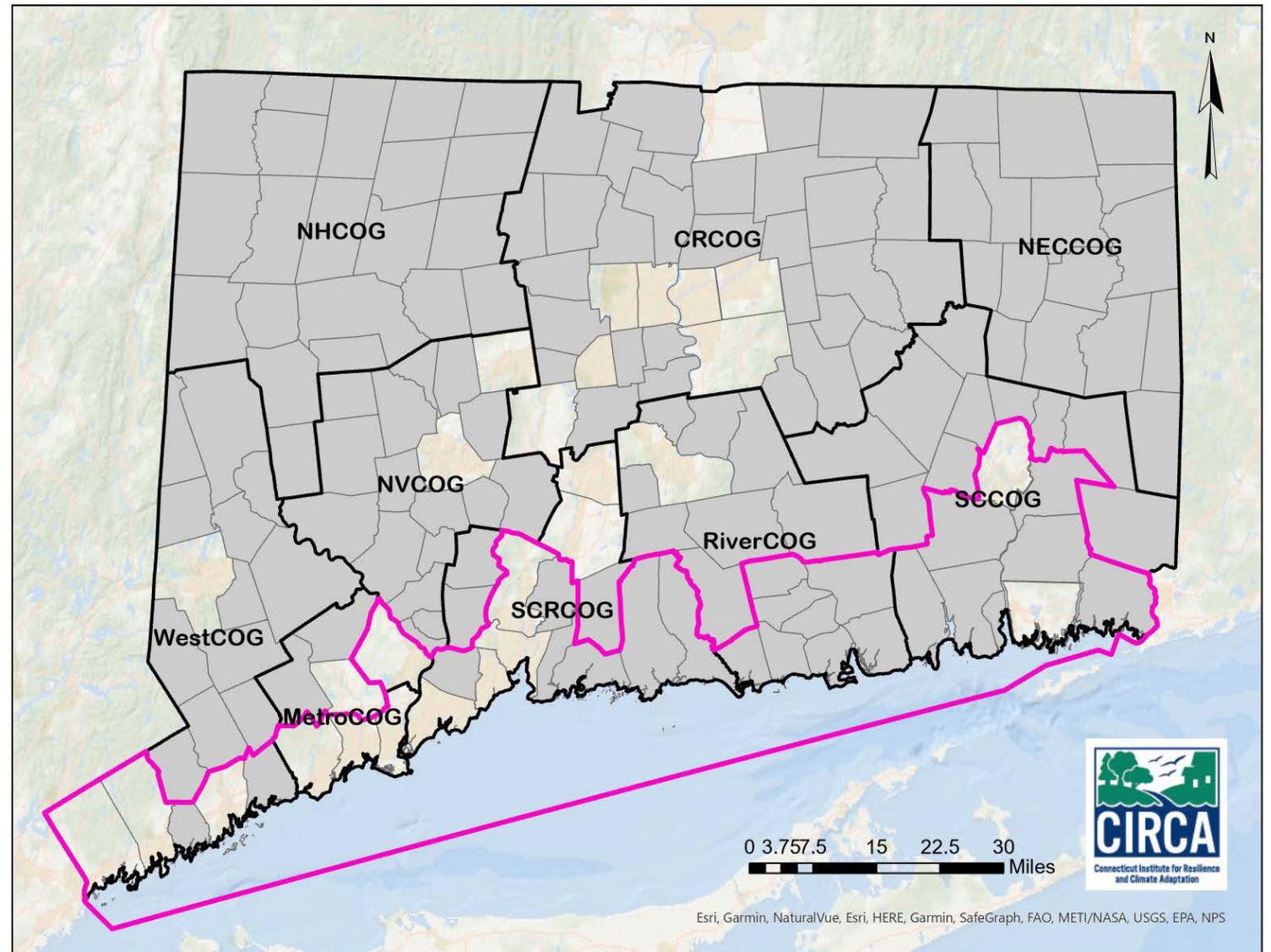
DEEP CLIMATE RESILIENCE FUND (DCRF)

- Most of the recipients of the first cycle of grants were large towns
- COST members did well where they were bundled into a COG-based project
- We anticipate that a new grant cycle will open in 2024



LONG ISLAND SOUND-RELATED GRANTS

- Track 1 (new) allows towns to submit letters of interest for climate vulnerability and adaptation plans and project development
- Track 2 (already in place since 2022) lets towns choose a vendor to write a grant application for *existing* grant programs such as the LISFF
- Consider letting another entity apply **for** you



HOW DOES A SMALL TOWN DECIDE WHAT TO USE?



