

# Update of Hazard Mitigation Plan for the Naugatuck Valley Region



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Public Workshop:  
Hazard Identification and Risk Assessment

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David Murphy, PE, CFM  
Noah Slovin, CFM



## WORKSHOP LOGISTICS

- Meeting will be recorded
- Meeting is accessible by phone or Zoom application
- Please comment in the chat box if you have any technical questions
- Please use the Q&A features to ask questions
- Participation Opportunities:
  - Zoom Poll feature
  - Q&A and Chat Box
  - Discussion opportunity at the end of the presentation

# Agenda

- Purpose and Need for Hazard Mitigation Planning
- Review of Hazards to be Addressed
- Effects of Climate Change
- Characterizing Hazard Losses
- FEMA Map Updates (Diane Ifkovic, CT Department of Energy and Environmental Protection)
- Next Steps

*Test Poll*  
*(to make sure it is working for you)*

*Poll #1: Tell us a little about you*

# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

## Authority

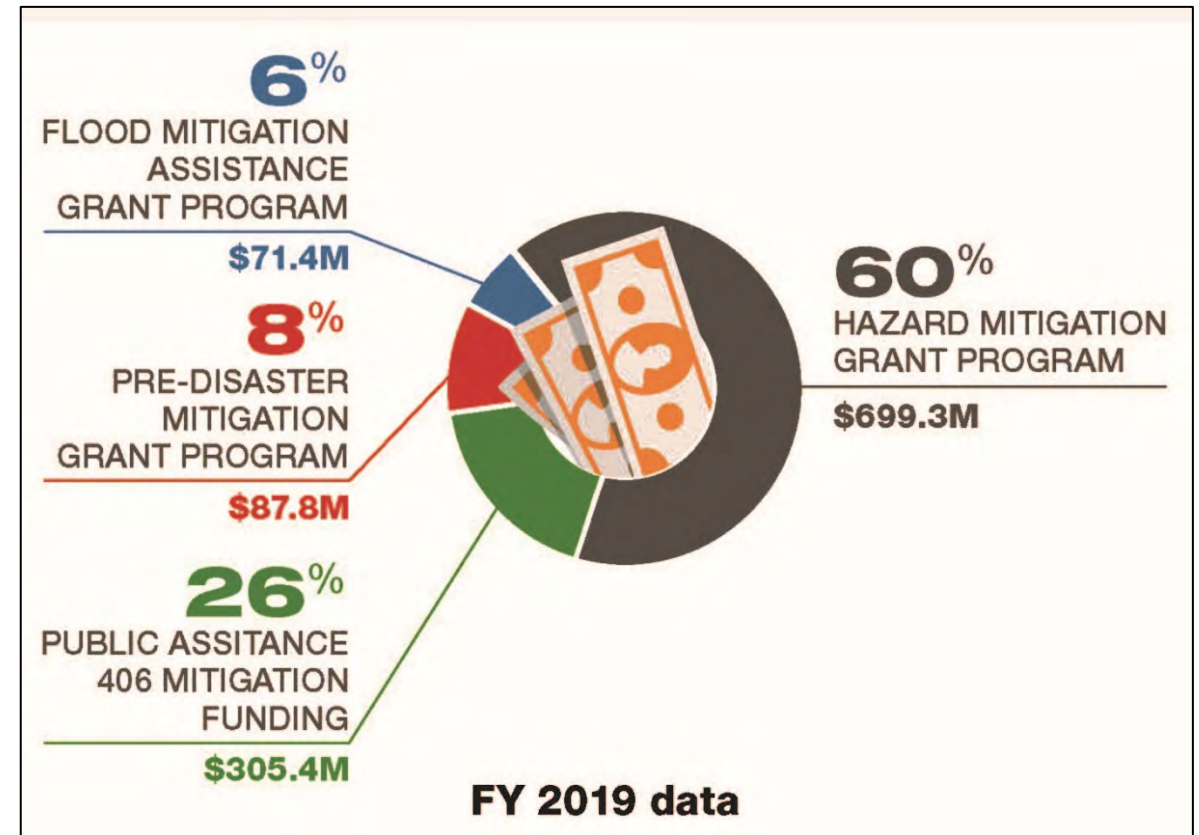
- Disaster Mitigation Act of 2000 (amendments to Stafford Act of 1988)

## Goal of Disaster Mitigation Act

- Promote disaster *preparedness*
- Promote hazard mitigation *actions* to reduce losses

## Mitigation Grant Programs

- Flood Mitigation Assistance (FMA)
- Hazard Mitigation Grant Program (HMGP)
- Building Resilient Infrastructure and Communities (BRIC)
  - Replaces Pre-Disaster Mitigation (PDM)
  - Shift from pre-disaster spending to research-supported investment



Graphic courtesy of FEMA

# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

## 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.



New Elevated Construction



Removal of Structures from Floodplain

# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

## LONG-TERM GOALS OF HAZARD MITIGATION

### Reduce

- Loss of life
- Damage to property and infrastructure
- Costs to residents and businesses (taxes, insurance, repair costs, etc.)
- Municipal service costs (long-term, e.g. emergency response, infrastructure maintenance)

### Educate

- Residents
- Policy-makers

### Connect

- Hazard mitigation planning to other community planning efforts

### Enhance

- And preserve natural resource systems in the community





# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

## Status of Plans in Connecticut

- Most initial plans developed 2005-2011
- Local plans updated every five years

## Status of NVCOG Plans

- Most initial plans developed 2005-2011 for individual towns and cities
- The most recent plans were adopted between December 2012 and July 2016
- Plans expired starting in February 2018 and running through September 2021
- All towns and cities will be part of ONE new plan



# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

After Adopting a Plan, mitigation grants can be used for:

- Building acquisitions or elevations
- Culvert replacements
- Drainage projects
- Bank stabilization
- Landslide stabilization
- Wind retrofits
- Seismic retrofits
- Snow load retrofits
- Standby power supplies for critical facilities



This home in Trumbull was acquired and demolished using a FEMA grant



# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

CULVERT REPLACEMENT FUNDED BY HMGP IN BUCKLAND, MA



Floyd 1999



Irene 2011

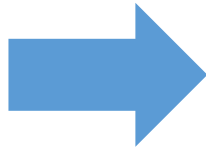


# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING

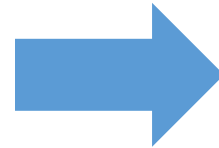
RIVERBANK STABILIZATION FUNDED BY HMGP IN HAWLEY, MA



Irene 8/2011



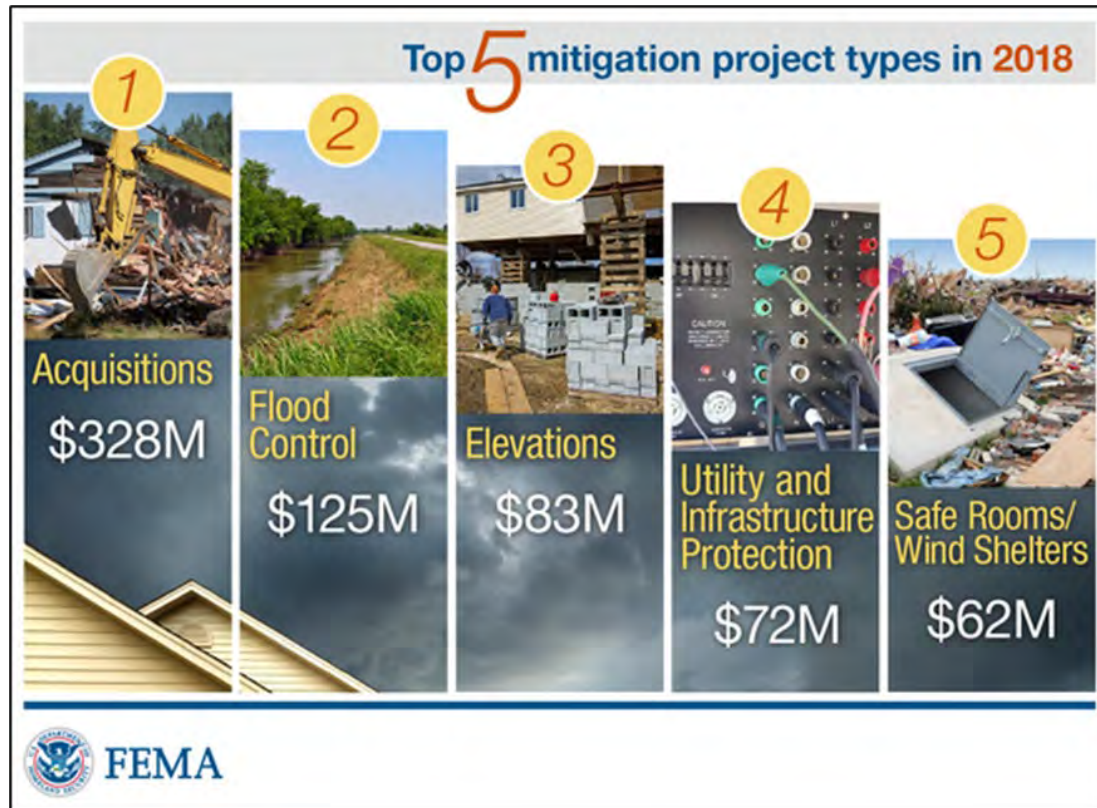
Post-Irene 9/2011



Construction  
August 2017



# PURPOSE AND NEED FOR HAZARD MITIGATION PLANNING





# HAZARDS TO INCLUDE IN THE PLAN

- Floods
  - Hurricanes and Tropical Storms
  - Summer Storms
  - Tornadoes and High Winds
  - Severe Winter Storms
  - Dam Failure
  - Wildfire
- ↑
- CLIMATE CHANGE
- Earthquakes
  - Landslides and Sinkholes (for some towns)



