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# SILVER JACKETS FLOOD TOOLKIT DASHBOARD

This dashboard contains links to most of the information contained in the Flood Toolkit along with links to internet resources. To retrieve information, hold down the CTRL Key and click on one of the topics below to get started.

**BEFORE THE FLOOD**

**BEFORE THE FLOOD**

**DURING THE FLOOD**

**AFTER THE FLOOD**

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FEMA FLOODPLAIN MAPPING      EMERGENCY MANAGEMENT DIRECTOR

ICE JAMS      NATIONAL WEATHER SERVICE

DAMS      NATIONAL HURRICANE CENTER

EXTREME RAINFALL & RISING SEA LEVELS      STORM PREDICTION CENTER

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EMERGENCY MANAGEMENT DIRECTOR      FLOOD RESPONSE & RECOVERY CHECKLIST



SIGN UP FOR CT ALERT  
 WIRELESS EMERGENCY ALERTS (WEA)  
 KNOW YOUR ZONE EVACUATION MAPS



# SILVER JACKETS

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## FLOOD TOOLKIT

### RECORD OF CHANGES

Date	Comments	Author(s)
1/19/22	First Version Completed and Rolled Out	Sheila Warren and Doug Glowacki
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# Introduction

The Connecticut Flood Toolkit has been created as a supplement to the local Emergency Management Director and Municipal Official Handbook and to provide 1-stop shopping for all things flooding. This toolkit contains information and links to the history of flooding in Connecticut, current flooding data such as river and tide levels, and resources to help residents and communities before, during and after a flooding event.

This toolkit was created under a grant from the U.S. Army Corps of Engineers Silver Jackets program. Silver Jackets teams in states across the United States bring together multiple state, federal, and sometimes tribal and local agencies to learn from one another in reducing flood risk and other natural disasters. By applying their shared knowledge, the teams enhance response and recovery efforts when such events do occur. While some states do not use the “Silver Jackets” name, there are a growing number of states applying the Silver Jackets approach – the ultimate goal is a state-led interagency team in every state. No single agency has all the answers, but leveraging multiple programs and perspectives can provide a cohesive solution.

Although each state Silver Jackets team is unique, common agency participants include state agencies with mission areas of hazard mitigation, emergency management, floodplain management, natural resources management or conservation, etc. Federal participation typically includes the U.S. Army Corps of Engineers and the Federal Emergency Management Agency and often others such as the National Weather Service and the U.S. Geological Survey.

Here in Connecticut our Silver Jackets Team consists of the Department of Emergency Services and Public Protection, Division of Emergency Management and Homeland Security, and the Department of Energy and Environmental Protection in cooperation with the U.S. Army Corps of Engineers, National Weather Service and United States Geological Survey.

We hope that towns, cities, regional planning organizations, homeowners and businesses will find this Flood Toolkit useful and informative. For questions regarding this toolkit, please contact your town or your local DEMHS Regional Coordinator.

Designed to be used both in “peace time” before a flood threat and also during and after a flood event, this handbook provides guidance, resources, and information about roles and responsibilities organized into situation-specific sections: **Before the Flood**, **During the Flood**, and **After the Flood (Short Term Recovery and Long Term Recovery Considerations)**. Also included as appendices are a customizable **Flood Response and Recovery Checklist** which can be used by community officials to identify and manage priority activities when a flood event does occur and an **Agency Contact List** to identify points of contact for more information about specific topics covered.

**Prepare**



**Respond**



**Recover**



**Mitigate**



## **ACKNOWLEDGEMENTS**

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# Before the Flood

Identifying Flood Risk

Using Flood Data to be Flood Aware

Promoting Public Awareness

Community Preparedness

# Identifying Flood Risk

## Types of Flooding

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Flooding is the most prevalent and frequent natural hazard that impacts Connecticut. The state features thousands of miles of rivers, brooks and streams along with lakes, and ponds. Flooding in Connecticut is a direct result of frequent weather events such as coastal storms, nor'easters, heavy rains, tropical storms, and hurricanes. Flood events are characterized in the Hazard Identification Risk Assessment (HIRA) as high probability and high in potential impacts to people, property and operations.

Connecticut's 2019 Natural Hazard Mitigation Plan (NHMP) provides definitions for different types of flood hazards that may impact municipalities and tribal nations across the state.

**Riverine Flooding** occurs when streams, rivers, channels and other waterbodies receive more rain or snowmelt from their watershed than their capacity can handle within the normal floodplain or when the waterbody becomes blocked by an ice jam or debris. Excess water overloads the channel and extends into or even beyond the natural floodplain.

**Flash flooding** can occur during a rapid rise of water throughout a watershed or in poorly drained urban areas composed mostly of impervious surfaces which cannot absorb precipitation. Flash flooding is typically a result of an unusually large amount of rain and/or high velocity of water flow (especially in hilly areas) within a very short period of time (e.g., intense rainfall, dam failure, ice jam).

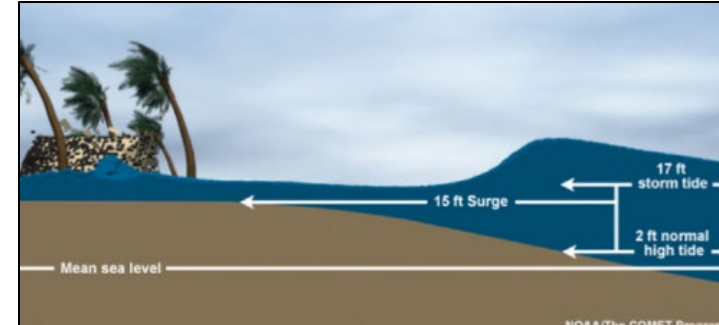
**Coastal flooding** can occur along the coastline of oceans, bays, inlets, large lakes, and coastal rivers. Coastal floods feature submersion of land adjacent to oceans and large water bodies as a result of overtopping of seawater above normal tidal action. Coastal flooding occurs from coastal storms that produce storm surges, extreme rainfall or inadequate capacity to drain inland waterbodies. Coastal flooding often exacerbated by severe dune erosion. These conditions are produced in Connecticut by hurricanes or tropical storms during the summer and fall, and Nor'easters and large coastal storms or extra-tropical storms during the autumn, winter, and spring.



Hartford, Connecticut 1936

# Identifying Flood Risk

**Storm surge** is an abnormal rise of water generated by a storm that exceeds predicted astronomical tide elevations. Storm surge is produced by water pushed towards the shore by winds associated with a storm. Storm surges may overrun barrier islands and push sea water into coastal rivers and inlets, blocking the downstream flow of inland runoff. Agricultural lands, forests, and wetlands along with developed areas may be inundated by fresh, brackish and salt water. Evacuation routes from coastal communities and barrier islands may be cut off quickly, stranding residents in flooded and inaccessible areas.



NOAA Storm Surge Diagram

**Waves** are a unique and damaging characteristic of coastal flooding that are addressed in floodplain hazard assessment. FEMA's Flood Insurance Rate maps (FIRMs) delineate areas vulnerable to wave heights greater or equal to three feet as Zone V (including Zones VE, V1-30, and V), also known as the Coastal High Hazard Area. V Zones are an area within the Special Flood Hazard Area (SFHA) extending from offshore to the inland limit of the primary frontal dune along an open coast and any other portion of the SFHA subject to high-velocity wave action from storms or seismic sources (Figure 2-15).

Zone A or AE is the coastal portion of the SFHA that is subject to wave heights of less than three feet. The Limit of Moderate Wave Action divides Zone AE into two sections: a Coastal A-zone where wave heights are between 1.5 and three feet (Moderate Wave Action area) and a Zone AE where wave heights are less than 1.5 feet (Minimal Wave Action area) (FEMA 2011).

**Shallow Flooding** occurs in flat areas where the lack of a defined channel results in poor drainage. There are three types of shallow flooding:

- Sheet Flow – water spreads out over a large area at a uniform depth;
- Ponding – runoff collects in depressions and cannot drain out; and
- Urban Flooding – when a drainage system, consisting of manmade features, is overloaded by a larger amount of water than the system was designed to accommodate.

**Ice Jams** are an accumulation of ice in a river that restricts water flow causing backwater that floods low-lying areas upstream from the jam. Ice jams occur when early spring warming temperatures combined with heavy rain cause rapid snow melt. The combination of snow melt and heavy rains can cause frozen rivers to swell, breaking the ice layer on top of the river. The ice layer often breaks into large chunks which float downstream and become jammed at man-made and natural obstructions. Areas below the ice jam can be affected by flash flooding when the jam releases, sending water and ice downstream rapidly.

# Identifying Flood Risk

## National Flood Insurance Program

Currently, the State of Connecticut and all of its communities participate in the National Flood Insurance Program (NFIP). The NFIP is a federal program enabling property owners to purchase insurance protection against losses from flooding. Participation in the NFIP is based on an agreement between the local community and the federal government. As part of the agreement, the community adopts and enforces a floodplain management ordinance or regulation to reduce future flooding risks to new construction in Special Flood Hazard Areas (100-year floodplain), the federal government makes flood insurance available within the community as a financial protection against flood losses. Connecticut's NFIP coordinator is located within DEEP's Land and Water Resources Division.

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## Connecticut Resources for Floodplain Managers

*The Torrent*, a newsletter of the Connecticut Department of Energy and Environmental Protection, explores floodplain management issues. The newsletter is a resource for local officials involved in administering the NFIP in their communities. To learn more about the Torrent, view archived issues, and receive the newsletter by email, visit: [The Torrent - A Newsletter for Floodplain Managers \(ct.gov\)](#)

**The NFIP Roles and Responsibilities Fact sheet** provides an overview of the NFIP program and outlines the community, State and Federal Roles. This Fact sheet can be found at: [FERTIGATION \(ct.gov\)](#)

**Flood Insurance Rate Maps and Flood Insurance Studies** from the FEMA Map Service Center (MSC) can be ordered on-line, by phone, by fax or by mail. To learn more, visit:

[https://portal.ct.gov/-/media/DEEP/water/flood\\_mgmt/HowtoOrderFEMAFIRMspdf.pdf](https://portal.ct.gov/-/media/DEEP/water/flood_mgmt/HowtoOrderFEMAFIRMspdf.pdf)

