Natural Hazard Mitigation Plan: 2024 Update

September 28, 2023: Public Meeting

Margaret Morton Government Center, Bridgeport

RESILIENT Land & Water

METROCOG
Connecticut Metropolitan Council of Governments

Agenda

- Purpose, Need & Long Term Goals
- How Can the Plan be Used?
- What has Changed?
- Risk Assessment – hazards included in the plan
- Mitigating Hazards
- **Mapping Hazards**
- Next Steps

Natural Hazard Planning: Background

When applying for certain types of non-emergency disaster assistance, FEMA requires a hazard mitigation plan.

Local hazard mitigation plans are a strategy to reduce disaster losses

Purpose & Need

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:

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

"the purpose of mitigation planning is for state, local and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources."

-44 CFR § 201.1(b)

Purpose & Need

Natural Hazard: An extreme natural event that poses a risk to people, infrastructure, and resources.

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

Extreme heat and heavy rainfalls are exacerbated by large swathes of impervious surfaces…but community-lead efforts to plant trees can mitigate the risk associated with these hazards.

Purpose & Need: Long Term Goals

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.

The NHMP provides the Bridgeport community with a comprehensive framework for emergency preparedness

Benefits of a Hazard Mitigation Plan

01

Increase education and awareness on natural hazards and community vulnerabilities

02

Identify long-term strategies for risk reduction

03

input from stakeholders and the public

04

Identify cost-effective mitigation actions that focus resources on the greatest risk areas

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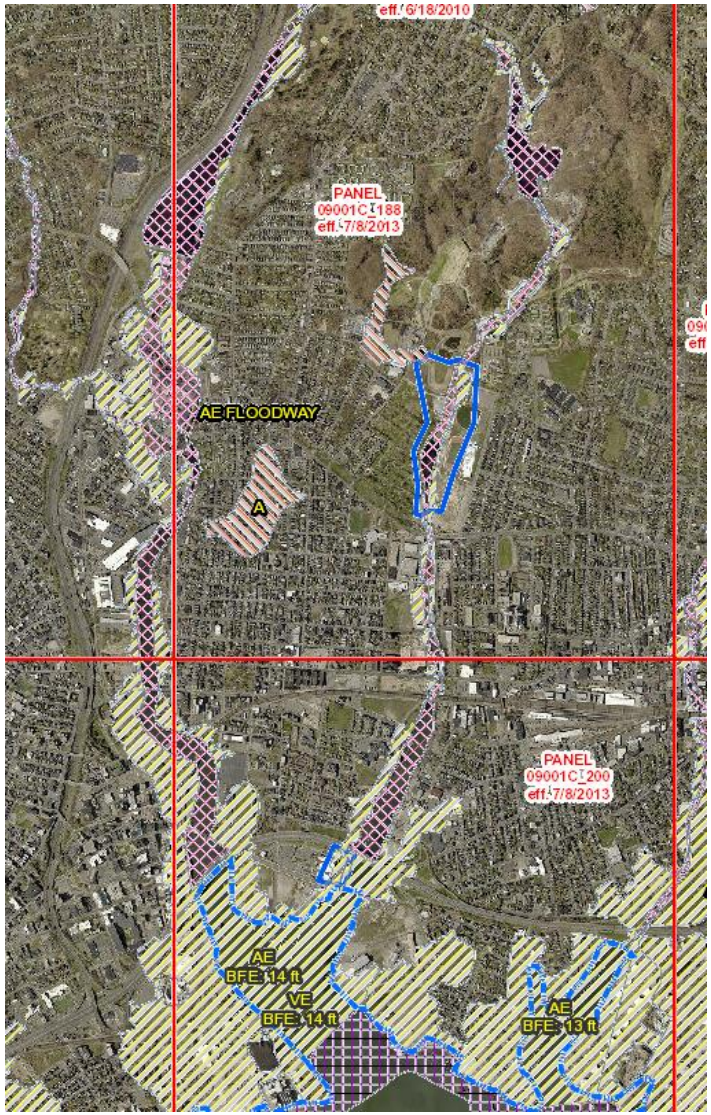
What Has Changed? (FEMA)

New FEMA requirements (previous NHMPs have included a lot of this already):

- Requires existing **regulatory** flood mapping products (see right)
- Must include the effects of **climate change** and other future conditions.
- Adopting/enforcing **building codes and land use/development ordinances** are important for local mitigation capabilities.
- Include all dam risks for **High Hazard Potential Dams** (HHPD) grant program eligibility.
- Broadens range of sectors for participation: including **community lifelines**, the public and community-based organizations that support underserved communities.