# HAZARDS TO INCLUDE IN THE PLAN

- Floods – Riverine
- Hurricanes and Tropical Storms
- Summer Storms
- Tornadoes and High winds
- Severe Winter Storms
- Dam Failure
- Wildfire
- Earthquakes
- Landslides and Sinkholes (for some towns)



Housatonic River, 2011



Pequabuck River, 2011



Pomperaug River, 2007

# HAZARDS TO INCLUDE IN THE PLAN

- Floods – Flash Floods During Intense Rain
- Hurricanes and Tropical Storms
- Summer Storms
- Tornadoes and High winds
- Severe Winter Storms
- Dam Failure
- Wildfire
- Earthquakes
- Landslides and Sinkholes (for some towns)



Waterbury Flood Damage After June 2006 Storms





# HAZARDS TO INCLUDE IN THE PLAN

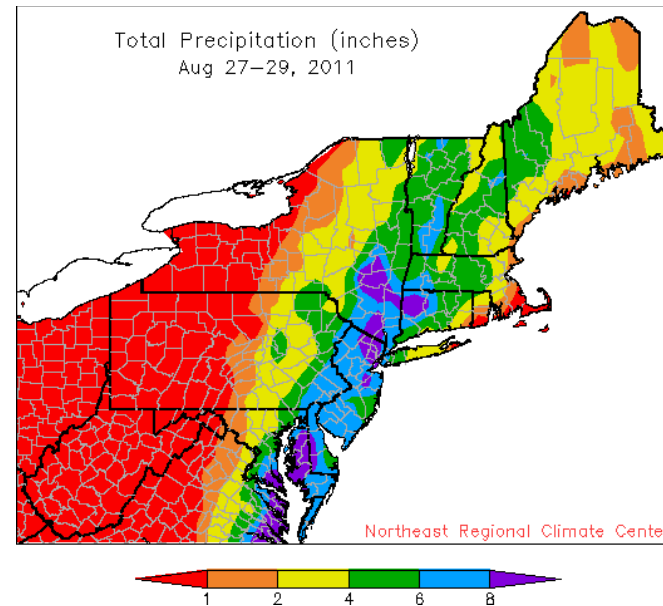
- Floods – Ice Jams
- Hurricanes and Tropical Storms
- Summer Storms
- Tornadoes and High winds
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Southbury ice jam damage

# HAZARDS TO INCLUDE IN THE PLAN

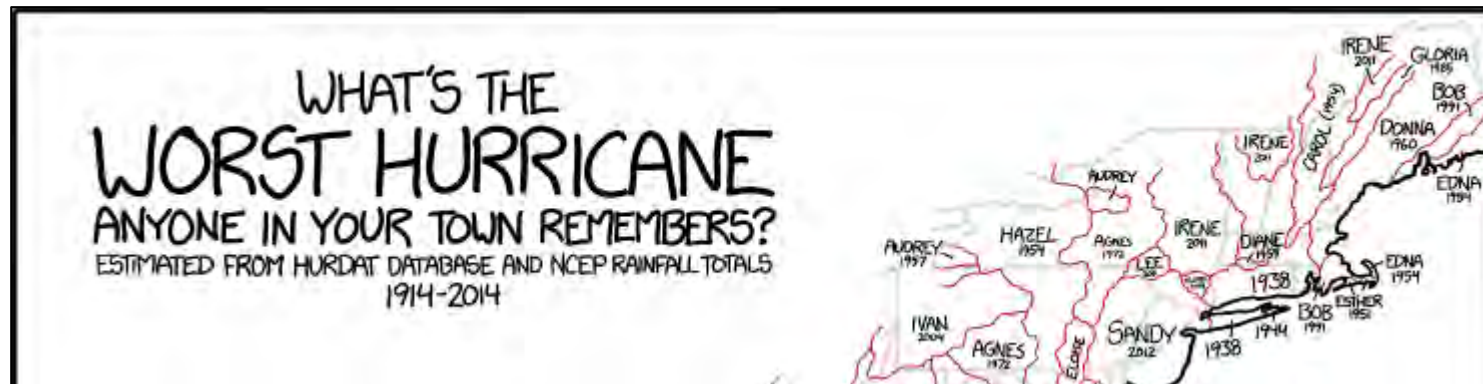
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Courtesy of  
Northeast  
Climate Data  
Center



Downed Power Lines from Tropical  
Storm Isaias in Cheshire, 2020



# HAZARDS TO INCLUDE IN THE PLAN

- Floods
- Hurricanes and Tropical Storms
- **Summer Storms**
- Tornadoes and High winds
- Severe Winter Storms
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Funnel Cloud in Woodbury, 2011  
New Haven Register



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- **Severe Winter Storms**
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Photos from Waterbury Rep-Am and others



Citizens News



courant



# HAZARDS TO INCLUDE IN THE PLAN

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Little River  
Photo by David Murphy

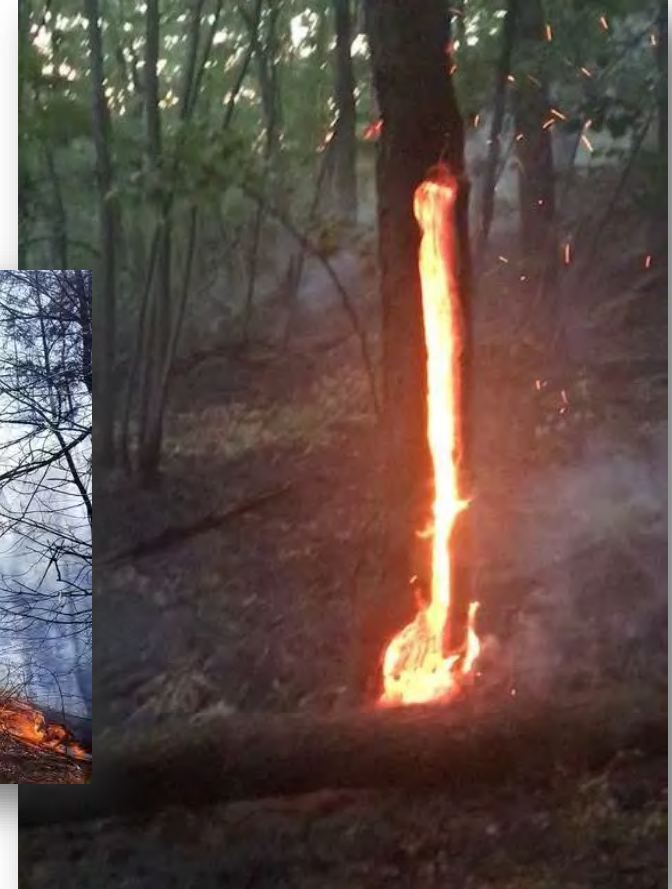


Great Hill Reservoir Dam, Seymour  
New Haven Register



# HAZARDS TO INCLUDE IN THE PLAN

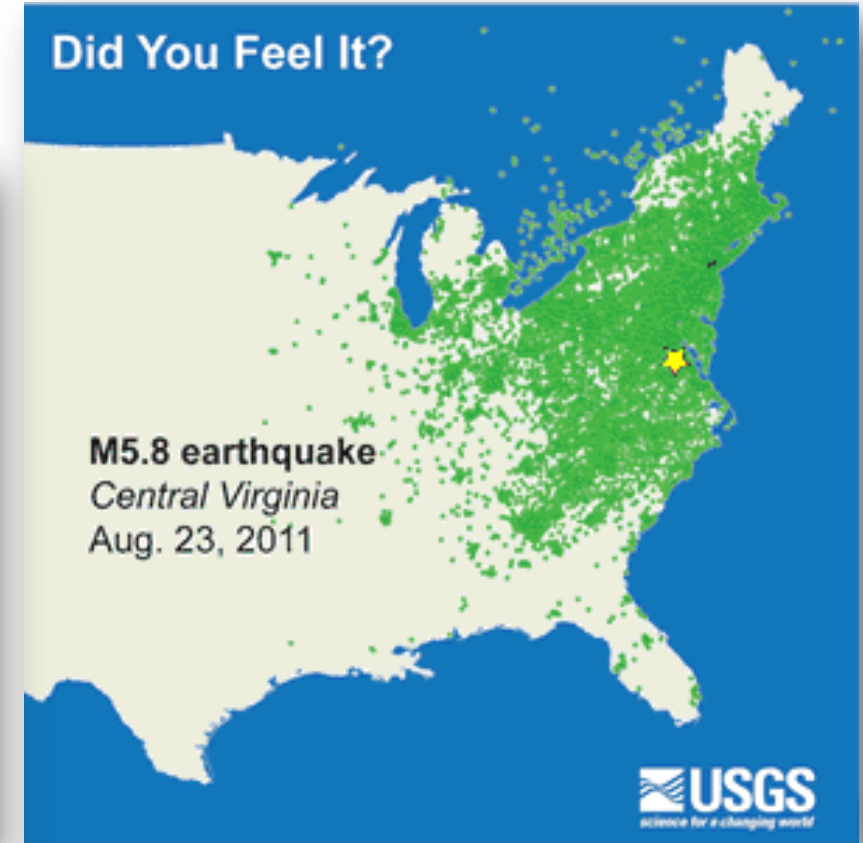
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- **Wildfire**
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- Landslides and Sinkholes (for some towns)