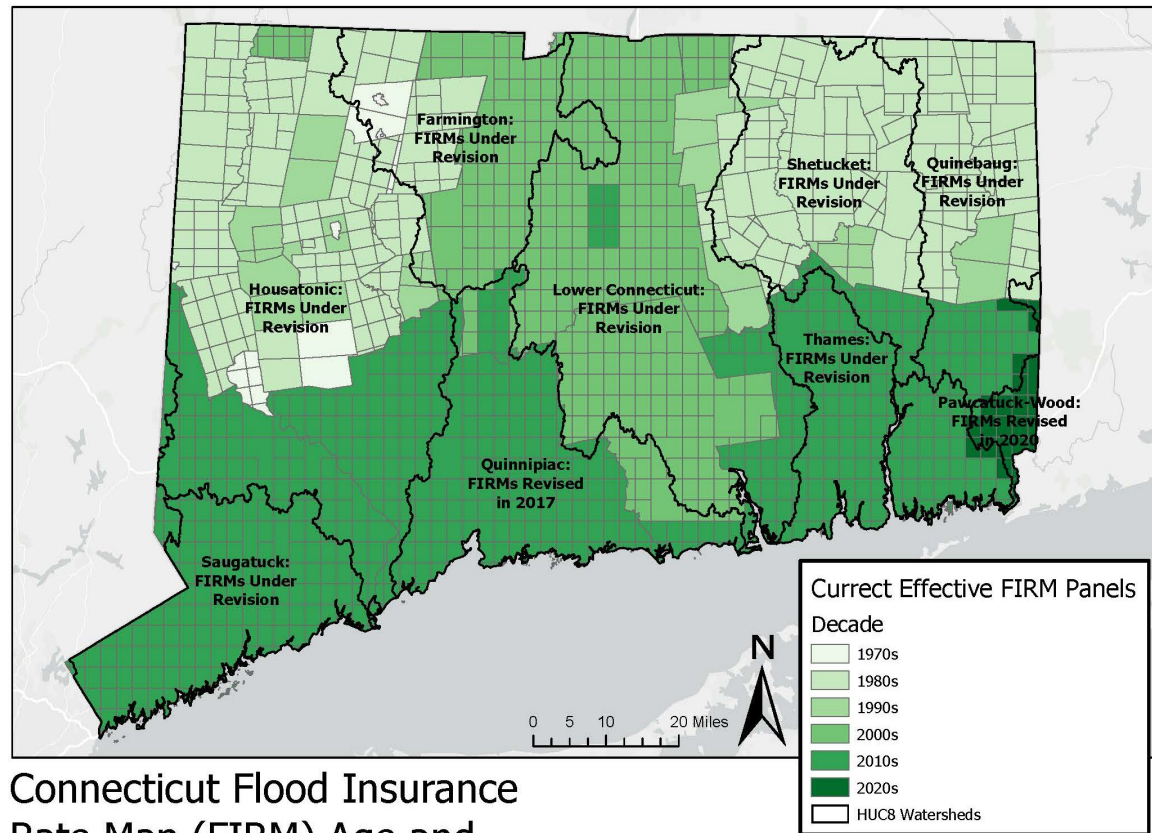
# Identifying Flood Risk

## FEMA Floodplain Mapping

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FEMA prepares Flood Insurance Rate Maps (FIRM) which identify Special Flood Hazard Areas (SFHA), high risk areas defined as any land that would be inundated by a flood having a 1- percent chance of occurring in any given year.

FEMA's Map Service Center, provides preliminary flood hazard data. This information can be found at: <https://hazards.fema.gov/femaportal/prelimdownload/searchResult.action>.



Connecticut Flood Insurance Rate Map (FIRM) Age and Revision Status

FEMA FIRMs are updated on a watershed basis. See the map for status of FIRM revisions in each watershed.



# Identifying Flood Risk

## Ice Jams

Ice jams and ice jam related flooding cause damages including loss of life and property, structural damage, bed and bank erosion and scour, riprap failure, increased flood fighting and assistance costs, and environmental damage.

Ice jams occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of the river. The ice layer often breaks into large chunks, which float downstream and often pile up near narrow passages other obstructions, such as bridges and dams.

Ice Jams can occur when the following conditions exist:

- Significant river ice thickness
  - Extended period of below freezing temperatures with limited thawing
- Increase in river flow
  - From rainfall and/or snowmelt
- Jam site
  - Sites near the confluence of two or more streams or rivers.
  - Sites with reduced capacity to pass water and sediment (such as at a sediment deposit or berm).
  - Location where ice stops moving and blocks the channel which can include: meanders (series of curves, bends), natural or constrictions man-made (bridges) or a decrease in river slope.

Ice Jams, which were removed as a listed hazard in the 2014 Update of the Natural Hazard Mitigation Plan (NHMP) were included in the 2019 NHMP Update based on recent events. River Ice Jams formed in the Housatonic and Connecticut Rivers in January of 2018 in the following mapped locations:

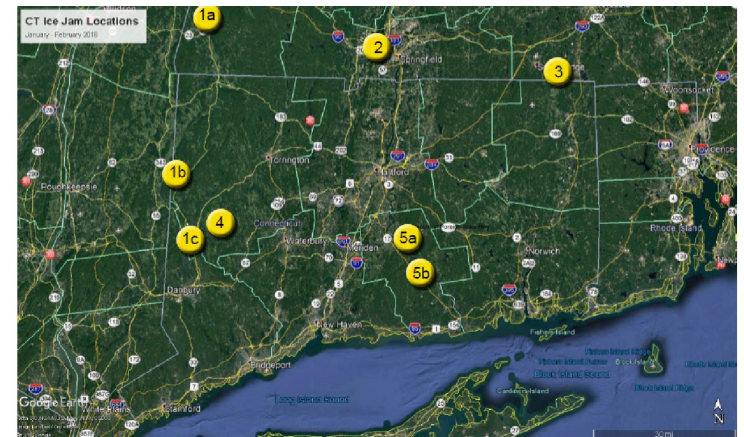
1: Housatonic River ice jams that formed on January 13th included Stockbridge, MA, Kent, CT and New Milford, CT.

1A: Stockbridge. The main ice jam in Stockbridge was at the South Street / Route 7 bridge. Flooding on the 13th upstream of the jam included a town park as well as the

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Connecticut River at Haddam 2018



Ice Jam Locations in 2018

# Identifying Flood Risk

Park Street neighborhood. This ice jam remained in place (without flood impacts once the river receded from the 13th event) until it broke up and flushed out with the Jan 23-25 river rises due to rainfall/warmup.

1B: Kent. The mile long ice jam in Kent, CT caused flooding that closed Route 7 through January 19th; this jam also caused flooding of the Kent School Campus, as well as closing River Road and Schaghticoke Road for several days. The Kent jam eventually formed into two separate jams which caused renewed flooding during a rainfall/warmup event later in January (Route 7 and Schaghticoke Road closed again from 1/23 - 1/25) before breaking up around Feb 11th.

1C: New Milford. No flooding was reported as a result of this ice jam.

2: West Branch Westfield River (MA) ice jam formed during the evening of Jan 12th, flushed into Westfield River and jammed there overnight before breaking free on Jan 13th. The Westfield River at Westfield peaked ½ foot over Flood Stage.

3: Quinebaug River at Quinebaug CT, ice jam formed and released on Jan 13th, river gage went 2 feet over Flood Stage (Minor flooding).

4: Shepaug River at Roxbury CT, flooding was reported along the Shepaug River in the town of Roxbury close to Route 67, flooding continued in the vicinity of Hodge Park on the 14th.

5: Two stretches of the Connecticut River in Middlesex County CT.

5A: Ice jam originating at the East Haddam Swing Bridge/Harper's Landing, extending several miles upstream from Haddam.

5B: Ice jam to the south was smaller, in the vicinity of Lyme and Deep River.



Civil Air Patrol - Connecticut River Ice Jam at the East Haddam 1/19/18

# Identifying Flood Risk

The January 2018 event included:

- Average ice thickness of 8"-14" across the State (January 10<sup>th</sup>)
- Nor'easter/Blizzard January 4<sup>th</sup>
- Increase in River Flow January 11-13<sup>th</sup>
  - Heavy rainfall and 3 day thaw
  - Record warm temperatures on January 12<sup>th</sup>

Under a 2019 Silver Jackets award, DEMHS/DESPP partnered with the U.S. Army Corps of Engineers (USACE), Cold Regions Research and Engineering Laboratory (CRREL), and the National Weather Service to provide a series of Ice Jam Workshops.

Presentations from the workshops can be found on the DEMHS website at

[The National Weather Service's Role in Ice Jam Forecasting \(ct.gov\)](#)

There have been 205 recorded ice jams in Connecticut since 1902. Details of these events can be found at the USACE Cold Regions Research and Engineering Laboratory (CRREL) Ice Jam Database: <https://icejam.sec.usace.army.mil>

## DAMS

Dams are man-made or artificial barriers (earth or combinations of earth and other materials) usually constructed across a stream channel to impound water. Dams provide a range of economic, environmental, and social benefits, including recreation, flood control, water supply, hydroelectric power, waste management, river navigation, and wildlife habitat.

All dams in the State of Connecticut (which are not otherwise regulated by the [Federal Energy Regulatory Commission](#), the [United States Army Corps of Engineers](#), or a local municipality) are governed by the [Dam Safety Regulatory Program](#).

Connecticut requires owners of dams of all hazard classes register their dam and provide information to the Commissioner of CT DEEP. To date, the state keeps an inventory of 4,800 dams in Connecticut, 3,088 of which have been registered with the CT DEEP.

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Colebrook River Lake Dam

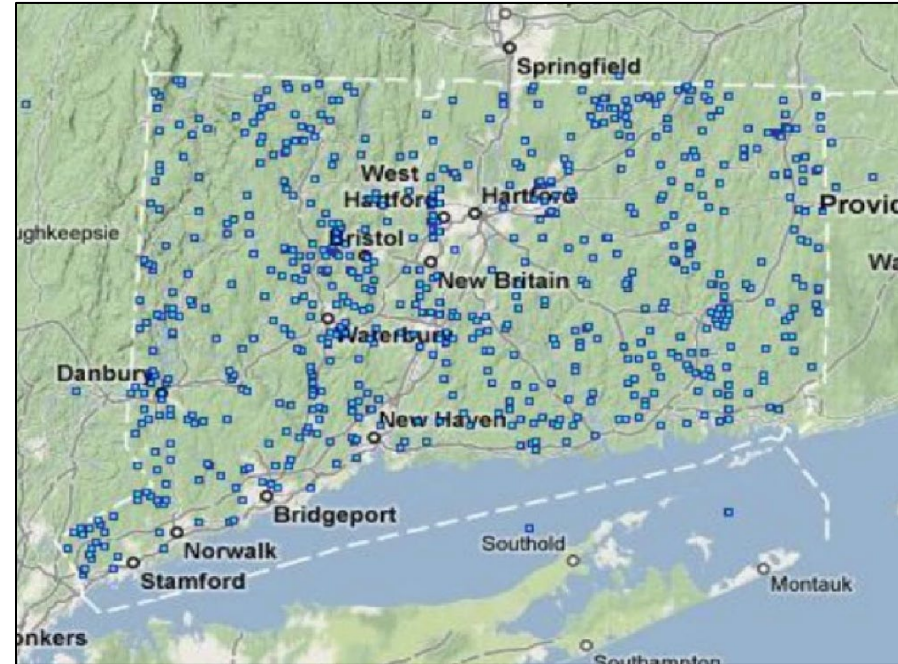


# Identifying Flood Risk

Dam Inspection Regulations require that high, significant, and some moderate hazard class dams (over 600 dams) in Connecticut be inspected annually. Dams which pose the greatest potential threat to downstream persons and properties are given priority for inspection. A limited number of lower hazard dams which have not been inspected in the past twenty years are also targeted for inspection. Other structures are inspected as time and funding permit, and upon notification of potentially significant deficiencies or emergency conditions.

Dams found to be unsafe after inspection are required to be repaired by the owner. Depending on the severity of the identified deficiency, an owner is allowed reasonable time to make the required repairs or to remove the dam. If a dam owner fails to make the necessary repairs, the Department may issue an administrative order requiring the owner to restore the structure to a safe condition and may refer noncompliance with such an order to the Attorney General's Office for enforcement. As a means of last resort, the Commissioner is empowered by statute to remove or correct, at the expense of the owner, any unsafe structures which present a clear and present danger to public safety.