FEMA FIRM, from MetroCOG GIS Service

Community Lifelines

- Safety & Security
- Hazardous Materials
- **Food,** Water, Shelter
- Health & Medical
- Energy
- Transportation
- Communications

FEMA defines **critical community lifelines** as the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.

Question:

What are Bridgeport's Community Lifelines?

What Else Has Changed?

Availability of data: a range of data products have been developed, both at the federal and local levels. Examples include:

- FEMA's National Risk Index (mapping)
- Interagency Sea Level Rise Scenario Tool – NASA Sea Level Change Portal
- National Oceanic and Atmospheric Administration – climate.gov
- Resilient CT Phase II: mapping, vulnerability assessments and opportunity areas.

> "COVID-19 has taught us that we must expand capabilities and cultivate expertise from multiple disciplines to meet new complexities and operational demands."
>
> *- FEMA's 2022-26 Strategic Plan*

The COVID pandemic impacted daily life for most of the planet – we realized the importance of redundant services/infrastructure & community lifelines.

- Helpful to have multiple satellite locations for shelter, food, & medicine
- This strategy can be applied when natural hazards occur.

Risk Assessment

Type, location, & extent - as well as previous occurrences & future probability.

From 2019:

- Hurricanes & Tropical Storms
- Inland Flooding
- Coastal Flooding
- Sea Level Rise
- Winter Storms
- Summer Storms & Tornadoes
- Dam Failure
- Wildfires
- Earthquakes

New for 2024 Update:

- Extreme Heat (& AQ issues)
- Extreme Cold
- **Climate Change***
- Drought
- Federal emergency & disaster declarations from 2018 to mid-2023.

**Impacts to public health*

Climate Change

- Heat-related hazards will increase in intensity.
- Flash droughts will become more frequent.
- Sea level rise will increase frequency of coastal flooding.
- Riverine flood risks will increase.
- Nuisance flood risks and drainage-related flood risks will increase.
- More atmospheric heat energy may lead to more intense hurricanes, tornadoes, and other wind events.
- Snow may be heavier, although the snow season will be shorter.
- Invasive flora and fauna could cause ecological and economic harm.

Public Health (CDC)

During extreme heat events, increased risk to the elderly and people with certain health conditions.

Increase in vector-based diseases, such as through ticks and mosquitoes.

Potentially longer allergy seasons & higher concentrations of allergens.

Adult spotted lanternfly, Lawrence Barringer, Pennsylvania Department of Agriculture, Bugwood.org

Climate Change: Measuring Vulnerability

VULNERABILITY =

CIRCA

Exposure

The degree of the stress that a certain asset is going through with climate variability. This includes changes such as the magnitude and frequency of extreme events.

×

Sensitivity

The degree to which a built, natural, or human system will be impacted by changes in climate conditions.

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Adaptive Capacity

The ability of a system to adjust to changes, manage damages, take advantage of opportunities, or cope with consequences.

Is there a lot of **impervious surface** or can most of the area **quickly infiltrate stormwater**?