CIRCA's Resilient Connecticut Program

- Community scale planning is not included
- Use when outcomes for a neighborhood scale challenge are not certain, and flexibility is needed
- Must address flood and/or extreme heat vulnerabilities
- Funds do not pass through the municipality



DEEP Climate Resilience Fund (DCRF)

- Track 1 is for community planning
- Track 2 is for project scale planning
- A variety of climate related challenges can be addressed
- 40% of funds must be in socially vulnerable communities
- Funds pass through municipality, which can add time



Sea Grant's LIS Resilience Support

- Track 1 is for community or neighborhood scale planning
- Track 2 is for funding grant application development
- Must be in the Long Island Sound coastal boundary
- Funds do not pass through the municipality

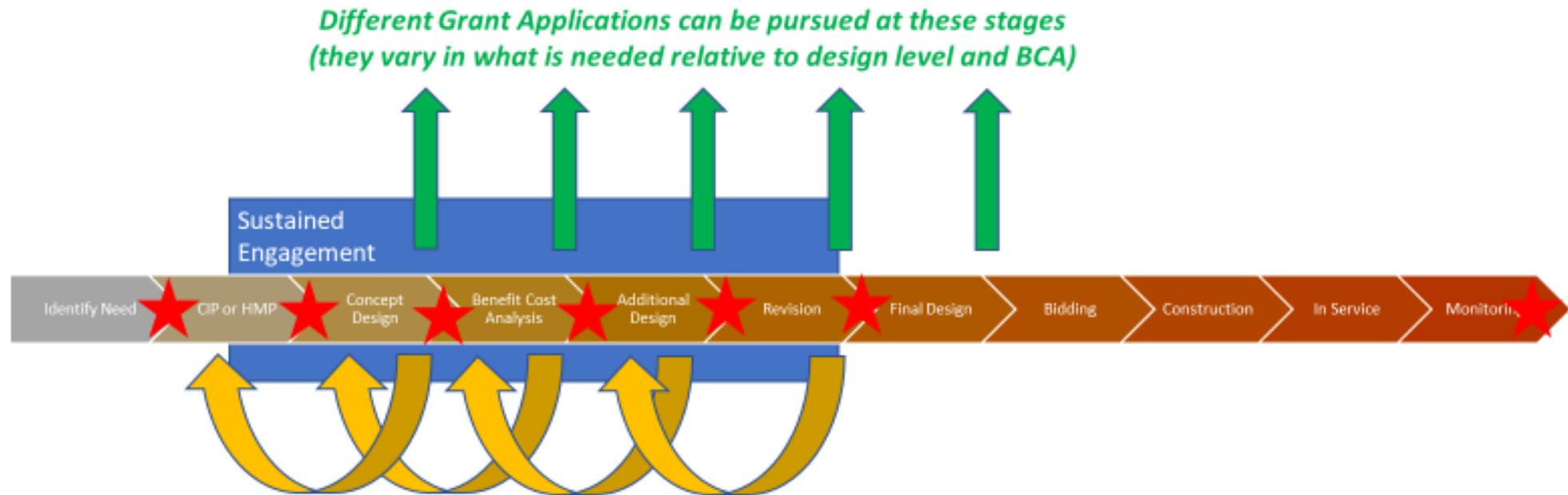
SUMMARY

- **What should go onto the project pipeline?**

- Your cooling center, senior center, or shelter
- Your low-lying road, culvert, or bridge
- Your sewer pumping station, public water supply watershed, or an area of private wells
- Your chicken facilities and your farms

- **How should it get there?**

- FEMA Hazard Mitigation Assistance
- *Resilient Connecticut*
- DEEP Climate Resilience Fund
- Sea Grant Programs
- Partnerships with TNC, Save the Sound, etc.



ACKNOWLEDGMENTS



Mary Buchanan, PhD
Community Resilience Planner



Nicole Govert
Community Resilience Planner



David Murphy, PE, CFM
Director of Resilience Engineering



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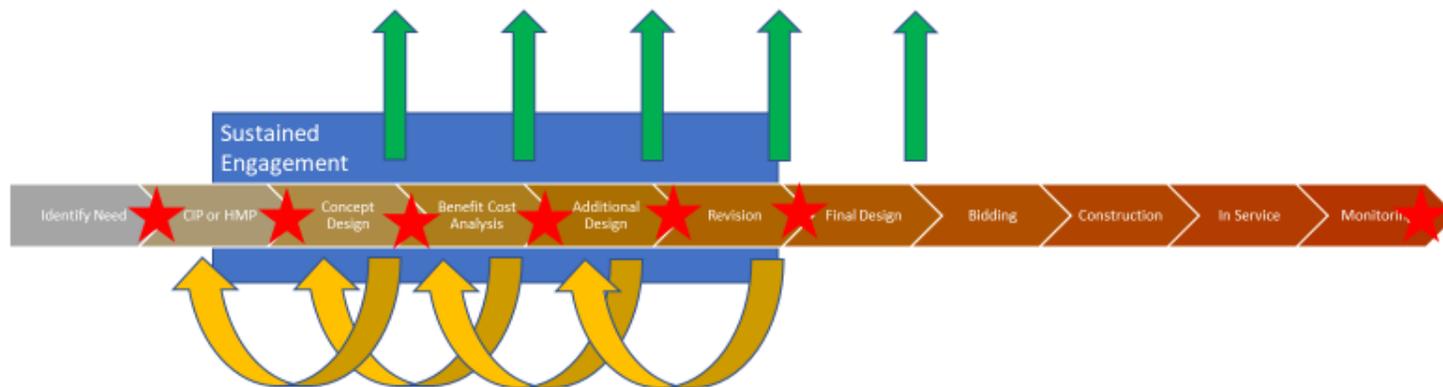
Victoria Vetre, CFM
Senior Environmental Planner



QUESTIONS



*Different Grant Applications can be pursued at these stages
(they vary in what is needed relative to design level and BCA)*



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