According to the Dam Incident Notification (DIN) system maintained by the National Performance of Dam Program (NPDP), there are 754 dams in the State of Connecticut. Of the 754 dams, there are 48 classified as low hazard (Class A), 444 classified as significant hazard (Class B), 232 classified as high hazard (Class C), and 30 having an unknown classification (NPDP 2018). However, these numbers differ from the CT DEEP, who keeps its own records of state regulated dams. As of January 21, 2016, CT DEEP identifies 1,348 state regulated dams (high, significant, and moderate hazard dams). Of that number, 288 have high hazard potential (Hazard Class C), 296 have significant hazard potential (Hazard Class B), and 764 have moderate hazard potential (Hazard Class BB).



High, Significant and Moderate Risk Dams in Connecticut

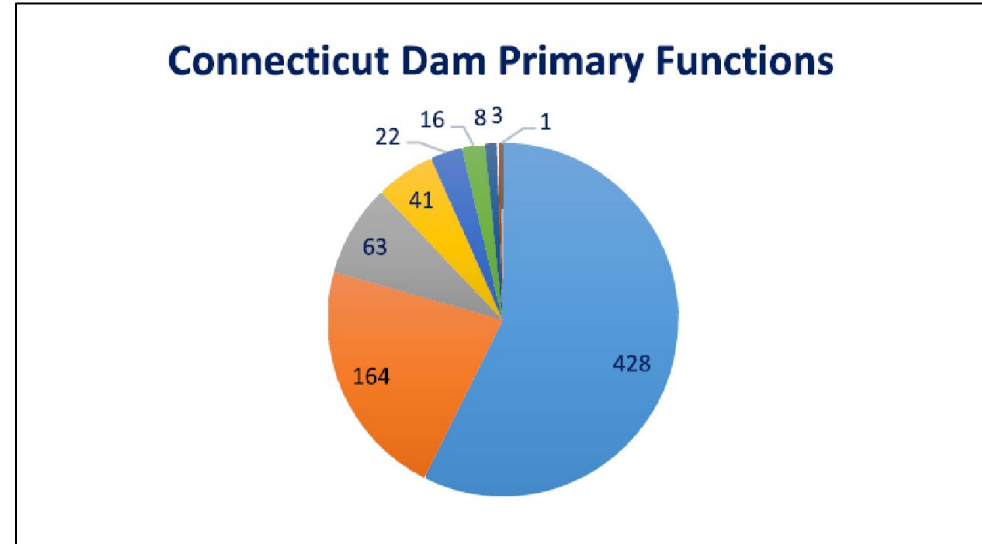
# Identifying Flood Risk

The NID categorizes the dams according to their primary function (See Figure Below):

- Recreation – 57.4% (428 dams)
- Water Supply – 22% (164 dams)
- Flood Control – 8.4% (63 dams)
- Hydroelectric – 5.5% (41 dams)
- Fish and Wildlife – 2.9% (22 dams)
- Other – 2.1% (16 dams)
- Irrigation – 1% (8 dams)
- Undetermined – 0.4% (3 dams)
- Fire Protection – 0.1% (1 dam)

Dam failures can result from natural events, human-induced events, or a combination. Failures due to natural events such as prolonged periods of rainfall and flooding can result in overtopping, which is the most common cause of dam failure. Overtopping occurs when a dam's spillway capacity is exceeded and portions of the dam not designed to convey flow begin to pass water, erode away, and ultimately fail.

Other causes of dam failure include design flaws, foundation failure, internal soil erosion, inadequate maintenance, or mis-operation. Complete failure occurs if internal erosion or overtopping results in a complete structural breach, releasing a high-velocity wall of debris-laden water that rushes downstream damaging or destroying everything in its path. An additional hazard concern is the cascading effect of one dam failure causing multiple dam failures downstream due to the sudden release of flow. While dam failures that occur during flood events compound an already tenuous situation and are certainly problematic, the dam failures that occur on dry days are the most dangerous. These "sunny day" dam failures typically occur without warning, and consequently, downstream property owners and others in the vicinity are more vulnerable to being unexpectedly caught in life threatening situations than failures during predicted flood events.



# Identifying Flood Risk

## Extreme precipitation and Higher Sea Level

The 2019 Update of the NHMP addressed climate change impacts including historical sea level rise, temperature predictions and precipitation predictions.

### Historical Sea Level Rise

Over the past thousand years, regional sea level has risen at a rate of 0.34 to 0.43 inch per decade. More recently, the rate of sea level rise along the Northeast Coast has increased. On average during the 20th century, sea level rose by 1.2 inches per decade. This reflects the increase in ocean water volume as the oceans warm, as well as the melting of glaciers and ice sheets and changes in Atlantic Ocean circulation. This rate of sea level rise exceeds the global average, due primarily to land subsidence, and has caused an increase in coastal flooding in the Northeast.

Temperature Predictions The northeast will experience an increase in mean temperatures, with little spatial variation. In the near future, changes in temperature vary little between low and high emission scenarios, but later in the 21st century the high emission scenario indicated nearly twice the amount of warming. Throughout the region, the number of days above 95°F will increase and the number of days below 10°F will decrease. The mean freeze-free period is expected to increase by 26 days. The largest temperature changes will occur in the north of the region, and the smallest changes will occur in coastal and southern areas. Seasonal changes show more spatial variability, with winter temperature increases ranging from 4.0°F in the southwestern part of the region to 6.0°F in the north.<sup>20</sup>

Historical Precipitation Data Annual precipitation has varied over time, showing a clear shift towards greater variability and higher totals since 1970. The wettest year since 1895 was in 2011.

Back in 1961 the National Weather Service drafted Technical Paper #40 which defined the return periods for heavy rainfall events in the United States. The report defined the duration, intensity and return frequency for rainfall events ranging from 1-year to 500-years.

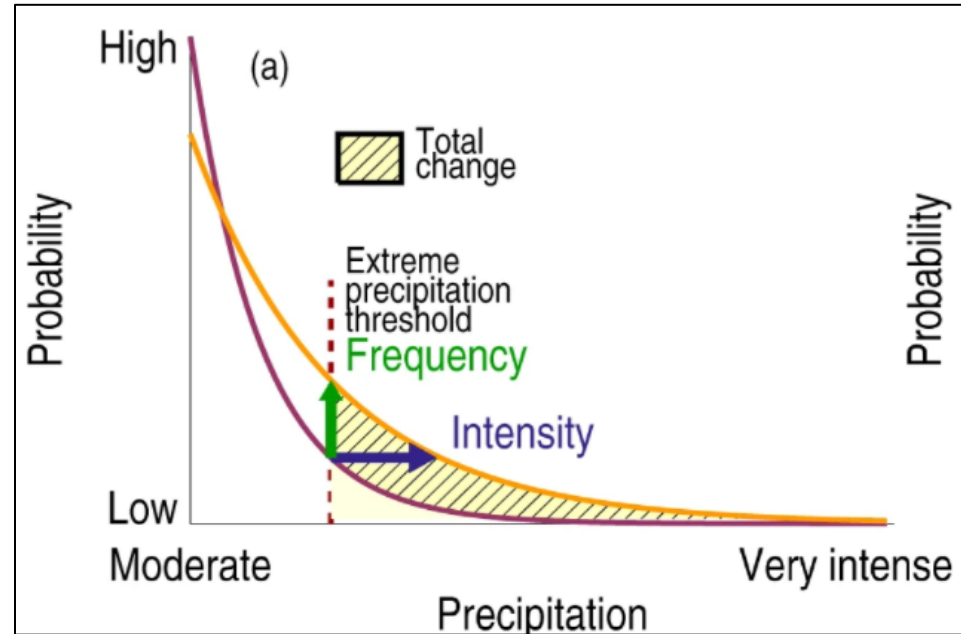
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**Regional Trends:** The Northeastern US Historical Temperature Data across the Northeastern US temperatures have generally remained above the 1901-1960 average, both annually and especially during the winter. Fifteen of the winters from 1992- 2011 have been above average. There has been an increasing trend in the length of the freeze-free season since the mid-1980s, with the average season length during 1991-2010 being about 10 days longer than during 1961-1990. Overall warming is further evidenced by later ice-in dates on northeastern lakes, decreases in average snow depth, and an increase in the rate of sea-level rise along the coast. (CT NHMP)

# Identifying Flood Risk

For example, the 1-hour 100-year storm in Connecticut was defined as a downpour that delivers 2.5" – 3.0" inches of rain in 1 hour to a town in our state. This amount of rainfall does not seem that rare these days. That is because it is not as rare as it used to be. Several studies conducted by Cornell University in the 1990's (that continue to the present time) have suggested that heavy rainfall events are becoming more common in New England.

The reason for this change is based on fundamental meteorology. Warmer air can hold more moisture. Thus, when condensation occurs, more water vapor is available to produce heavy rainfall. The graph to the right shows the effect of a warmer climate. Both the frequency of heavy rainfall events and also their intensity are increasing.



The largest change is occurring (see the green and blue arrows) in the moderately severe events that may bring a quick 4" – 6" of rain to a town in just a few hours.

Many older catch basins and other urban water conveyance systems are designed for a 10-year\* storm (i.e. a storm that would be expected once every ten years). The increase in heavy rainfall events is estimated to have cut the return frequency from 10 years down to 5 years. This means that these water conveyance systems will experience rainfall events that equal their maximum design threshold much more often. In addition, larger storms that exceed the design threshold (e.g. a 25-year storm) are also occurring approximately twice as often.

Impacts: Sea Level Rise and Coastal Flooding Coastal cities and towns will become more vulnerable to storms in the coming century as sea level rises, shorelines erode, and storm surges become higher. Rising sea level erodes wetlands and beaches, reducing their mitigating effect on coastal storms. Infill and shoreline development further reduce the capacity of natural coastlines to reduce storm surges and impacts of sea level rise. With less natural protection, coastal communities are more vulnerable to the impacts of climate change.

# Identifying Flood Risk

## National Climate Assessment

The Global Change Research Act of 1990 mandates that the U.S. Global Change Research Program (USGCRP) deliver a report to Congress and the President no less than every four years that “1) integrates, evaluates, and interprets the findings of the Program...; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years.”<sup>1</sup>



The Fourth National Climate Assessment (NCA4) fulfills that mandate in two volumes. This report, Volume II, draws on the foundational science described in Volume I, the *Climate Science Special Report (CSSR)*.<sup>2</sup> Volume II focuses on the human welfare, societal, and environmental elements of climate change and variability for 10 regions and 18 national topics, with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways. Where possible, NCA4 Volume II provides examples of actions underway in communities across the United States to reduce the risks associated with climate change, increase resilience, and improve livelihoods.

This assessment was written to help inform decision-makers, utility and natural resource managers, public health officials, emergency planners, and other stakeholders by providing a thorough examination of the effects of climate change on the United States.



# Using Data to be Flood Aware

[Using Data to be Flood Aware](#)

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## NATIONAL WEATHER SERVICE

The National Weather Service issues weather and water related forecasts, watches and warnings for the protection of life and property.

### Definitions of Watch and Warning:

A **Watch** indicates that conditions are favorable for the particular weather event in and near the Watch area, and which may pose a risk to life and property. Watches are issued up to 48-72 hours in advance with forecaster confidence around 50%.