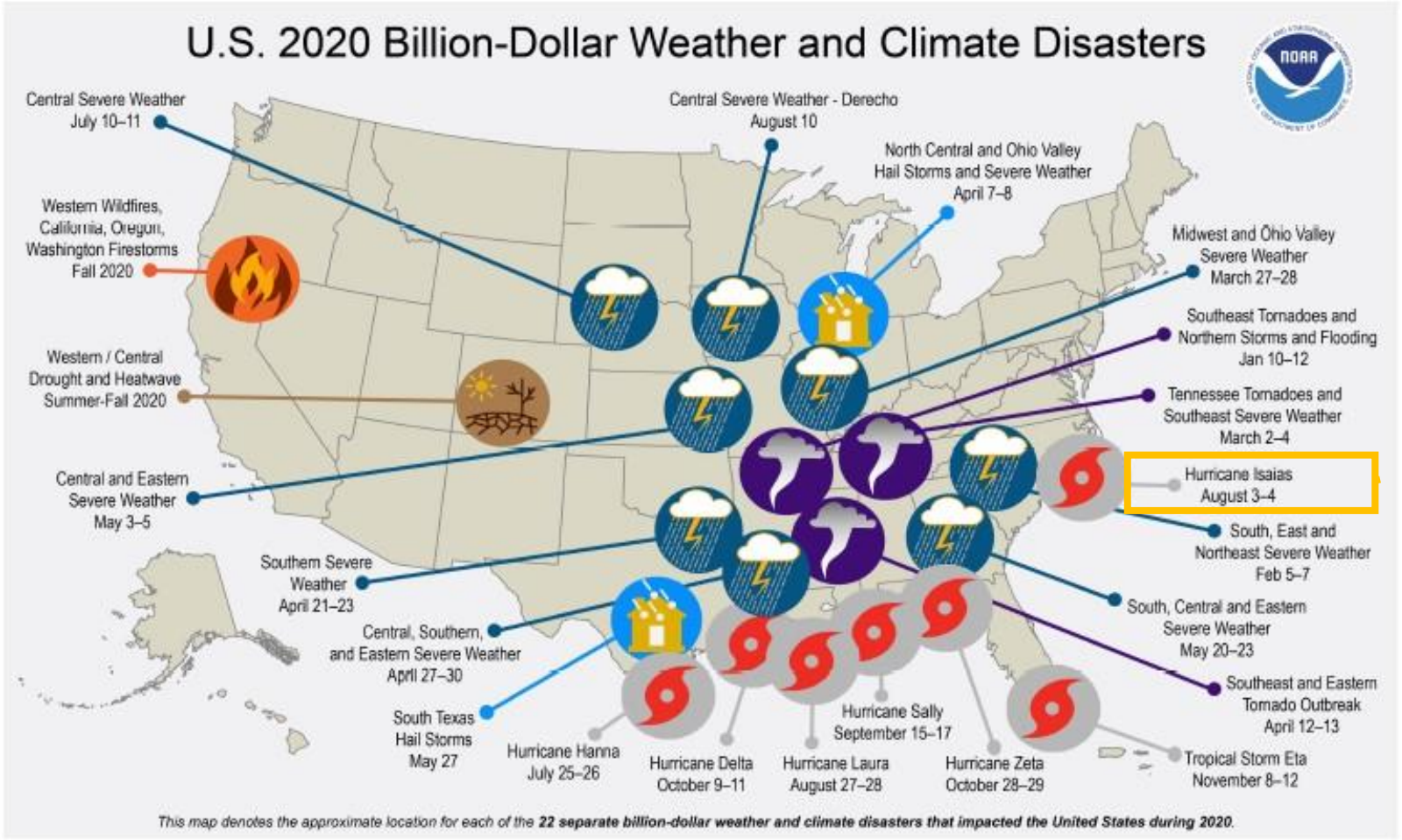
How close are **major roadways** and/or **evacuation routes**?

Do households have a **vehicle available or access to transit**?

Pervious surfaces will help storm water quickly drain. If flooding occurs, residents can quickly evacuate in their personal vehicles.