Beacon Falls (left)  
Watertown (right)  
Republican American

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- Dam Failure
- Wildfire
- **Earthquakes**
- Landslides and Sinkholes (for some towns)



Courtesy of USGS



# HAZARDS TO INCLUDE IN THE PLAN

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Photos courtesy of New Haven Register



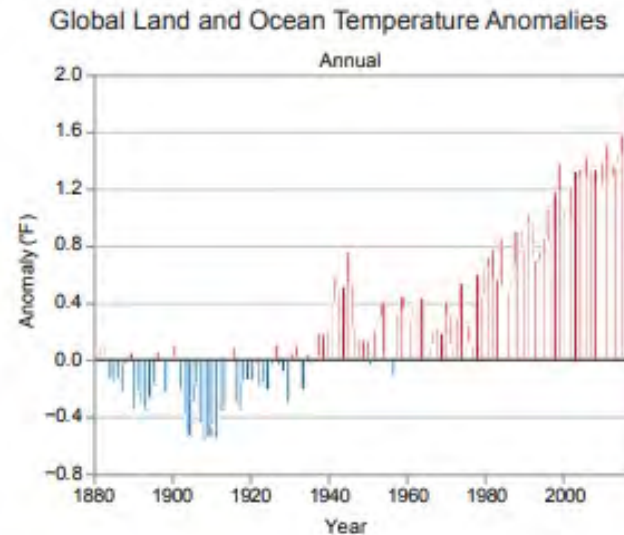
Photo courtesy of Waterbury Rep-Am

# HAZARDS TO INCLUDE IN THE PLAN

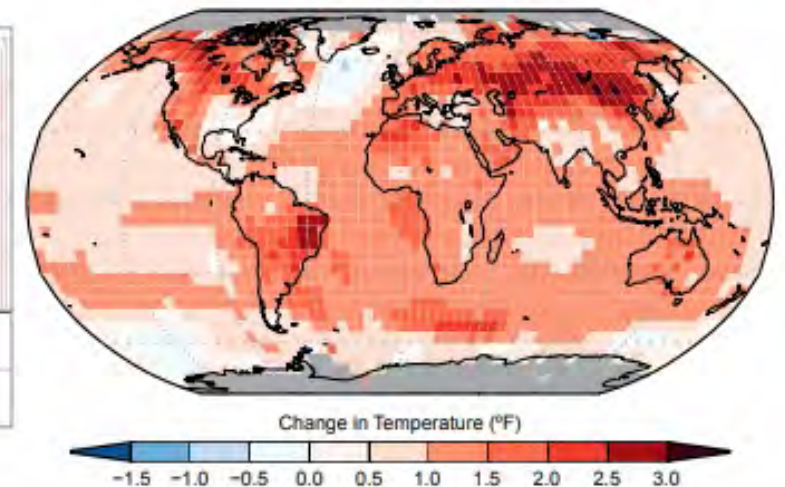
## EFFECTS OF CLIMATE CHANGE

- Global average temperatures are increasing
- Growing seasons may fluctuate
- Extreme heat episodes may increase

Global Temperatures Continue to Rise



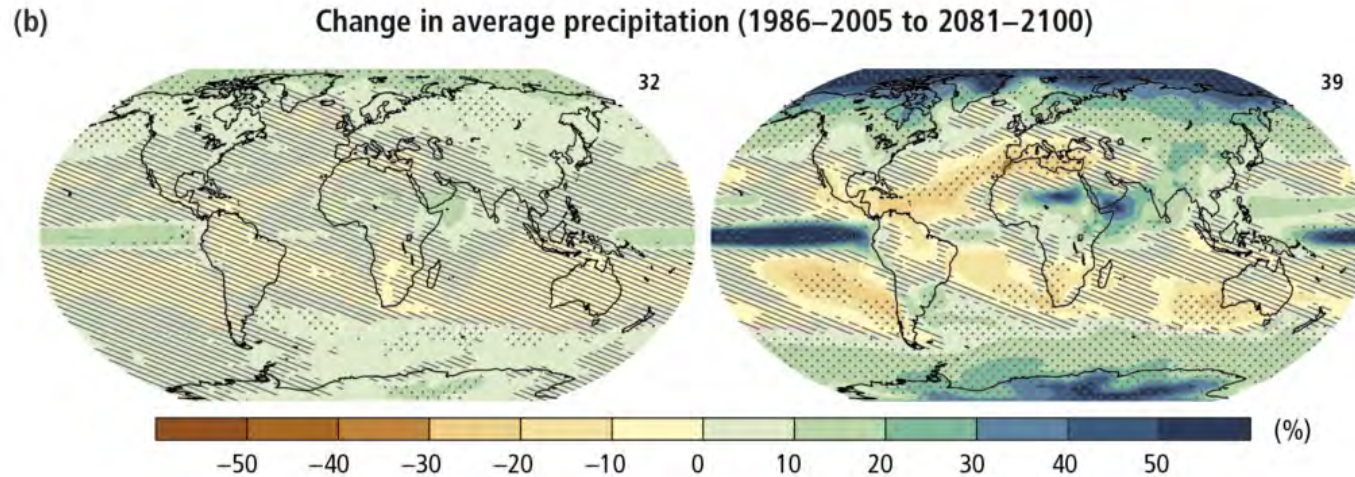
Surface Temperature Change





# HAZARDS TO INCLUDE IN THE PLAN

## EFFECTS OF CLIMATE CHANGE

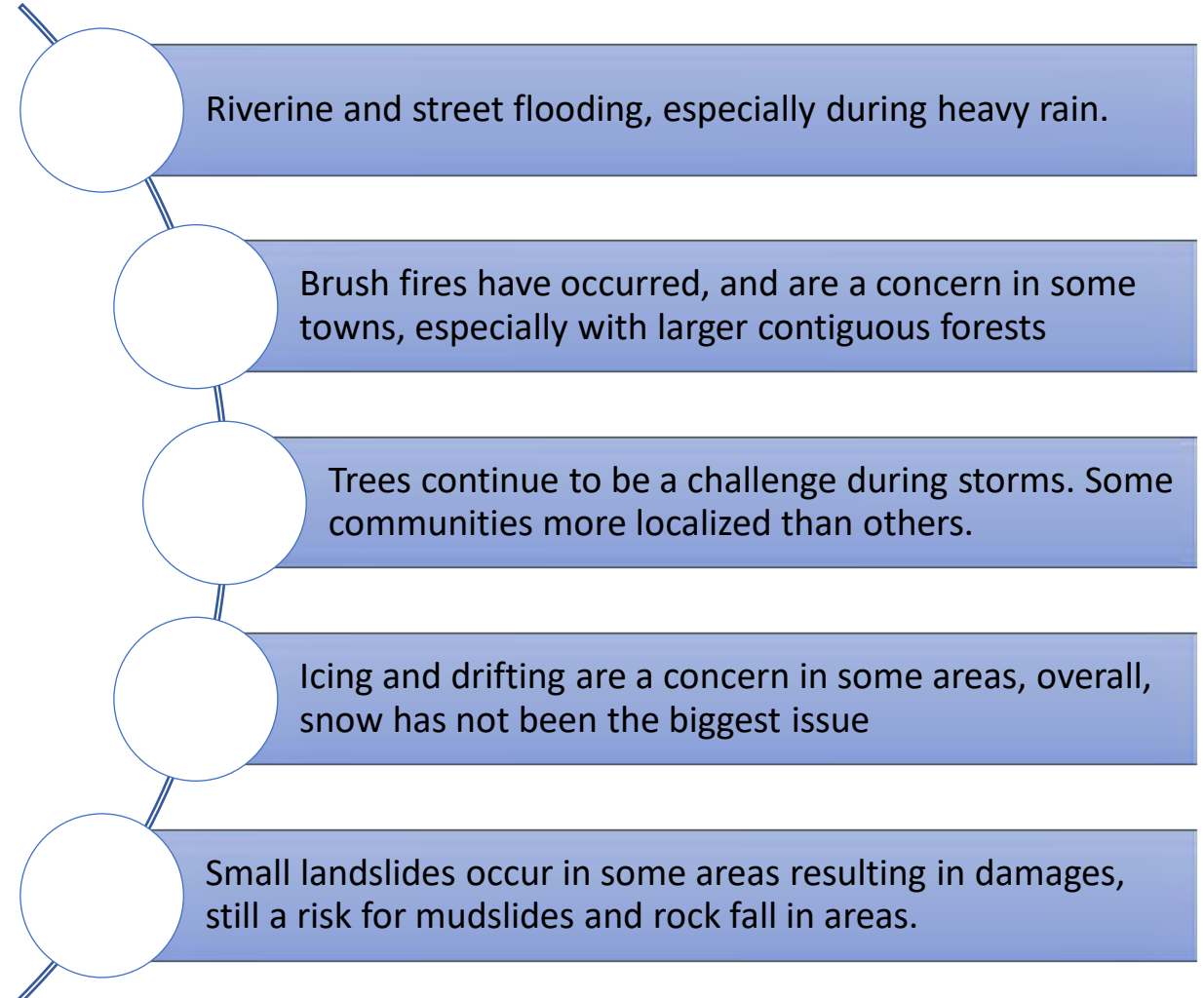


- Precipitation is expected to increase throughout the higher latitude regions
- Winter precipitation may increase, but may not always be snow
- Drought occurrences may increase