A **Warning/Advisory** indicates that a particular weather event is imminent or occurring. Advisories are issued if the weather event will lead to nuisance conditions, while Warnings are issued for significant weather events which will pose a risk to life and property. During longer-term events, Warnings and Advisories may be issued up to 48 hours in advance with forecaster confidence of at least 80%. Watches and Warnings issued for Severe Thunderstorms, Tornadoes, and Flash Flooding have much shorter lead times, on the order of hours for Watches or even minutes for Warnings.

### Flood Warnings

Flood warnings are issued to inform the public, emergency management, and other cooperating **agencies that flooding is in progress, imminent, or highly likely**. Coastal, flash flood, flood and river flood warnings are issued by the National Weather Service (NWS) offices which serve Connecticut.

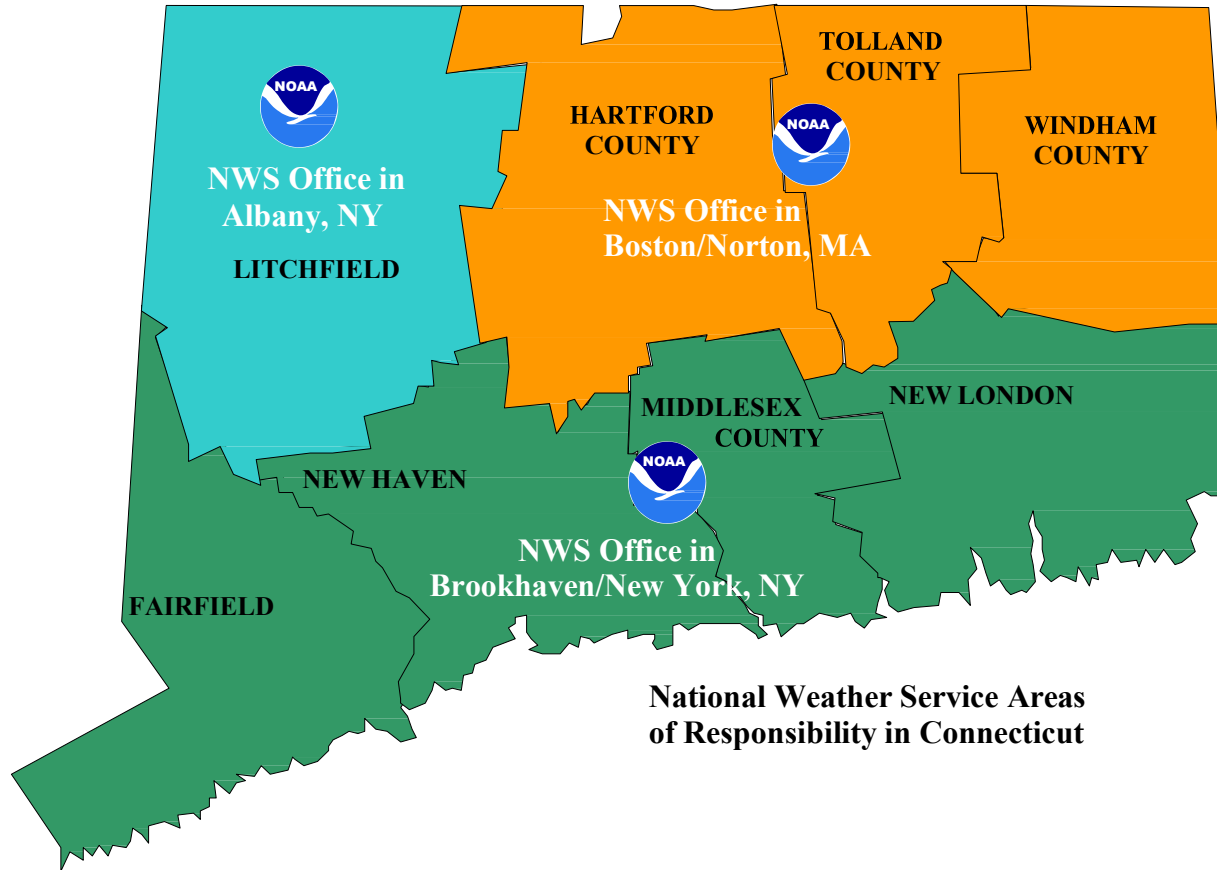


# Using Data to be Flood Aware

This map depicts which National Weather Service Office issues most water-related watches and warnings for a given County.

## NWS SERVICE AREAS IN CONNECTICUT

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Local Hydrology Program Manager contacts are available at this link: <https://www.weather.gov/water/ct-hydro>

# Using Data to be Flood Aware

## National Weather Service Offices that Cover Connecticut:

NATIONAL WEATHER SERVICE OFFICE IN ALBANY, NY – **Covers Litchfield County**

NOAA/National Weather Service

251 Fuller Road, Albany, NY 12203-3640

24 Hours – (518) 925-4516 (Unlisted)

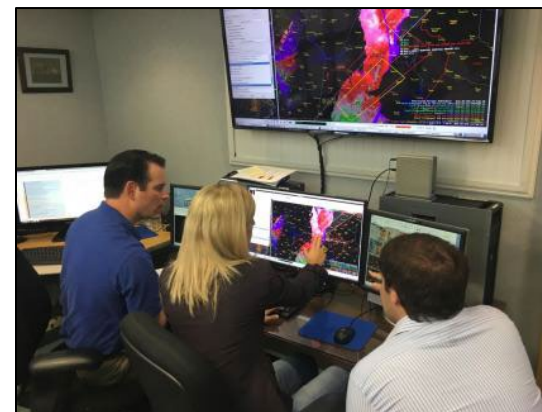
Office operations email - [alb.stormreport@noaa.gov](mailto:alb.stormreport@noaa.gov)

Web Site: <https://www.weather.gov/aly/>

Twitter: [@NWSAlbany](https://twitter.com/NWSAlbany)

Facebook: [US National Weather Service Albany NY](https://www.facebook.com/USNationalWeatherServiceAlbanyNY)

YouTube: <https://www.youtube.com/NWSAlbany>



NATIONAL WEATHER SERVICE OFFICE BOSTON/NORTON, MA – **Covers Hartford, Tolland & Windham Counties**

NOAA/National Weather Service

46 Commerce Way, Norton MA 02766

24 Hours – (508) 622-3280

Office operations email: [box.operations@noaa.gov](mailto:box.operations@noaa.gov)

Web Site: <https://www.weather.gov/box/>

Twitter: [@NWSBoston](https://twitter.com/NWSBoston)

Facebook: [US National Weather Service Boston MA](https://www.facebook.com/USNationalWeatherServiceBostonMA)

YouTube: <https://www.youtube.com/user/NWSBoston>

NATIONAL WEATHER SERVICE OFFICE IN BROOKHAVEN, NY – **Covers Fairfield, New Haven, Middlesex & New London Counties**

NOAA/National Weather Service

175 Brookhaven Ave, Building NWS #1

Upton, NY 11973

24 Hours – (631) 924-0383 (Unlisted) or Alt 24-Hour - 1-800-226-0217

Office operations email: [okx.operations@noaa.gov](mailto:okx.operations@noaa.gov)

Web Site: [www.weather.gov/okx/](http://www.weather.gov/okx/)

Twitter: [@NWSNewYorkNY](https://twitter.com/NWSNewYorkNY)

Facebook: [US National Weather Service New York NY](https://www.facebook.com/USNationalWeatherServiceNewYorkNY)

YouTube: <https://www.youtube.com/user/NWSNewYorkNY>



# Using Data to be Flood Aware

NATIONAL WEATHER SERVICE NORTHEAST RIVER FORECAST CENTER – **Covers All of Connecticut and the Northeast.**

NOAA/National Weather Service

46 Commerce Way, Norton MA 02766 (Co-Located with NWS Boston/Norton)

Routine Hours 6am-10pm, open 24 hours during floods

(508) 622-3301 (Unlisted)

Office email - [nerfc@noaa.gov](mailto:nerfc@noaa.gov)

Web Site: [www.weather.gov/nerfc/](http://www.weather.gov/nerfc/)

Twitter: [@NWSNERFC](https://twitter.com/NWSNERFC)

Facebook: [US National Weather Service Northeast River Forecast Center](https://www.facebook.com/USNationalWeatherServiceNortheastRiverForecastCenter)

# Using Data to be Flood Aware

## DEMHS Weather Updates

In coordination with the NWS, DEMHS issues informational weather forecasts (not warnings) that provide a combined weather forecast for the entire state during significant weather events. DEMHS will typically issue weather updates for:

- snowstorms
- flooding
- severe thunderstorms
- high wind events and tornadoes.

DEMHS External Weather Updates are distributed via the Everbridge/CT Alert system and posted on the DEMHS Website at:

<https://portal.ct.gov/DEMHS/External-Weather-Updates>

## Stream Flow Monitoring Network

The United States Geological Survey (USGS) also maintains a series of river and rainfall gauges across the state that continuously monitor river levels. Over 50 locations are monitored by the USGS along most of the state's rivers. Information from these gauges is available from the USGS at [USGS Current Water Data for Connecticut](https://waterwatch.usgs.gov/index.php?id=ww)

## USGS Water Watch:

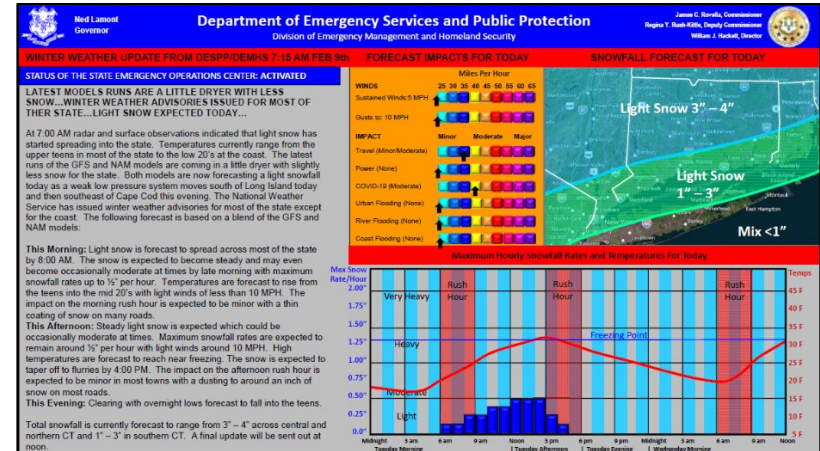
USGS Water Watch Is a U.S. Geological Survey (USGS) World Wide Web site that displays maps, graphs, and tables describing real-time, recent, and past streamflow conditions for the United States. The real-time information generally is updated on an hourly basis. WaterWatch provides streamgage-based maps that show the location of more than 3,000 long-term (30 years or more) USGS streamgages; use colors to represent streamflow conditions compared to historical streamflow; feature a point-and-click interface allowing users to retrieve graphs of stream stage (water elevation) and flow; and highlight locations where extreme hydrologic events, such as floods and droughts, are occurring. Information from the USGS Water Watch website is available at

<https://waterwatch.usgs.gov/index.php?id=ww>

## Coastal Observations

The National Oceanic and Atmospheric Administration (NOAA) National Ocean Service (NOS) maintains coastal tide gauges and offshore buoys that record and transmit tide data in real-time. Data is available at [CO-OPS Map - NOAA Tides & Currents](https://co-ops.nos.noaa.gov/)

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DEMHS Winter Storm Update

# Using Data to be Flood Aware

## Real Time Flood Information

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Connecticut has the potential to experience multiple types of flooding, potentially at the same time. **Flash Flooding** is rapid-onset inundation of usually localized areas. **Urban and Poor Drainage Flooding** is a rapid inundation of low lying areas due to excessive rainfall. **Stream Flooding** is often slower to occur, but in extreme events can be just as destructive as a flash flood. **Coastal Flooding** is inundation of normally dry land by high tides.