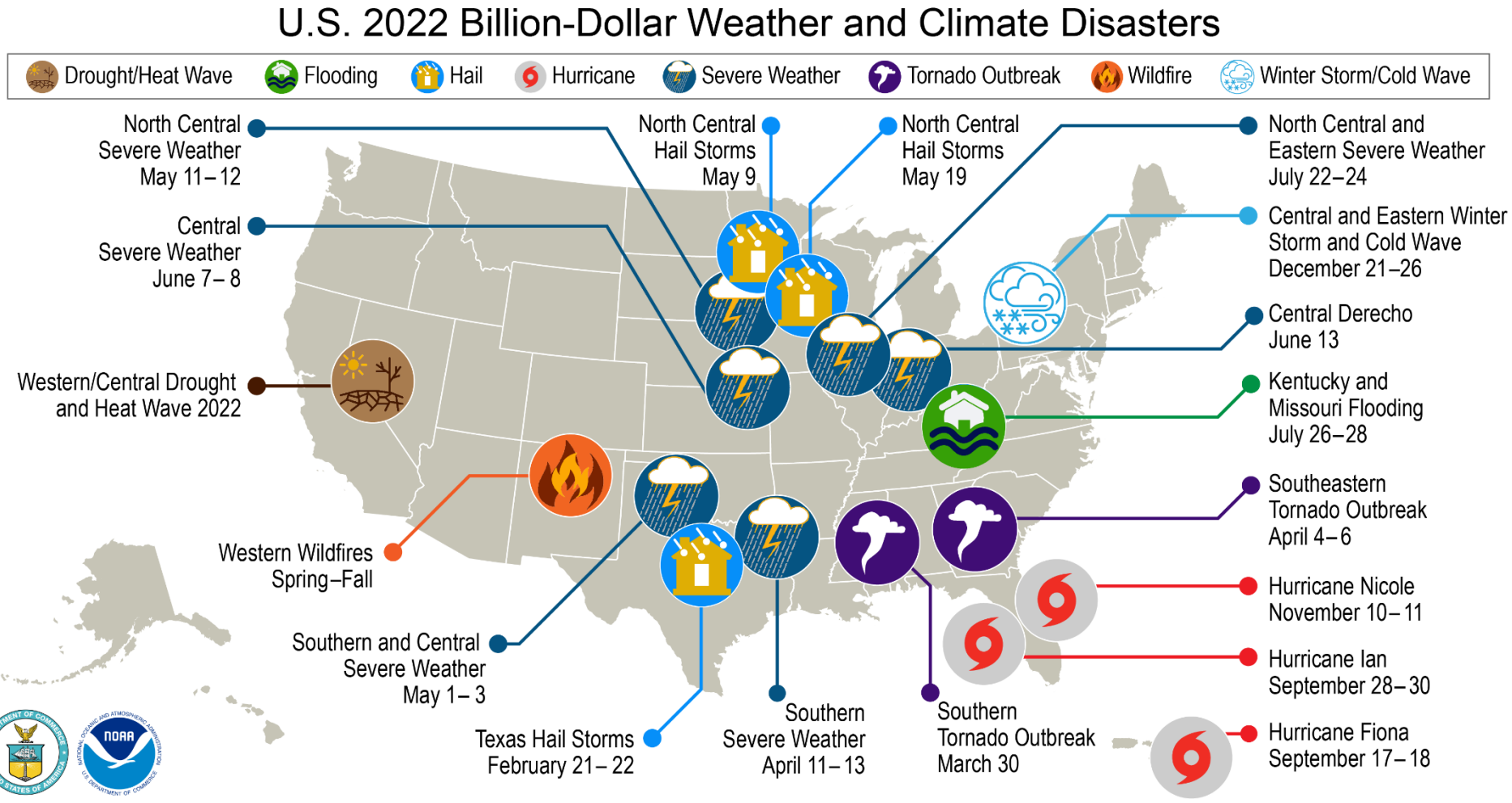
2020

- 22 weather and climate disasters with overall damages of at least $1 billion, (CPI, 2020), a total of approximately $95 billion.
- These disasters resulted in 262 deaths.
- The 2020 Atlantic hurricane season produced 30 named storms; 12 made landfall in the continental U.S. for a combined cost of approximately $40.1 billion.



2022

- 18 separate weather and climate disasters costing at least 1 billion dollars, a total of approximately $165.1 billion (CPI, 2022).
- At least 474 direct or indirect fatalities occurred due to these events.



*This map denotes the approximate location for each of the **18 separate billion-dollar weather and climate disasters that impacted the United States in 2022.***

Hurricanes & Tropical Storms

Storm surges, powerful winds, and heavy rains can lead to devastating inland and coastal flooding, loss of power, and structural damage to homes and businesses.

Since 2018, Connecticut has been impacted by multiple hurricanes and tropical storms. Federal Emergency and/or Disaster Declarations since 2018 have included:

- August 4th, 2020, Tropical Storm Isaias
- July 9, 2021 Tropical Storm Elsa
- August 22, 2021 Tropical Storm Henri
- September 1, 2021 – September 2, 2021 Remnants of Hurricane Ida

Tropical Storm Isaias

Numerous trees & power lines downed, resulting in numerous power outages.