# HAZARDS TO INCLUDE IN THE PLAN

## REPORT FROM MUNICIPAL MEETINGS

- Floods
- Hurricanes and Tropical Storms
- Summer Storms
- Tornadoes and High winds
- Severe Winter Storms
- Dam Failure
- Wildfire
- Earthquakes
- Ice Jams, Landslides, and Sinkholes (for some towns)



## *Poll #2: Hazards of Concern*

# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## Methods of Characterizing Risk

- State Hazard Mitigation Plan
- FEMA maps
- National Centers for Environmental Information (NCEI)
- FEMA Public Assistance (PA) reimbursements after disasters
- HAZUS-MH
- National Flood Insurance Program (NFIP) claims
- Repetitive Loss property lists
- Meetings with local planning teams
- Public Input



# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

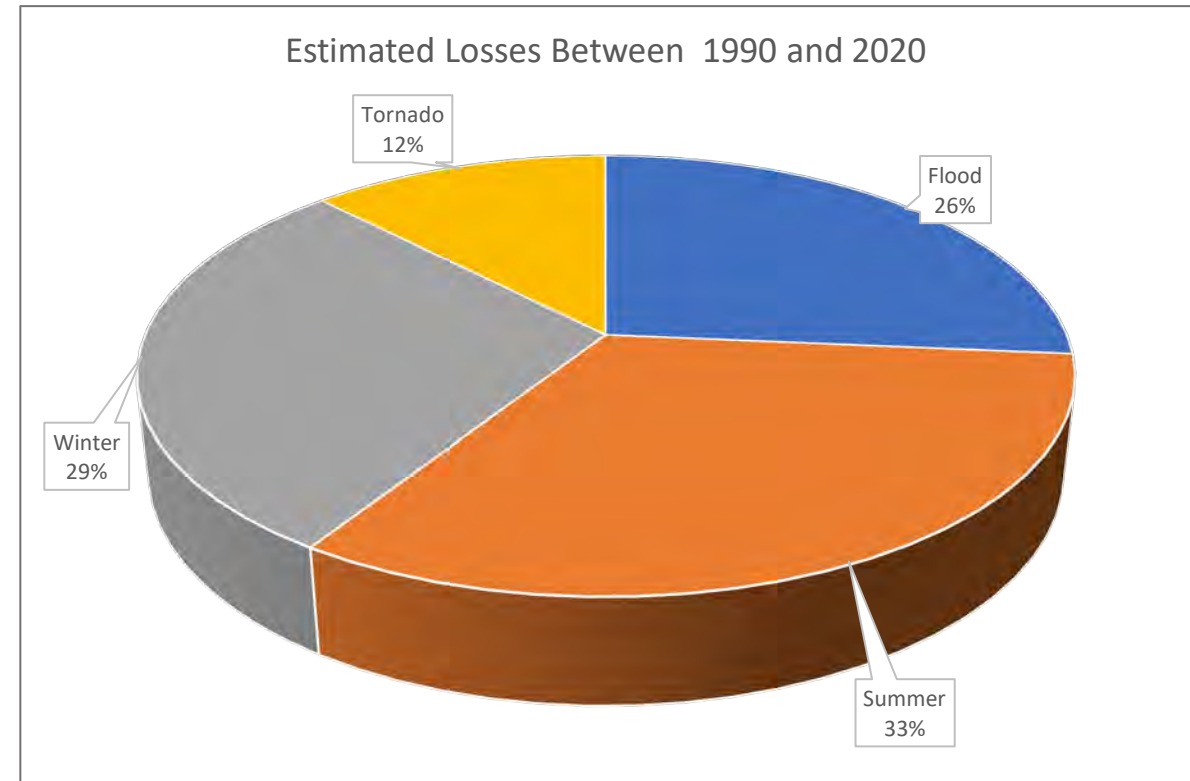
## LOSSES FROM NATURAL HAZARDS (NCEI)

	Events Since 2013	Costs Since 2013	Average Annual Cost (2013-2019)	Injuries Since 2013	Deaths Since 2013	Episodes
<b>Flood</b>	137	\$18,706	\$2,672	0	0	Flood: 34 Flash Flood: 89
<b>Summer Storms &amp; Thunderstorms</b>	490	\$1,135,659	\$162,237	7	4	Drought: 3 Extreme Heat: 46 High Winds: 371 Hail: 44 Lightning: 24
<b>Winter Storm</b>	419	\$366,925	\$52,418	6	3	Blizzard: 15 Drought: 5 Extreme Cold/Wind Chill: 38 Frost/Freeze: 3 Hail: 2 Heavy Snow: 76 High Winds: 84 Ice Storm: 1 Winter Storm: 60 Winter Weather: 135
<b>Tornado</b>	11	\$425,754	\$60,822	0	0	Tornado: 10 Funnel Cloud: 1

# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## LOSSES FROM NATURAL HAZARDS (NCEI)

	Total losses 1990 – 2020	Average Annual Cost
Flood	\$135,000	\$61,123
Summer Storms & Thunderstorms	\$9,175,300	\$69,354
Winter Storm	\$2,543,300	\$42,011
Tornado	\$5,315,000	\$13,429





# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## LOSSES FROM NATURAL HAZARDS (NCEI)

Based on 2013 to 2020:

- Flash floods: 12 per year
- Other flood events: 4 to 5 per year
- Summer high wind events: 53 days a year
- Wintertime high wind events: 12 days a year
- Heavy snow: 10 to 11 days a year
- Extreme heat: 6 days a year
- Extreme cold: 5 days a year
- Tornado: 1 to 2 per year

# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS

- These are the reimbursements to towns and cities for cleaning up after disasters.
- Declared natural disasters in Connecticut (2014-2020)
  - 2015 Snow Storm
  - 2018 Tornadoes
  - 2018 Flooding
  - 2020 Tropical Storm Isaias (Emergency, not Disaster)

Also...