### CT Stream Flooding

Streams of all sizes in Connecticut can flood. Smaller streams react faster and are harder to predict. Larger streams have more predictability and can be specifically forecast when there is a defined threat. In Connecticut, the NWS' Northeast River Forecast Center provides routine daily forecasts out to three days in the future for 11 specific locations, along with two locations on the tidal portion of the Connecticut River. Table 1. below contains a listing of River Forecast Points in CT, where daily or high water forecasts are available, and River Flood Watches/Warnings are issued. \*Housatonic River at Falls Village- forecasts and Warnings are issued as needed during times of high water, but are not routinely available. Local NWS offices issue Flood Warnings for these sites if flooding is forecast or occurring.

Stream Name	Location	Responsible Weather Forecast Office	Stream Name	Location	Responsible Weather Forecast Office
Housatonic River	<a href="#">Falls Village</a> *	Albany, NY	Connecticut River	<a href="#">Thompsonville</a>	Boston, MA
Housatonic River	<a href="#">Gaylordsville</a>	Albany, NY	Connecticut River	<a href="#">Hartford</a>	Boston, MA
Housatonic River	<a href="#">Stevenson</a>	Albany, NY	Connecticut River	<a href="#">Middle Haddam</a>	Boston, MA
Naugatuck River	<a href="#">Beacon Falls</a>	New York, NY	Shetucket River	<a href="#">Willimantic</a>	Boston, MA
Farmington River	<a href="#">Unionville</a>	Boston, MA	Quinebaug River	<a href="#">Putnam</a>	Boston, MA
Farmington River	<a href="#">Simsbury</a>	Boston, MA	Quinebaug River	<a href="#">Jewett City</a>	New York, NY
Farmington River	<a href="#">Tarriffville</a>	Boston, MA	Yantic River	<a href="#">Yantic</a>	New York, NY

# Using Data to be Flood Aware

Forecasts and warnings for these locations can be found at <https://www.weather.gov/nerfc> by clicking on the map at the location of interest. A Connecticut-zoomed graphic is available at <https://water.weather.gov/ahps/region.php?state=ct>

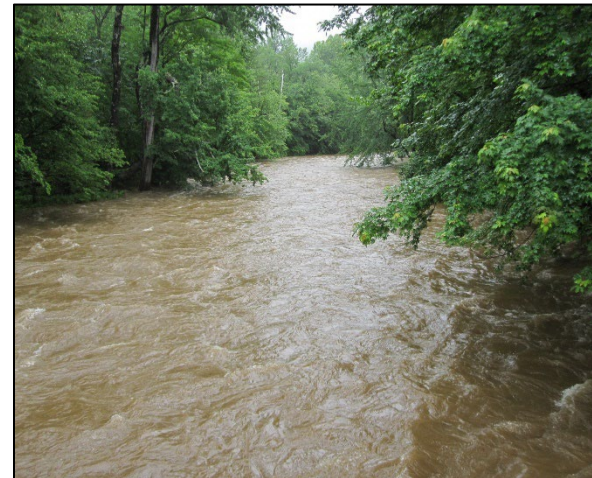
For a longer-range view of potential flood conditions, the NWS provides ensemble forecasts for the same set of locations out to ten days in the future through three different ensemble prediction systems. This information is available at <https://weather.gov/erh/mmefts>. Recorded training is available on this site, along with specific documents explaining the difference between the official daily forecasts and these ensemble systems.

For other rivers and streams in CT not included in Table 1, the NWS Offices (as depicted in Map 1) issue a Flood Watch when flooding is possible, and issue Flood or Flash Flood Warnings when significant flooding is imminent or occurring. Flood Warnings are typically issued during longer rain or rain and snowmelt events. Flash Flood Warnings are issued when streams and rivers are expected to rapidly rise out of their banks and produce flooding.

Flood Watches and Flood Warnings for these smaller waterways in CT are available at the [NWS New York NY web page](#). Local and State officials can also access NWS Watches and Warnings via iNWS and NWS Chat. NOAA Weather Radio is another resource for receiving NWS Watches and Warnings. NOAA Weather Radio stations in and around CT are available at <https://www.weather.gov/nwr/connecticut>.

## Urban and Poor Drainage Flooding

Significant urban and poor drainage flooding can occur during any time of the year, but most often occurs due to heavy rainfall produced by thunderstorms, tropical cyclones or remnants of tropical cyclones. This type of flooding can coincide or precede river and stream flooding. Urban and poor drainage flood impacts most frequently include roadways blocked by floodwaters, but can also include inundation of other low lying infrastructure such as homes and businesses.



# Using Data to be Flood Aware

Like river and stream flooding, Flood Warnings for significant urban and small stream flooding are typically issued during longer rain or rain and snowmelt events. Flash Flood Warnings are issued when rapid inundation of low lying urban and poor drainage flooding will result in multiple road closures and other inundated infrastructure.

Flood Watches and Flood Warnings pertaining to significant urban and poor drainage flooding in CT are available at the [NWS New York NY web page](#) , as well as NOAA Weather Radio. Local and State officials can also access NWS Watches and Warnings via [iNWS](#) and [NWS Chat](#).

## Coastal Flooding

NWS Brookhaven NY issues Coastal Flood Advisories when storm surge and wave action are expected to result in minor inundation of roadways and typically flood-prone infrastructure. A Coastal Flood Watch is issued when there is potential for moderate to major inundation of coastal communities, possibly resulting in infrastructure damage and necessitating evacuations. A Coastal Flood Warning, is issued when moderate and/or major coastal flooding is forecast within 24-36 hours, or earlier if confidence is 80% or greater.



NWS Coastal Flood Advisories, Watches and Warnings (when in effect) will be available via various means. This includes the NWS New York NY Weather Forecast Office's web page: [New York, NY \(weather.gov\)](#) . In addition, more detailed information about coastal flood impacts will be available at the [NWS Eastern Region Coastal Flood Page \(weather.gov\)](#)

## NWS Total Water Level and Coastal Change Forecast Viewer

The USGS National Assessment of Coastal Change Hazards project is working in collaboration with the National Oceanic and Atmospheric Administration (NOAA)/National Weather Service (NWS) and the National Centers for Environmental Prediction (NCEP) to make total water level and coastal change forecasts. This operational model combines NOAA wave and water level predictions and a USGS wave runup model with beach slope observations to provide regional weather offices with detailed forecasts of total water levels. The USGS compares these total water levels to the protective dunes along sandy coastlines to forecast the probability of coastal change. This experimental viewer is available at: <https://coastal.er.usgs.gov/hurricanes/research/twlvviewer/>



# Using Data to be Flood Aware

## COASTAL FLOODING THRESHOLDS, IMPACTS and ANALYSIS

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Long Island Sound		
Station	Coastal Flood Benchmarks (MLLW / MHHW / NGVD)	Tidal Impacts/Analysis
Connecticut		
<b><u>Bridgeport</u></b> (NOS)	Minor -8.9' / 1.6' Moderate - 10.4' / 3.1' Major - 11.4' / 4.1' MLLW - 3.6' = MSL MLLW - 7.3' = MHHW	<u>Impacts</u> <u>Top 20 list</u> <u>Exceedance Probabilities</u>
<b><u>New Haven</u></b> (NOS)	Minor - 8.6' / 1.9' Moderate - 9.2' / 2.5' Major - 10.5' / 3.8' MLLW - 3.3' = MSL MLLW - 6.7' = MHHW	<u>Impacts</u>
<b><u>New London</u></b> (NOS)	Minor -5.0' / 1.9' Moderate - 6.0' / 2.9' Major - 7.8' / 4.7' MLLW - 1.5' = MSL MLLW - 3.1' = MHHW	<u>Impacts</u> <u>Top 20 list</u> <u>Exceedance Probabilities</u>
<b><u>Stamford</u></b> (USACE) Site ID# 01209788	Minor -9.4' / 1.5' / 6.4' Close Hurr. Barrier -10.0' / 2.1' / 7.0' Moderate - 11.0' / 3.1' / 8.0' Major - 12.4' / 4.5' / 9.4' Overtop Hurr. Barrier -20.0' / 12.1' / 17.0' MLLW - 3.0' = NGVD MLLW - 7.9' = MHHW	<u>Impacts</u> <u>Top 20 list</u>

Table 2. Listing of tide gages along coastal CT operated by the National Ocean Service (NOS) and US Army Corps of Engineers (USACE). Flood Categories (Minor, Moderate, Major) are provided for each tide gage. Critical stage thresholds are provided for Stamford.

# Using Data to be Flood Aware

## How does the geography or shape of Long Island & CT (bathtub) increase the tidal flood threat?

- Winds (speed, duration, fetch) are the primary forcers of coastal flooding
- Storm surge enters LI Sound from the ocean and is amplified by winds piling that water to the west end of Long Island Sound (LIS).
- E/NE/SE winds are most favorable for coastal flooding.
  - LIS is a funnel, large opening on the east end and only a small outlet at the west end (east river).
- LI sound is favorable for wave action.
  - Can get waves of 8-10 ft on and an easterly fetch of storm force winds
  - 5-6 feet on a S/SE fetch that is aiming direct wave energy right towards the CT coasts (most impactful combo to CT coast.)



## How fragile/vulnerable is CT shoreline to storm surge?

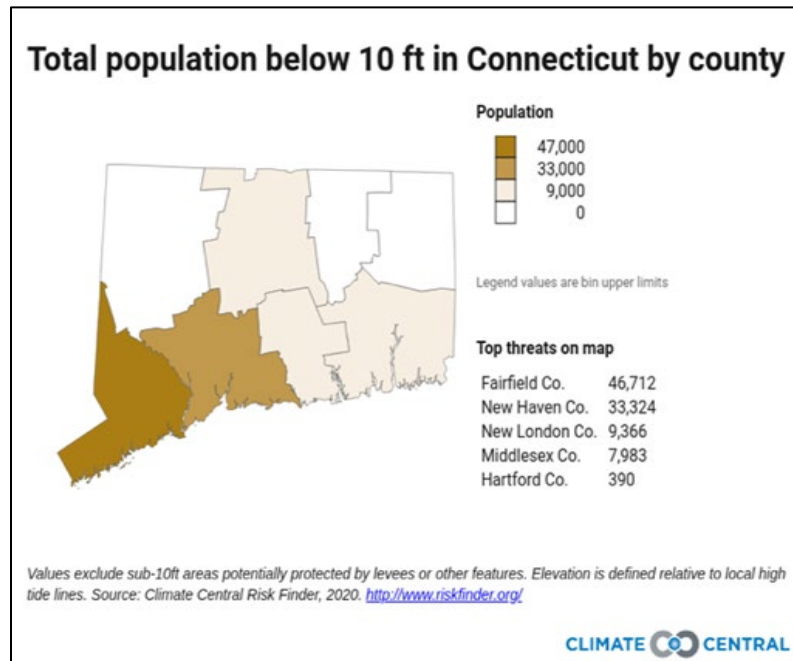
- Risk = Hazard (Storm Surge) x Vulnerability (High) x Consequence (loss of life)
- High vulnerability to storm surge hazard...
  - Minor - 1 1/2 to 2 ft above the average higher high tides start seeing minor flooding issues (nuisance- a few roads closed and flooded properties) A few to several times a year)
  - Major - 4 to 5 ft surge above high tides we are talking life threatening and destructive storm surge (rare events - tropical, 1992 Nor'easter, 1950 Southeaster) Once every 25-50 yrs.
- Wave action vulnerability - No barrier beaches. The shorefront areas take the brunt of these combined surge and wave impacts. SE high wind events will typically be the most destructive.