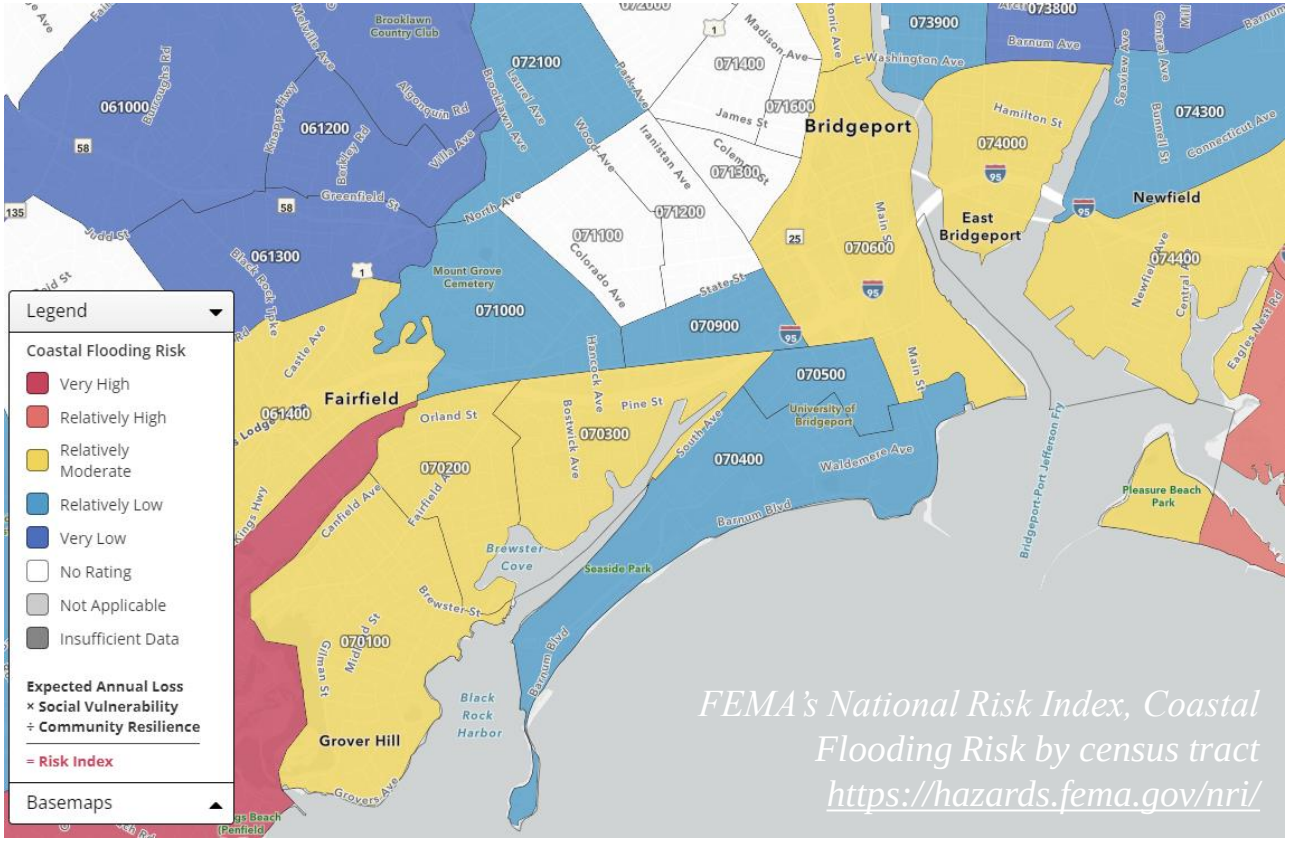
Bridgeport's Sikorsky Memorial Airport reported a maximum sustained wind of 43 mph & a peak wind gust of 62 mph.

No reports of coastal flooding - the highest storm surge did not coincide with high tide & was during a period of low astronomical tides.

Adapted from NOAA's Storm Events database, Southern Fairfield County

Coastal Flooding

Increasingly strong storms and densely populated shorelines mean that coastal flooding has become increasingly common to shoreline communities.