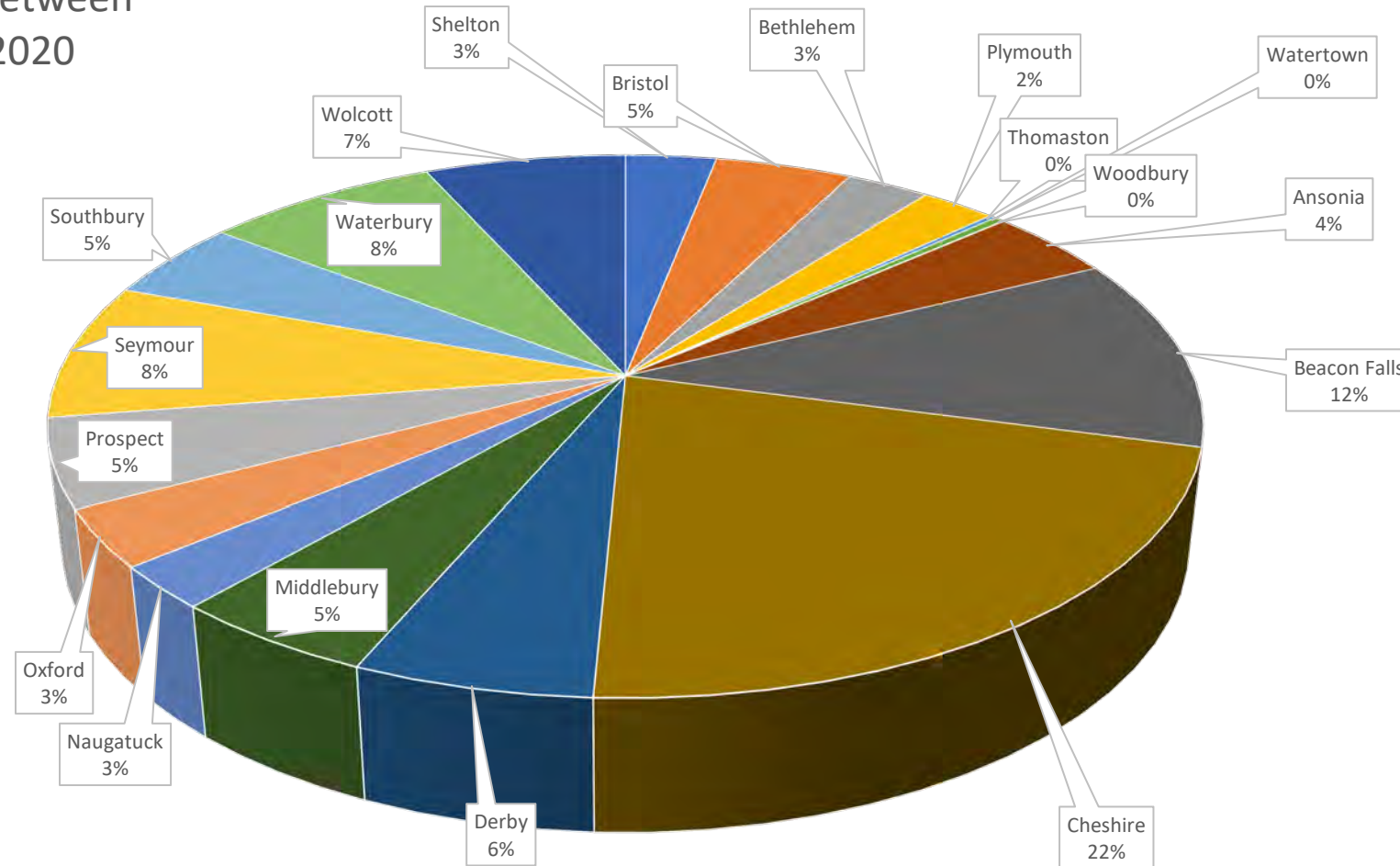
- 2020 COVID-19



# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS

PA Received between  
2013 and 2020

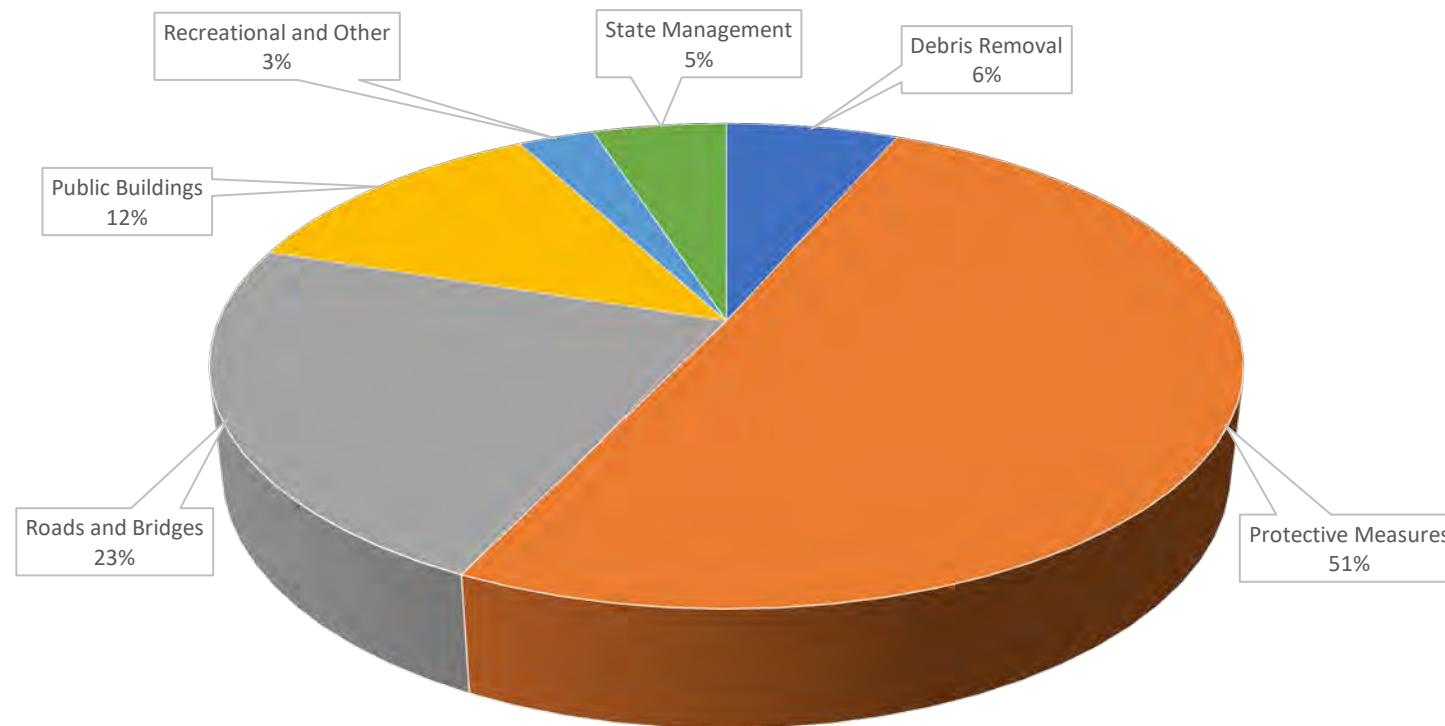


Most PA attributed to winter storms, then tornadoes. Little flood and wind.

# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS

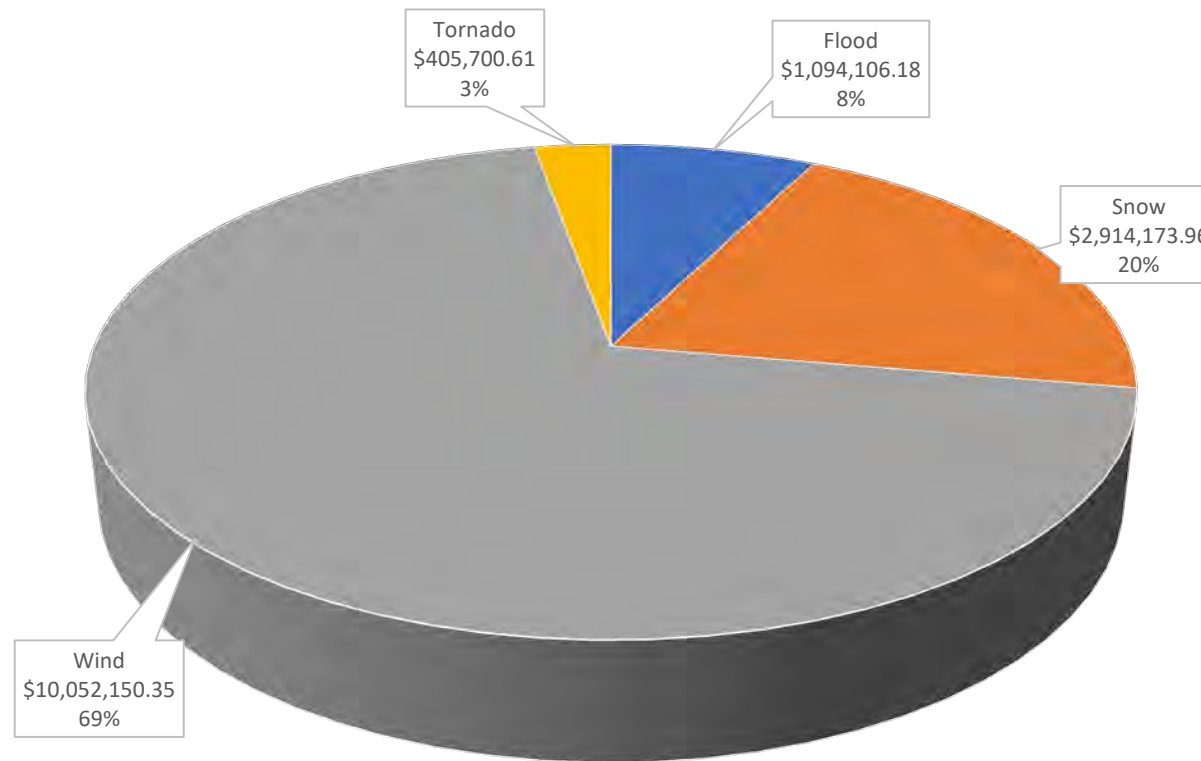
Types of PA Received between 2013 and 2020



# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## FEMA PUBLIC ASSISTANCE (PA) REIMBURSEMENTS

PA Received Since 1998



# National flood insurance programs (NFIP) Policies

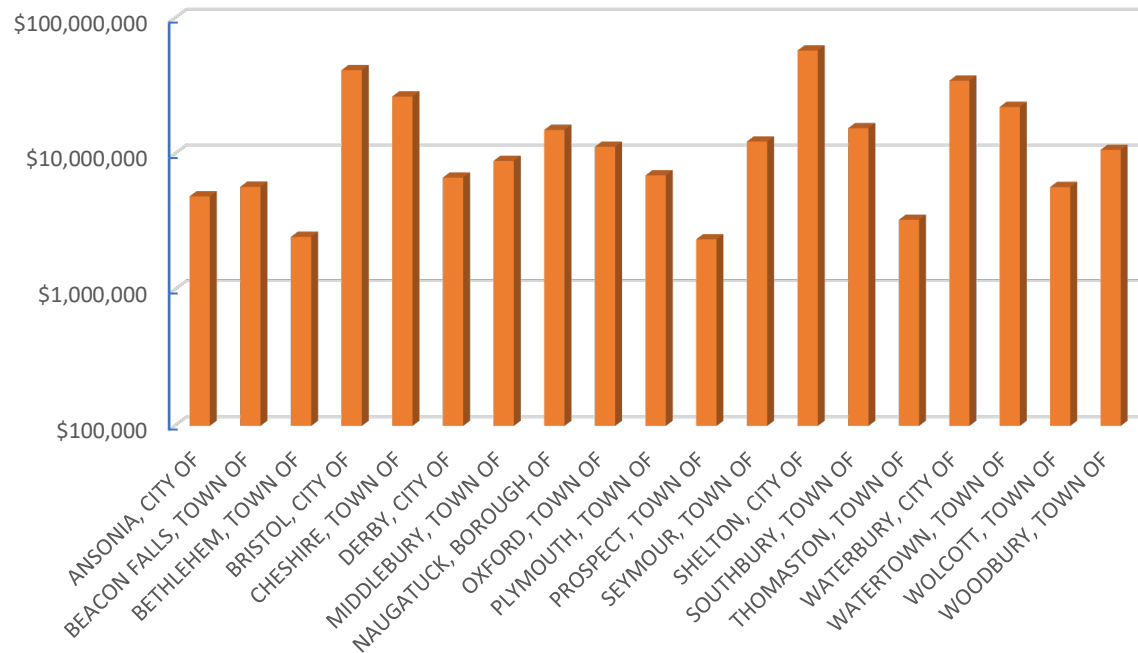


Municipality	Policies in Force	Total Coverage (\$)
Ansonia	18	4,865,900
Beacon Falls	19	5,727,100
Bethlehem	11	2,451,500
Bristol	194	41,452,200
Cheshire	88	26,492,300
Derby	26	6,694,500
Middlebury	36	8,884,700
Naugatuck	93	15,037,300
Oxford	45	11,298,900
Plymouth	26	6,952,700
Prospect	7	2,350,000
Seymour	58	12,340,200
Shelton	244	57,801,200
Southbury	64	15,484,100
Thomaston	8	3,269,900
Waterbury	207	34,647,800
Watertown	83	22,198,500
Wolcott	26	5,702,800
Woodbury	45	10,714,600