# Using Data to be Flood Aware

## Recent and Historical Storms

### Central and Southwestern Connecticut Coast:

- **Super Storm Sandy** - 6 ft above MHHW - (7-9 ft. surge) (4-6 ft. inundation)
  - Storm tides resulted in up to 2 to 5 feet of inundation several blocks inland along Long Island Sound, with a few feet of inundation working north of I-95 in several spots along waterways such as the Pequonnock River in Bridgeport, Ash Creek and Mill River in Fairfield, Saugatuck River in Westport, Norwalk River in Norwalk, Housatonic River in Milford, the West River and Quinnipiac River in New Haven, Branford River in Branford, and East River in Guilford. The most widespread major damage occurred along sound front communities in Milford and East Haven.
  - Due to sea level rise, peak storm tides surpassed water levels from Hurricane Carol in 1954 and the 1938 Hurricane.
- **Tropical Storm Irene** - 5 ft above MHHW - (4-8 ft surge)

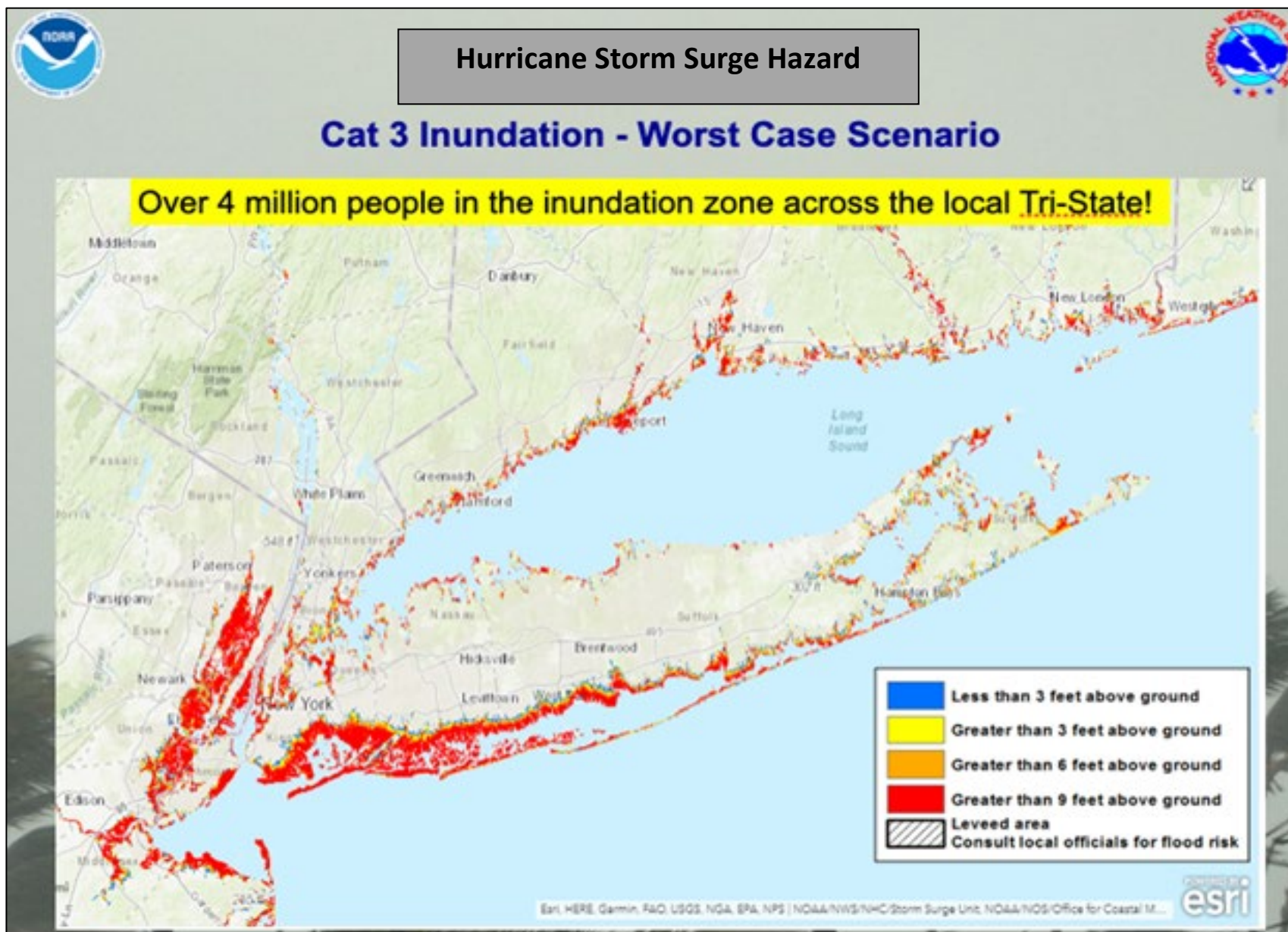


### Southeastern Connecticut Coast:

- **1938 Hurricane - Cat 3** - (10-15 ft inundation)
  - Coastal communities from Eastern Long Island and Coast CT eastward were devastated. Near the coast, the combination of strong winds (80-100 mph sustained), destructive waves, and the storm surge damaged or destroyed thousands of buildings. As much as 10 to 16 ft of inundation AGL from Fire Island and New London eastward into southeastern New England. Entire coastal communities were nearly wiped out in New London, Groton, and Mystic, Connecticut.
- **Hurricane Carol (1954) - Cat 3** - 6 ft above MHHW - (8-10 ft inundation)
  - Coastal communities from central Connecticut eastward were devastated. Near the coast, the combination of strong winds and the storm surge damaged or destroyed thousands of buildings. 10 to 15 ft of surge from New London eastward. Entire coastal communities were nearly wiped out in New London, Groton, and Mystic, Connecticut. Several feet of inundation with battering wave action.



# Using Data to be Flood Aware



# Using Data to be Flood Aware

## How quickly can storm surge flood an area?

- Below is the water level trace from New London during Cat 3 Hurricane Carol. You can see a 4 ft rise in water level in one hour (minor to well over major flood levels)! So a very rapid rise in water level at the gauge. The exact rate of inundation for a particular location will depend on numerous factors (geography, topography, man-made structures, wind and wave action, etc.) During Sandy, there were bowl-like areas that were sheltered by natural or man-made structure, but once surrounding water levels exceeded those barriers, inundation in those areas became life threatening in a matter of minutes. In the 1938 Hurricane, there was a 7 ft water rise at the Battery tidal gage in 30 minutes! Not something anyone ever wants to time or think they can outrun. Even if water rises more gradually in their area, they could become cutoff from safety by impassable inundation in surrounding areas. In addition, this inundation is in most cases occurring during other life threatening hazards that will make escape or rescue impossible. All reasons to heed mandatory evacuation orders.



# Using Data to be Flood Aware

## What can residents do now to prepare for future flood events?

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- Know your risk - Are you in a flood zone. What evacuation zone are you in?
- Develop an evacuation plan -
  - Have a go bag?
  - Where are you going to go?
  - Remember your pets needs
- Disaster supply kit
  - Enough water, non-perishable food, and medicine for at least 3 days for each person.
  - Battery powered radio and flashlight - Power outages could last weeks.\
  - Practice good generator safety
- Check your insurance (car and home)
  - Flood insurance
- Strengthen your home
- Stay weather aware and Heed evacuation orders from local officials!
  
- **CHECK OUT OUR TWITTER FEED:** <https://twitter.com/CTDEMHS>



[Connecticut Sea Level Rise and Storm Surge Viewer | Connecticut Institute for Resilience & Climate Adaptation \(CIRCA\) \(uconn.edu\)](#)

This dataset shows different flood maps with sea-level rise projections (1 foot and 20 inches), above the North American Vertical Datum of 1988 (NAVD88) along the Connecticut coastline and the adjacent inland. CIRCA research recommends that planning anticipates sea level will be 20 inches higher than the national tidal datum in Long Island Sound by 2050. CIRCA's report on [Connecticut sea level rise](#) 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.

Note: Currently there is no coastal change modelling done for coastal CT, only for ocean facing shorelines (eg. Rhode Island, Long Island, and NJ)

### **Additional Connecticut Coastal Flooding Resources:**

[Understanding the Minor, Moderate, Major Coastal Flood Thresholds](#)

[Understanding Coastal Flooding Terminology](#)

[Visualizing the Impacts of NWS Coastal Flood Forecasts using NWS Impacts Catalogs and NOAA Coastal Inundation Viewer](#)

# Promoting Public Awareness, Outreach & Education

[\*Promoting Public Awareness, Outreach and Education\*](#)

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## Resources Available from the State of Connecticut

The State of Connecticut provides public awareness, outreach and education through a variety of means including: CT DEMHS weather advisories, CT DEMHS website, CT Prepares App, CT Ready (website and guide) and social media (twitter and Linked-in).

**Connecticut Weather Advisories** (see DEMHS Weather Updates on Page 18)

**CT DEMHS Website** [www.ct.gov/demhs](http://www.ct.gov/demhs)

The DEMHS website has a section “Staying Informed” includes the following listed resources:

### **CT Prepares Web Application:**

CT Prepares provides information and alerts in emergency situations and includes text messaging, email and social networking – allowing residents to communicate with family members during an emergency. Users will receive real-time notifications including emergency news, state office closings, and public safety messages. The CT Prepares app can be downloaded on both Apple and Android smartphones.



### **Connecticut 211**

Connecticut 211 provides informational services to the public during disasters. Residents are urged to call 211 if you need help finding specific resources or basic information before, during, and after a disaster. Additionally, resources are available on the Connecticut 211 website at [United Way 211 \(211ct.org\)](http://United Way 211 (211ct.org))

### **CT Alert Notification System**

CT Alert is an enrollment-based notification system that is used to notify the public of impending emergency situations. The public may enroll in this notification system at [Learn about CT Alerts](#). Residents can opt to receive alerts by text message, email, mobile app or phone call.





# Promoting Public Awareness, Outreach & Education



## **CT ready! Personal Preparedness Guide**

An emergency can happen at any time. The Connecticut Department of Public Health wants to help you get ready so you and your loved ones can be safe. Use this guide to prepare so that you are ready in the event of ANY emergency. To download your copy today, just go to <https://portal.ct.gov/DPH/Public-Health-Preparedness/Main-Page/Personal-Preparedness-Guide>

## **NWS Community Readiness, Responsiveness and Resilience Efforts**

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### **Storm Ready**

Being part of a Weather-Ready Nation is about preparing for your community's increasing vulnerability to extreme weather and water events. Americans live in the most severe weather-prone country on Earth. You can make sure your community is StormReady®. Some 98 percent of all Presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly \$15 billion in damage. The StormReady program helps arm America's communities with the communication and safety skills needed to save lives and property--before, during and after the event. StormReady helps community leaders and emergency managers strengthen local safety programs.