FEMA's National Risk Index, Coastal Flooding Risk by census tract
https://hazards.fema.gov/nri/

- Occurs during hurricanes and other strong cyclones including nor'easters.
- The effects of flooding are exacerbated during high tide, and especially astronomical high tides.
- In low-lying coastal areas, storm surge and flooding can flow up rivers and across flat land, causing severe impacts to residences, businesses and infrastructure.

Inland Flooding

NEWS

In just hours, 6 inches of rain fell in Bridgeport — 1.5 times what city typically sees in a month

Gift this article

Matt Rocheleau

Sep. 2, 2021 | Updated: Sep. 2, 2021 10:13 a.m.

1 of 7

Remnants of Hurricane Ida

Rainfall totals ranged from 5-8+ inches, with much of that rain falling in just a few hours; resulted widespread flash flooding & extensive river flooding.

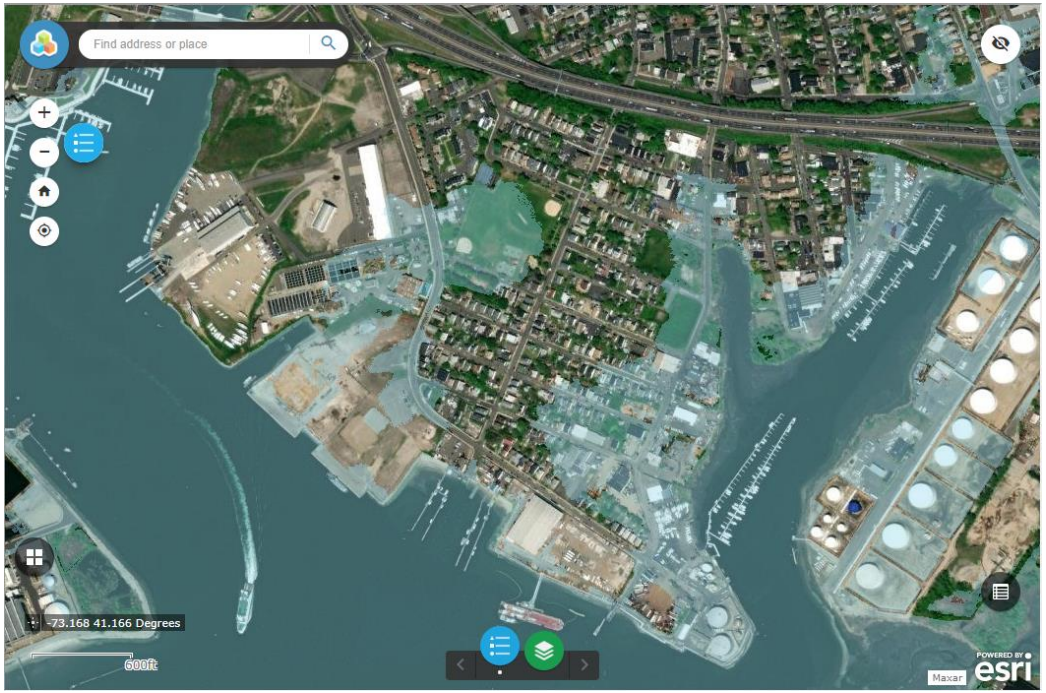
Bridgeport: Multiple cars stranded in flood waters on I-95 with water above the car doors.

Adapted from NOAA's Storm Events database, Fairfield County

- Pluvial (Surface Water) Flooding is caused when the ground is over-saturated and/or drainage systems overflow - the excess water cannot be absorbed or drained away.
- Heavy rainfall has caused flooding in 2018, 2019, 2020, 2021 & 2022.
- In September of 2021, the remnants of Hurricane Ida caused significant flooding throughout Fairfield County.

Sea Level Rise

CIRCA, East End of Bridgeport



In recent decades ocean warming and ice sheet loss due to global warming have contributed significantly to global sea level rise. Impacts to the Connecticut shoreline include:

- increased erosion
- increased frequency of flooding
- coastal inundation

The Connecticut Institute for Resilience and Climate Adaptation (CIRCA) anticipates that by 2050, sea level in Long Island Sound will be 20 inches (1 foot, 8 inches) higher than the national tidal datum.