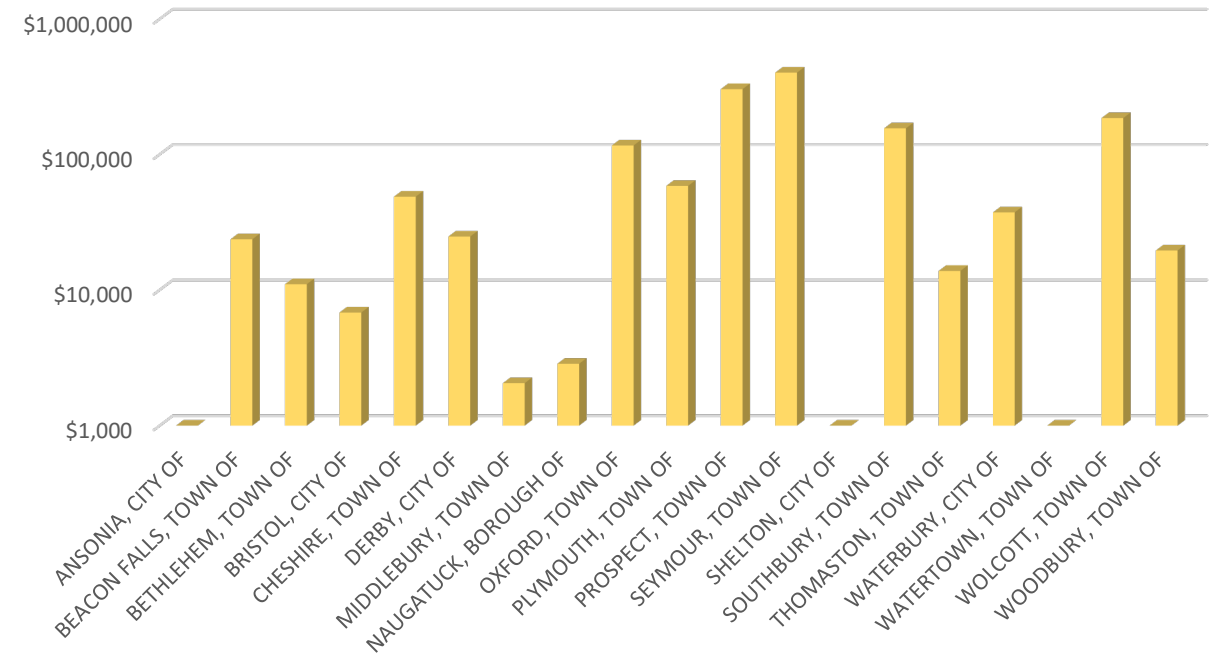
# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## NFIP POLICIES AND LOSSES PAID

NFIP Insurance in Force



NFIP Total Losses Paid Since 1978

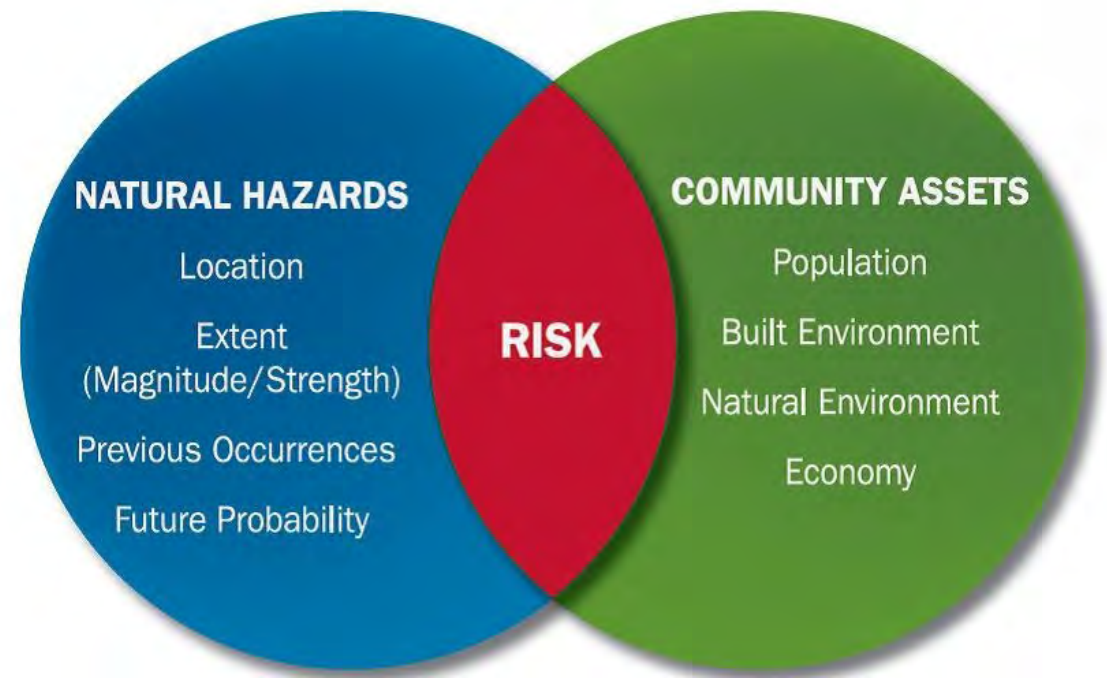


# VULNERABILITIES, RISKS, AND LOSS ESTIMATES

## WHAT IS AT RISK?

- Repetitive Loss (RL) properties and properties near them
- Historic and Cultural Resources
- Critical Facilities
- *As well as the built environment and people at large*

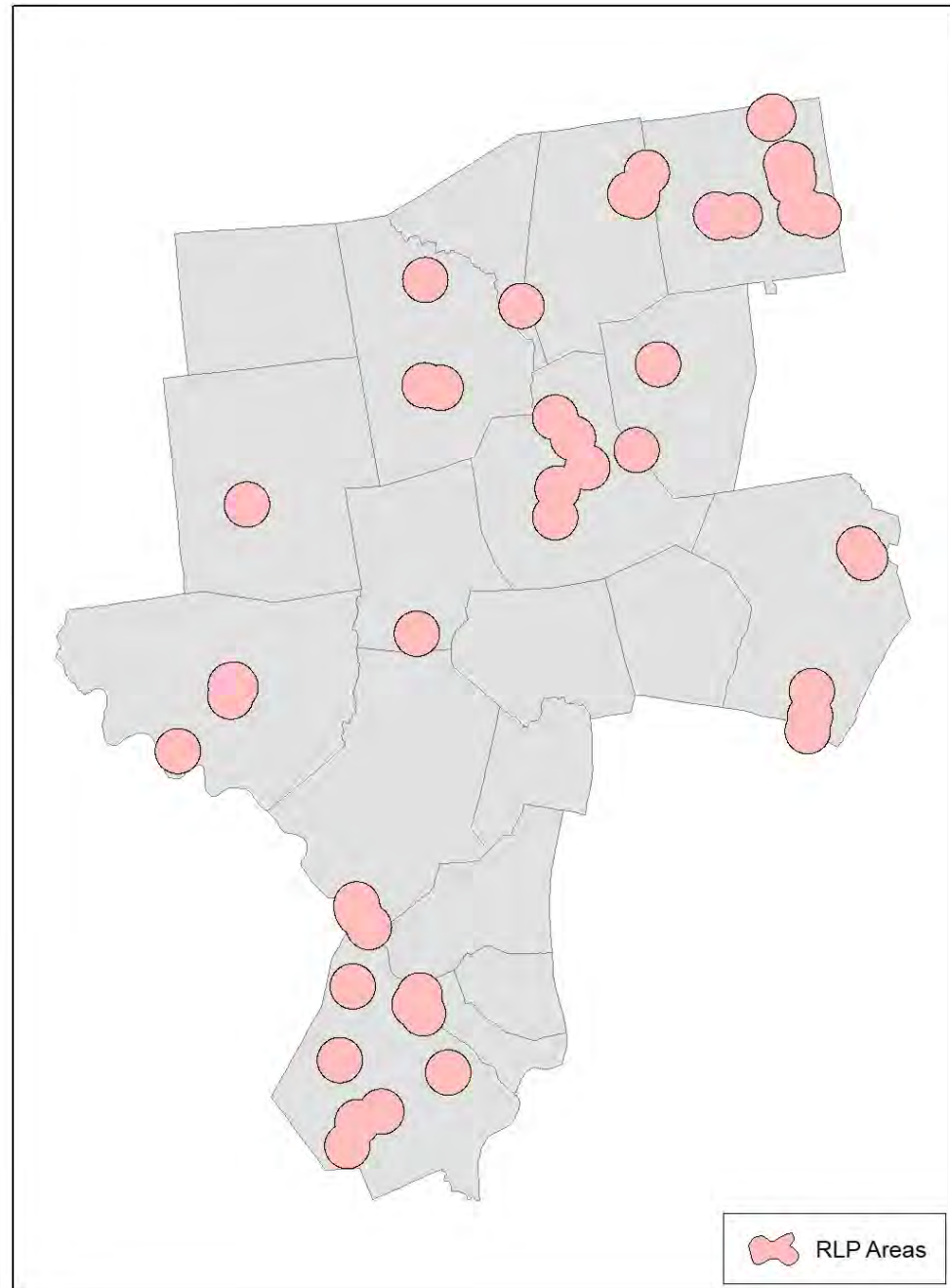
Overall – infrastructure, residential and commercial properties, utilities