StormReady communities, counties, Indian nations, universities and colleges, military bases, government sites, commercial enterprises and other groups are better prepared to save lives from the onslaught of severe weather through advanced planning, education and awareness. No community is storm proof, but StormReady can help communities save lives.

StormReady uses a grassroots approach to help communities develop plans to handle all types of extreme weather—from tornadoes to winter storms. The program encourages communities to take a new, proactive approach to improving local hazardous weather operations by providing emergency managers with clear-cut guidelines on how to improve their hazardous weather operations. Applying is easy. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public

# Promoting Public Awareness, Outreach & Education

- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises.

To apply, see the [How to Become StormReady](#) page. Your local NWS office [Warning Coordination Meteorologist](#) will walk you through the easy application process. Sites that can't meet the StormReady criteria can show their support for weather safety by joining the StormReady [Supporter](#) program.

**Note for Southern CT:** We have had to limit our StormReady Recognition to the county and large city government level. We are asking towns, villages, and cities in southern CT to register as a WeatherReady Nation Ambassador (see next section).

## Weather Ready Nation Ambassadors

As a WRN Ambassador, partners commit to working with NOAA and other ambassadors to strengthen national resilience against extreme weather. In effect, the WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards.

To be officially recognized as a WRN Ambassador, a town must commit to:

- Promoting Weather-Ready Nation messages and themes to their stakeholders;
- Engaging with NOAA personnel on potential collaboration opportunities;
- Sharing their success stories of preparedness and resiliency;
- Serving as an example by educating employees on workplace preparedness



As a WRN Ambassador, you will serve as a change agent and leader in your community. You will inspire others to be better informed and prepared, helping to minimize or even avoid the impacts of these natural disasters. To support your efforts, NOAA can:

- Provide outreach content about creating a Weather-Ready Nation;
- Explore innovative approaches for collaboration with your organization;
- Recognize your organization as a WRN Ambassador; and
- Share the WRN Ambassador logo for your use.

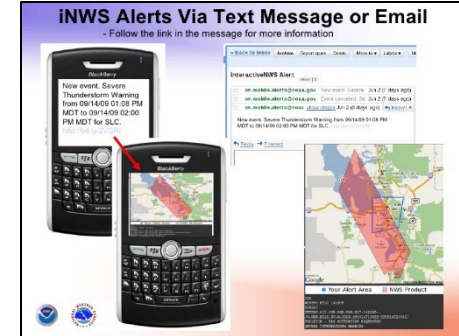
More information concerning the WeatherReady Ambassador program can be found at:

<https://www.weather.gov/wrn/ambassadors>

# Promoting Public Awareness, Outreach & Education

## iNWS - Interactive NWS

- Interactive NWS (iNWS): <https://inws.ncep.noaa.gov/>.
- This application allows you to automatically receive NWS watches, warnings, advisories and statements for your area of interest through text messages and mobile enabled webpages.



## NWSChat

- NWSChat: <https://nwschat.weather.gov/live/>.
- An instant messaging system that allows the National Weather Service to share and receive critical weather information with partners.

## Skywarn

- To obtain critical weather information, the National Weather Service (NWS) established SKYWARN® with partner organizations. SKYWARN® is a volunteer program of trained severe weather spotters. These volunteers help keep our local communities safe by providing timely and accurate reports of severe weather to the National Weather Service.
- Since the program started in the 1970s, the information provided by SKYWARN® spotters, coupled with Doppler radar technology, improved satellite and other data, has enabled NWS to issue more timely and accurate warnings for tornadoes, severe thunderstorms and flash floods. SKYWARN® storm spotters form the nation's first line of defense against severe weather.
- Find out more at: <https://www.weather.gov/SKYWARN>



# Promoting Public Awareness, Outreach & Education

## Flood Safety for Pets and Other Animals

It is important that your residents plan for the safety of their pets and other animals they are responsible for before a flood happens. Consider sharing the information and resources below with your residents periodically and when a flood is imminent.

### Pets

The [Ready.gov Pets and Animals page](#) includes information for pet owners about preparedness and pet care during a disaster. It is recommended that pet owners prepare shelter kits for their pets ahead of time to be ready for a flood or other disaster. The Humane Society of the United States (HSUS) has developed [this short video](#) that describes what to include. **If an evacuation order is given, residents should not leave their pets behind.**



### Horses and Farm Animals

The HSUS has also developed disaster preparedness guidance related to [horses](#) and [farm animals](#). This includes information about evacuation and what to do if large animals cannot be evacuated.



### The Connecticut Animal Response Team (CTSART)

CTSART is a collaboration among government agencies, not-for-profit organizations, industry, and volunteers for preparing and responding to animal needs in disasters. It is a public-private partnership, organized to prepare our state for any disaster that involves domestic animals in Connecticut. CTSART is the signature program of the Connecticut Veterinary Medical Foundation. CTSART's goals include 1) To facilitate a prompt, effective response to emergencies involving animals in Connecticut. 2) To decrease the health and safety threat to people and animals, 3) To minimize the economic impact of animal issues in emergencies, and 4) To prevent or decrease the spread of animal disease in emergencies. CTSART missions include deployment of co-located companion animal evacuation shelters, building volunteer networks trained and state certified to assist with animal needs in disasters and public education.

### Other State Resources

Additional resources related to the care of animals is available on the [CT Department of Agriculture website](#).



### Hazard Mitigation Planning and Funding in Connecticut

*The State Hazard Mitigation Officer or Hazard Mitigation Planner at CT Division of Emergency Management and Homeland Security (DEMHS) can provide further information about hazard mitigation plans, including a copy of your community's latest plan, expiration dates (plans must be updated every 5 years), development guidance, and potential funding to develop plans*

Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. It is most effective when implemented under a comprehensive, long-term mitigation plan. State and local governments engage in hazard mitigation planning to identify risks and vulnerabilities from natural disasters and develop long-term strategies for protecting people and property from future hazard events. Mitigation plans are key to breaking the cycle of disaster damage, reconstruction, and repeated damage.

Mitigation policies/actions are identified based on an assessment of hazards, vulnerabilities, and risks and participation of a wide range of stakeholders and the public in the planning process. Benefits of mitigation planning include:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public.
- Focusing resources on the greatest risks and vulnerabilities.
- Building partnerships by involving citizens, organizations, and businesses.
- Increasing education and awareness of threats and hazards, as well as their risks.
- Communicating priorities to state and federal officials.
- Aligning risk reduction with other community objectives <sup>1</sup>.



<sup>1</sup> [FEMA Local Mitigation Planning Handbook](#)

# Community Preparedness

## Key Federal Mitigation Funding Sources

### **Hazard Mitigation Grant Program (HMGP)**

The Hazard Mitigation Grant Program, authorized by Section 404 of the Stafford Act is funded under a presidentially declared disaster if requested by a state governor, or acting governor, a federally recognized tribe, or a territory government. The purpose of these funds is to take mitigation measures to reduce the risk of loss of life and property and minimize future impact on the community. Funding is generally 15% of the total federal assistance amount made available for recovery.

- Statewide funding is available for eligible sub-applicants with a FEMA approved pre-disaster mitigation plan.
- Eligible applicants include states, local, tribal, and territorial governments, and certain private nonprofit (PNP) organizations.
- Eligible activities must reduce or eliminate long-term risk through cost effective measures and proven future loss avoidance.
- Detailed information for eligible applicants and sub applicates can be found at [FEMA.gov](https://www.fema.gov)
- Applicants who have questions regarding the HMGP program should contact the State Hazard Mitigation Officer at [Kenneth.Dumais@ct.gov](mailto:Kenneth.Dumais@ct.gov) .

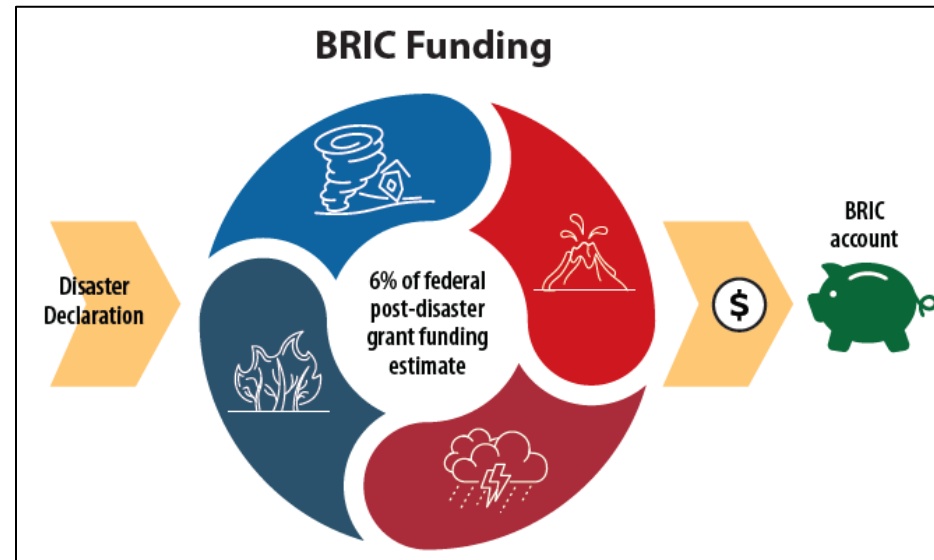
### HMGP eligible activities include, but are not limited to:

- Retrofitting existing buildings to make them less susceptible to damage from a variety of natural hazards.
- Purchasing hazard prone property to remove people and structures from harm's way.
- Utility and infrastructure retrofits to reduce risk of failure caused by natural hazards.
- Drainage improvement projects to reduce potential for flood damage.
- Slope stabilization projects to reduce risk to people and structures.
- Developing and adopting hazard mitigation plans, which are required for state, local, tribal and territorial governments to receive funding for their hazard mitigation projects.
- Using aquifer storage and recovery, floodplain and stream restoration, flood diversion and storage, or green infrastructure methods to reduce the impacts of flood and drought.
- Property owners please see [Property Owners and the Hazard Mitigation Grant Program | FEMA.gov](#) or [Hazard Mitigation Grant Program \(HMGP\) | FEMA.gov](#)



# Community Preparedness

**Building Resilient Infrastructure and Communities (BRIC)**  
Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program. More information is available at [Building Community Resilience with Nature-Based Solutions: A Guide for Local Officials \(fema.gov\)](#)



## **Flood Mitigation Assistance (FMA)**

This program provides funding to States, Territories, federally recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the National Flood Insurance Program NFIP. FMA funding is also available for management costs. For more information, please see [Flood Mitigation Assistance \(FMA\) Grant | FEMA.gov](#)

### **Additional Resources:**

**PNP eligibility** see 206.434(a)(2) in [Electronic Code of Federal Regulations \(eCFR\)](#)

For more information, visit the [CT DEMHS Mitigation Resource Center](#) and the [FEMA Hazard Mitigation Planning](#).