This projection provided the basis for projections in Bill S.B. 7, which was introduced into the 2018 legislative session and was enacted into law as Public Act 18-82.

Severe Storms

Summer Storms

- Severe summer storms include tornadoes, downbursts, lightning, high winds, heavy rain and hail.
- Can bring torrential rains, damaging winds, dangerous lighting, and large hail, which can cause flash floods and downed trees and power lines.
- Due to the complex nature of these storms, and impacted area could be very small or encompass the entire Region.
- Summer storms are a regular occurrence; tornadoes are much less frequent.

Winter Storms

- Winter storms range from blizzards, ice storms, heavy snow, sleet, freezing rain and extreme cold.
- Impacts include damage to trees and tree limbs, downing of utility cables and loss of power and heat.

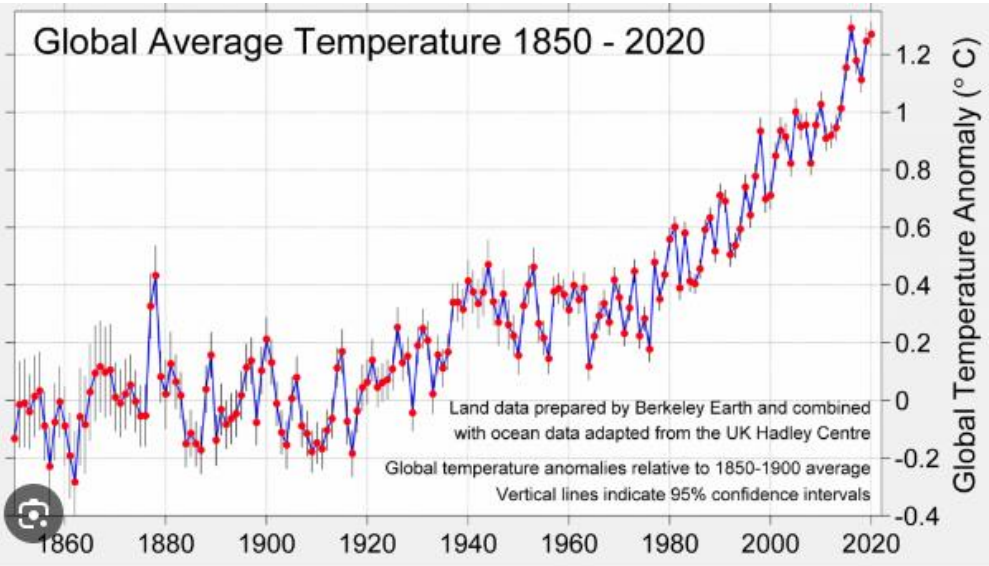
Dam Failure

In Bridgeport, there are 3 Class C Dams: the Lake Forest Dam, the Island Brook Lagoon Dam and the Bunnells Pond Dam.

Bunnells Pond Dam; MetroCOG

- Dams are at a greater risk of failure during heavy rain events as overtopping is a major cause of dam failure.
- CTDEEP requires dams to be routine inspection of dams; those that have a higher hazard potential (B or C) are inspected more frequently.

Extreme Heat & Cold



https://berkeleyearth.org/global-temperature-report-for-2020/

The average number of days annually with temperatures greater than 90°F is now 15.2.

However, **2020 had 30 days greater than 90°F and since 2000, the average number of 90+°F days annually has increased to 16.5.**

FEMA defines an extreme heat event as a long period (2-3 days) of high heat and humidity with temperatures above 90 °F.

FEMA defines a cold wave as a rapid fall in temperature within 24 hours and extreme low temperatures for an extended period.

Although temperatures are likely to continue rising, periods of extreme cold also occur, such as in early February of 2023. However, January 2023 was CT's warmest January on record.