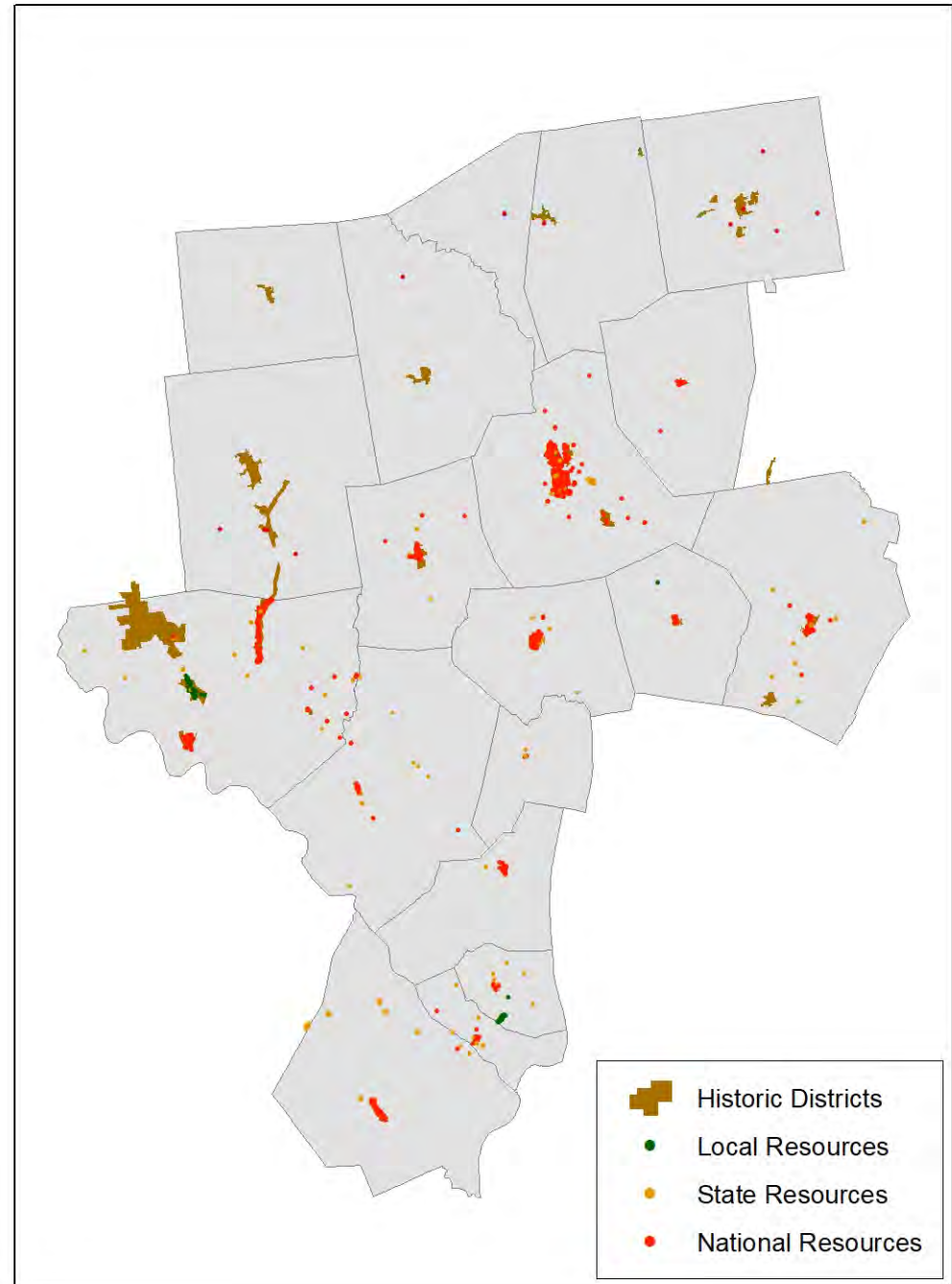
Source: FEMA, Local Hazard Mitigation Handbook



# Repetitive Loss Properties (more than one flood insurance payment)



# Historic and Cultural Resources

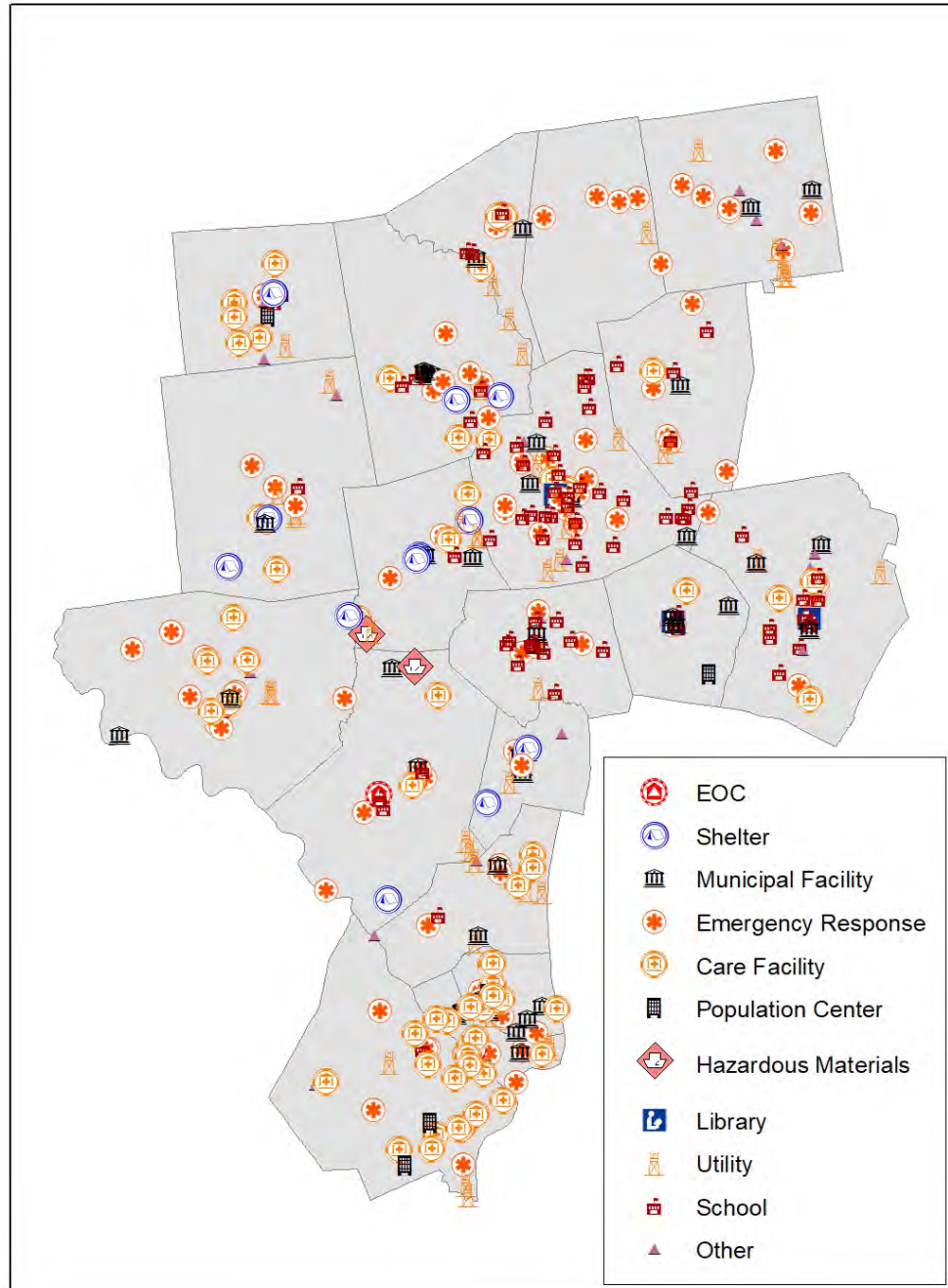




# Critical Facilities

Critical facility updates and changes are made based on feedback during municipal meetings. These include