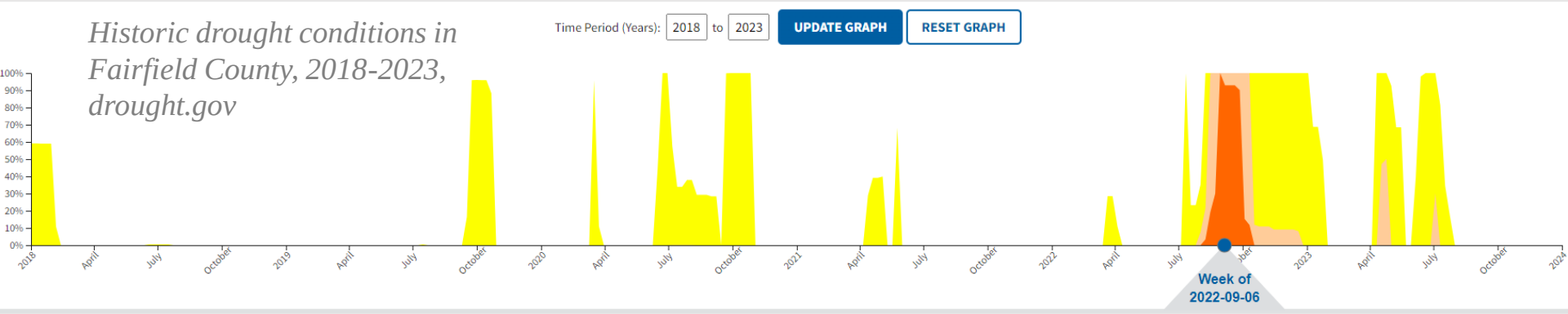
Drought

A drought is a prolonged period of abnormally low precipitation, often combined with abnormally high evaporation, that adversely affects the water resources of a given geographic area.

Droughts are known to occur in Connecticut, although the state typically receives plentiful precipitation.

Recent climate change studies predict that drought—as well as flooding rains—will become increasingly frequent and severe in the future (CT State Drought Plan)

Much of Fairfield County experienced moderate to severe drought conditions in August and September of 2022.



Historic drought conditions in Fairfield County, 2018-2023, drought.gov

Wildfires

- Wildfires are a relatively common occurrence in the state but are typically small and cause little to no damage.
- The likelihood of damage due to wildfires typically decreases with increasing population density.
- However, drought conditions in tidal marsh areas and open space can increase the likelihood of a wildfire.
- Connecticut traditionally experiences high forest fire danger from mid-March through May.
- CTDEEP's Division of Forestry is responsible for monitoring and rating the danger of a fire.

Earthquakes

- USGS has concluded that Connecticut is a region of minor seismic activity.
- The earthquakes that have occurred have been of low magnitude and intensity.
- While earthquakes have occurred outside the state, the impacts felt has also been minor.
- The likelihood of an earthquake of sufficient magnitude and intensity impacting the Region is low.

Mitigating Natural Hazards

6 types of mitigation activities:

- Preventive
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information

All these activities include strategies that can be used toward flood protection

Mapping Hazards

- There are 4 maps
- Indicate areas of the City vulnerable to natural hazards.
  - What type of hazard?
    - Hurricanes & Tropical Storms
    - Flooding: Coastal & Inland
    - Sea Level Rise
    - Severe Storms (summer & winter)
    - Extreme Temperatures
    - Dam Failure
  - Are there important community assets in these areas?
- Are there solutions to mitigate these hazards?

After 10 minutes, each group will provide a brief overview of the hazards that they've identified, and potential strategies for mitigation.

Next Steps

Schedule

- The focus of this meeting was on risk, vulnerability & local capabilities.
- Once the risk, vulnerability and community capabilities assessments are complete, we will begin working with municipalities to identify mitigation actions.
- FEMA requires a benefit-cost analysis, and some prioritization.
- The final plan must receive local approval by **August 2024** – but there are multiple reviews required.

Participation

- A survey is available, visit https://bit.ly/nhmp-2024 - please let your neighbors know, or en espanol at https://bit.ly/nhmp-2024-es
- To comment (or sign up for our mailing list) visit https://bit.ly/nhmp-comments.
- Updates will be e-mailed to interested people and organizations and will also be posted to www.ctmetro.org and social media, https://www.linkedin.com/company/metrocog/.
- **We anticipate a second series of public meetings in early 2024 where we will present a draft plan.**

CIRCA Sea Level Rise Viewer:
https://circa.uconn.edu/sea-level-rise-and-storm-surge-viewer/

Resilient CT, Climate Change Vulnerability Viewers:
https://resilientconnecticut.uconn.edu/ccvi/