- EOC
- Police
- Fire
- Shelters
- Municipal buildings
- Care facilities
- Hospitals
- Schools
- Other facilities that are critical to emergency response



## *Poll #3: Vulnerabilities and Risk*



# Connecticut Department of Energy and Environmental Protection



Connecticut Department of  
**ENERGY &  
ENVIRONMENTAL  
PROTECTION**

# **Naugatuck Valley Council of Government (NVCOG)**

## **Regional Natural Hazard Mitigation Plan Update - Mapping Projects**

**November 18, 2020 (5:30-6:30pm, Public)**

**Diane Ifkovic, State NFIP Coordinator**



Connecticut Department of Energy and Environmental Protection





# NVCOG communities participate in NFIP National Flood Insurance Program (NFIP)

- Flood Maps
- Flood Insurance
- Flood Regulations



Connecticut Department of Energy and Environmental Protection



## FEMA Flood Mapping Process (3-5 years)

- Funding from Congress
- Discovery (meetings, report)
- Field Surveying
- Work Map issued to town officials
- Work Map meeting with town officials
- FEMA resolves problems, appeals
- Preliminary map issued to town officials, resolves appeals
- Meeting with public before map is effective/final







- NVCOG is comprised of 19 communities
- Four Connecticut Counties – New Haven, Litchfield, Fairfield, Hartford
- Four Major Watersheds – Quinnipiac, Saugatuck, Farmington, Housatonic Rivers



# Evolution of FEMA Flood Maps

- Individual Community Maps (joined NFIP 1978 to 1990)
- Countywide Maps (2008-2010)
  - New Haven County – December 17, 2010
  - Hartford County (Bristol) – September 26, 2008
  - Fairfield County (Shelton) – June 18, 2010
  - Litchfield County – No countywide update  
Bethlehem, Plymouth, Thomaston, Watertown, Woodbury
- Levee Updates (July & October 2013) Ansonia, Derby
- Watershed Map Updates (2015 to present)
  - Quinnipiac River Watershed – May 16, 2017  
Ansonia, Bristol, Cheshire, Derby





# Flood Map Updates in the NVCOG Region

1. Saugatuck River Watershed
2. Farmington River Watershed
3. Housatonic River Watershed



Connecticut Department of Energy and Environmental Protection



# Saugatuck River Watershed (20 communities)

- NVCOG 1 Community Included:  
Shelton
- FEMA Mapping Contractor:  
U.S. Geological Survey (USGS)





# Saugatuck River Watershed

- Discovery meetings were held June 7, 2016
- Discovery report issued in 2017
- Field surveying was completed in summer 2018
- Work maps will be issued soon to community officials
- Work Map meetings (webinars) January/February 2021



# Farmington River Watershed (24 communities)

- NVCOG 3 Communities Included:  
Bristol, Plymouth, Wolcott
- FEMA Mapping Contractor: Compass



# Farmington River Watershed

- Discovery meetings were held September 25, 2018
- Field surveying was completed in summer 2019
- Work Map meetings (webinars) held July 21 & 22, 2020
- One-on-one community meetings held Aug. 3 & 11, 2020
- Preliminary flood maps projected summer 2021
- Final effective maps projected summer 2023



# Housatonic River Watershed (54 communities)

- All NVCOG 19 Communities Included:  
Ansonia, Beacon Falls, Bethlehem, Bristol,  
Cheshire, Derby, Middlebury, Naugatuck,  
Oxford, Plymouth, Prospect, Seymour,  
Shelton, Southbury, Thomaston, Waterbury,  
Watertown, Wolcott, Woodbury
- FEMA Mapping Contractor:  
U.S. Geological Survey (USGS)





# Housatonic River Watershed

- Discovery meetings held May 2017
- Field surveying has begun
- Selection of priority stream reaches is complete





## What should public be aware of with these projects?

1. Review updated flood maps
2. Review flood insurance coverage
3. When final maps go effective, town is required to update local floodplain zoning regulations or ordinance or be suspended from the NFIP (hinders home sales)



# Ice Jams and Climate Change

- FEMA flood maps do not contain flood risk information on ice jam flooding or climate change
- Ice jams were a problem in January 2018 on Housatonic River, especially in Kent
- Inland areas seeing effects of climate change with “rain bombs”, extreme precipitation events
- This type of changing rain pattern can have more adverse effects in hilly areas due to increased flash flooding or new areas experiencing flooding (urban/rural)



# Be Informed, Protect Yourself

- Lines on a map are not walls
  - Water will go where it wants to and causes damage
  - Maps are made to a certain design storm event, we can experience stronger storm events
  - Development over the years can change drainage patterns
  - Maps cannot account for every nuance at property level
- 
- FEMA Map Service Center: [www.msc.fema.gov](http://www.msc.fema.gov)
  - Flood Factor: [www.firststreet.org](http://www.firststreet.org)







# Questions?

Diane Ifkovic

Email: [diane.Ifkovic@ct.gov](mailto:diane.Ifkovic@ct.gov)

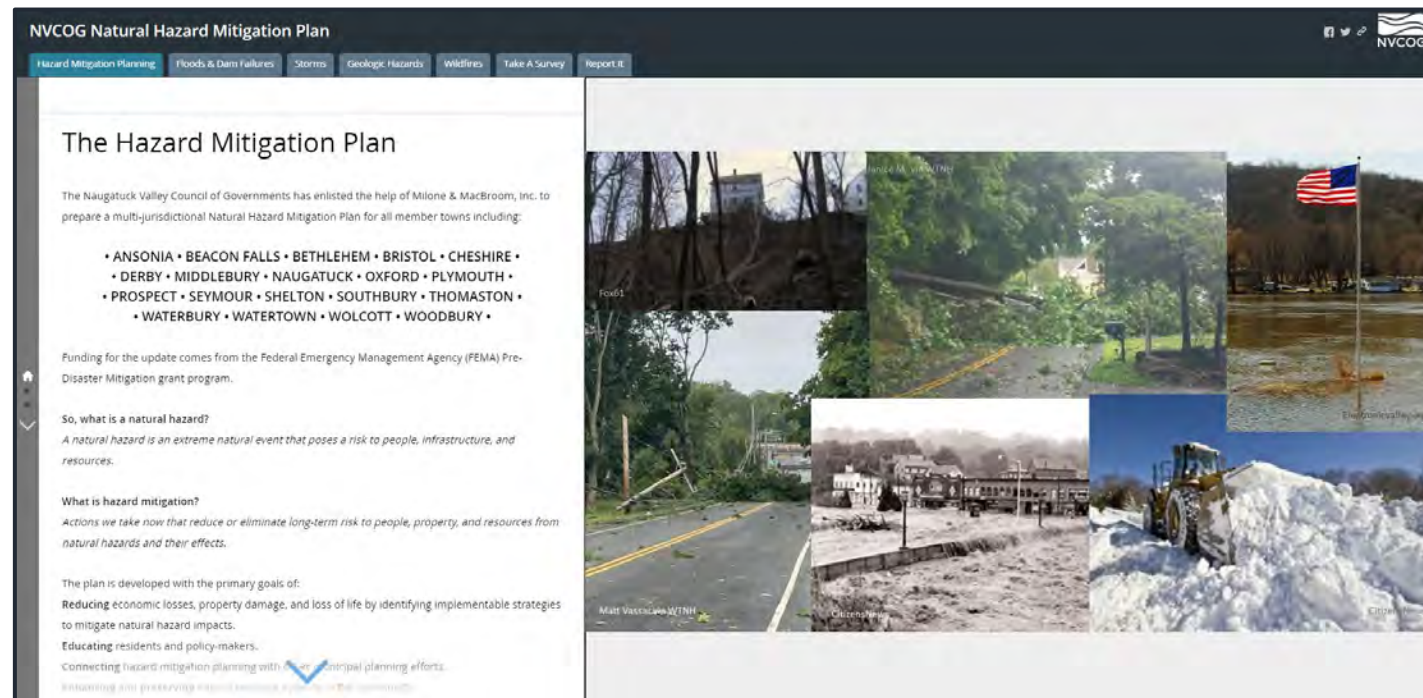
(860) 424-3537



Connecticut Department of Energy and Environmental Protection

# NEXT STEPS

- Online Survey is OPEN – can access through <https://nvcogct.gov/project/current-projects/regional-natural-hazard-mitigation-plan-update/>
- View Story Map (clip below) from the same link
- Additional public meetings hosted by each town's planning, zoning, or wetlands commission
- One more workshop like this one to discuss mitigation strategies





# REPORT FROM MUNICIPAL MEETINGS

## Topics Discussed

- Critical facilities and standby power
- Changes in capabilities
- Changes in risk
- Events of note in the last 4-5 years
- Repetitive loss properties
- Review of prior mitigation actions
- Potential new mitigation actions
- Designation of the local coordinator

## So far...

15 Municipalities

1 Scheduled

Prospect 11/25

3 Meetings still need to be complete

**Middlebury**

**Plymouth**

**Seymour**

Let's focus on  
these





# REPORT FROM MUNICIPAL MEETINGS

## Changes in Capabilities

- Upgrading backup power at municipal and critical facilities
- Improving drainage, including streetscape projects
- Increasing tree maintenance budget
- Advancing storm response and recovery documentation
- Updating stormwater regulations
- Increasing municipal operation redundancies – IT and facilities
- Education continues to increase for all hazard types