# DURING THE FLOOD

Keeping Your Community Safe

Evacuation and Sheltering

Keeping Your Community Informed

# Keeping Your Community Safe

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## State Emergency Operations Center

The [State Emergency Operations Center](#) (SEOC) operates under the State Response Framework (SRF). The SRF was approved and is maintained in accordance with Section 28-5(b) of the Connecticut General Statutes. The SRF describes the general emergency operations concepts that normally apply in all disasters and emergencies requiring a state level response. It also outlines the general responsibilities of the various emergency management partners at the local, state, federal and private sector partner level.

### Implementing Procedures for the SRF:

The State operates under the SRF and Executive Order No. 34 which directs State Agencies to utilize the National Incident Management System (NIMS).

State Emergency Operations Center (SEOC) Activation Levels are dependent on local, regional, tribal, state and federal events or weather system situational awareness affecting the state based on critical incident priorities: life safety, incident stabilization and property conservation.

### Activation Levels/Monitoring Posture

- Monitoring: Steady State of monitoring with Division on-call staff only
- Enhanced Monitoring: Depending on the incident, specifically selected Emergency Support Functions (ESF) and/or state agency liaisons, will supplement DEMHS on-call staff for a short-term monitoring of an incident or weather event.
- Partial Activation: Specifically selected ESF and/or state agency liaisons report to the SEOC with DEMHS on-call staff to handle an incident or weather event with a single or multiple operational periods.
- Full activation of all ESF and State Agency Liaisons report to the SEOC to handle a full scale event incident or weather event with multiple operational periods.



#### **SEOC Activation Levels:**

- Monitoring
- Enhanced Monitoring
- Partial Activation
- Full Activation



# Keeping Your Community Safe

The decision to upgrade the monitoring posture can include transitioning from:

- Monitoring to Enhanced Monitoring
- Monitoring to Partial or Full Activation
- Enhanced to Partial or Full Activation

## Local Emergency Operations Plans

Local Emergency Operations Plans (LEOPs) establish a community's strategy to prevent, protect, prepare for, respond to, recover from, and mitigate the impacts of a wide variety of disasters and other emergencies that could adversely affect the health, safety and/or general welfare of its residents and guests.

A community's LEOP is a document that:

- Assigns responsibility to organizations and individuals for carrying out specific actions that exceed routine
- Responsibility at projected times and places during an emergency
- Sets forth lines of authority and organizational relationships and shows how all actions will be coordinated
- Describes how people (including unaccompanied minors, individuals with disabilities, others with access and functional needs, and individuals with limited English proficiency) and property are protected
- Identifies personnel, equipment, facilities, supplies, and other resources
- Available within the jurisdiction or by agreement with other jurisdictions
- Reconciles requirements with other communities

The CT Division of Emergency Management and Homeland Security (DEMHS) works closely with local municipalities and the two tribal nations to assist in the development of local emergency operations plans. According to [Conn. Gen. Stat, 28-7](#), local municipalities are required to submit annually Local Emergency Operations Plans to their DEMHS Regional Coordinator.

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Local Emergency Operations Plan (LEOP)  
for  
[Enter Town of/City of/Tribal Nation Name Here], Connecticut

Last Full Revision: [Enter Month/Year Here]  
Last Reviewed: [Enter Month/Year Here]

Prepared in accordance with:  
State Response Framework  
Connecticut General Statutes Title 28, Chapter 517  
[List any pertinent additional/local regulations here.]

LEOP Template

# Keeping Your Community Safe

DEMHS provides a LEOP template via its [Planning for all Hazards](#) page. Please contact your respective DEMHS Regional Office for more information about developing a LEOP and exercise/training assistance that can support planning efforts.

## Regional Emergency Support Plans

Each of the five State of Connecticut [Regional Emergency Planning Teams](#) (REPT) writes a [Regional Emergency Support Plan](#) (RESP) to outline how local governments may seek mutual aid among municipalities when local resources are exhausted in the event of a large scale disaster affecting all or part of the REPT Region. Goals of the plan include: Maximize the preservation of life and property

- Correct or alleviate, as expeditiously as possible, serious disaster or emergency-related conditions which present continued threats to the health or welfare of the public, and
- Facilitate a return to normalcy by all practical means

The RESP applies to all municipalities and response organizations in an REPT Region and to the State DESPP/DEMHS and encompasses mutual aid provided under the [Intrastate Mutual Aid Agreement](#) (Section 28-22a, C.G.S.).

## Local Emergency Management Directors

The Emergency Management Director (EMD) is appointed by and serves at the pleasure of the Chief Executive Officer (CEO). He or she advises the Chief Executive on all Emergency Management matters and related laws, rules, regulations and requirements of Title 28 and Public Act 87-535 of the Connecticut General Statutes, and the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as Amended (42 U.S.C. 5121 *et seq*), Rev. 1998.

She or he develops, organizes, directs and coordinates the town's Emergency Management Program with the goal of saving lives and protecting property by maintaining emergency operational capabilities that mitigate, prepare for, respond to, and recover from any emergency or disaster. The Emergency Management Director is responsible for accomplishing all of the following Emergency Management functions: (1) Emergency Organization, Planning and Management, (2) Direction, Control and Warning, (3) Population Protection, and

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# Keeping Your Community Safe

(4) Training and Exercises. However, those emergency responsibilities assigned to department chiefs by charter or standard procedures remain the responsibilities of department chiefs.

## EXAMPLES OF DUTIES

Formulates emergency management policies and procedures related to the functioning of emergency services during emergencies.

Develops and executes a program operating budget.

Plans, organizes, and coordinates the Emergency Management activities of those operating departments, agencies and offices of local government which are responsible for carrying out response operations in an emergency.

Coordinates planning and organization for the use of all public and private resources available to local government to provide the capability of dealing with the effects of peacetime and national security (wartime) disasters.

Updates and conforms the town's Emergency Operations Plan to state and federal criteria including national security (nuclear attack/weapons of mass destruction) risk assumptions.

Maintains a continuous review of the warning system and warning procedures.

Serves as the communications planning coordinator for all town emergency direction and control communications insuring proper design, coordination, maintenance and suitability for emergency operations.

Develops and maintains a training and exercise program to prepare the Emergency Management organization for emergency operations.

Prepares requests for federal financial assistance for emergency management programs.



# Keeping Your Community Safe

During emergencies, the Emergency Management Director assumes the overall responsibility for the operation of the Emergency Operating Center (EOC) and for advising the Chief Executive on local government emergency operations, including the execution of (1) appropriate Increased Readiness measures should an international crisis occur; (2) such emergency and supporting operations plans and procedures as are appropriate for the emergency; and (3) necessary coordination among the operating departments of town government.

Coordinates, prepares and executes local government programs which involve the training and education of individual citizens and of business, industry, and private organizations in individual and collective response in an emergency.

Maintains the Emergency Operations Plan, Annexes, and operating procedures (SOP's) updated as required by the Commissioner of the Department of Emergency Services and Public Protection or his designee.

Prepares and submits Emergency Management reports to appropriate town, state and federal agencies as required. Serves as the liaison between town, state and federal agencies on Emergency Management matters.

Maintains a reference file of general emergency preparedness, emergency response, national security (attack preparedness/weapons of mass destruction), and similar emergency management publications as guidance documents.

## **MINIMUM QUALIFICATIONS**

The minimum qualifications of the Emergency Management Director shall be determined by the appointing authority in accordance with local civil service and personnel policies and procedures as well as by the statutory responsibilities and duties found in Connecticut General Statutes Title 28.”

## **SPECIAL REQUIREMENTS**

The Emergency Management Director must be over 18 years of age, a citizen of the United States and should be available to respond to emergencies 24 hours a day, seven days a week.

# Evacuation and Sheltering

## [Evacuation and Sheltering](#)

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Flooding kills more people in the United States each year than any other hazard. Nearly 100 persons perish from flooding each year. Flooding is the number one killer during hurricanes. In 2005, 1,833 persons lost their lives. Most of the deaths were the result of flooding.

In the case of an evacuation from a hurricane, tropical storm or other flooding event on the shoreline, it is important that you "Know Your Zone!"

Find out if you live in a hurricane evacuation zone, what the hazards are and how to prepare by clicking the [Interactive Know Your Zone Evacuation Map Tool](#). You can type in your address of your home or business to find out which evacuation zone you are in.

If you are instructed to evacuate, do not hesitate to check with friends and sources of information. There will be time for that later. Pack up and leave as quickly as possible. Be sure to pack food and water for three days. Pack all medications, important papers and always carry an ID. Many shelters are pet friendly. Check your local town website before a flood hits and know your nearest shelter.



### **The Connecticut Urban Search and Rescue (USAR) Team**

It is the mission of the Urban Search and Rescue Team (USAR), Connecticut Task Force 1 (CT-TF1) to provide a coordinated effort of personnel and resources to locate, extricate and provide immediate medical treatment to victims trapped within collapsed structures.

To accomplish this mission, CT-TF1 members will develop and deploy efficient and effective rescue technologies in a planned and measured response that mirrors the Federal Emergency Management



# Evacuation and Sheltering

Agency's guidelines on Urban Search and Rescue and consistent with existing National Fire Protection Association Standards. Task Force capabilities will include rapid mobilization to assist in natural or manmade disasters.

Members of CT-TF1 will conduct search and rescue operations in a professional, ethical, and compassionate manner that will protect the dignity of the victims and the communities served.

Members of CT-TF1 will develop and maintain the highest level of skills and capabilities required when deployed to natural or manmade disasters, including hurricanes, floods, conflagrations, explosions, earthquakes, or the use of weapons of mass destruction that result in events that are beyond the capability of local emergency service resources.

The US&R Team is based out of Brainard Airport located in Hartford, Connecticut, and will have airborne capabilities by utilizing military helicopters, C-130s, C-141s and other aircraft. The Team will use the best available resources possible.

## Temporary Shelters

Prior to, during, or immediately after a disaster, people and their pets may need safe refuge in temporary, accessible shelters. State and local governments must comply with Title II of the Americans with Disabilities Act and the Pets Evacuation and Transportation Standards Act. Both of these federal laws state that Emergency Operations Plans (see page xx) must provide emergency and disaster-related activities, programs, and services. This would include equal access by all people, pets, and service animals for the benefits that shelters provide, including but not limited to safety, food, a place to sleep, and essential needs until it is safe to return home. In large disasters local government officials may find it necessary to combine resources and open a regional shelter. The Federal Emergency Management Agency (FEMA) and the [American Red Cross](#) have developed resources and guidelines for sheltering including the [Shelter Field Guide](#) and other information available on the [National Mass Care Strategy website](#).



# Keeping Your Community Informed

## [Keeping Your Community Informed](#)

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Studies show that residents are much more likely to evacuate if they receive the order from a leader (e.g. Police Chief, Fire Chief, Mayor) within their community. Studies also show that many residents are unaware that they live in a floodprone area. Community leaders need to keep residents up to date on hazards. The lifespan of public outreach campaigns is only a few years. People move to a new home once every 5 years on average. In just two years, 40% of your residents may be new to your town.

After Super Storm Sandy in 2012, Yale University conducted a study of the [Hurricane Attitudes of Coastal Connecticut Residents](#) in 2013. Social scientists who conduct post-disaster studies have long understood that people are often surprised by and unprepared for the severity or extent of natural hazards. Such results are found even despite major advances in the technical accuracy and advanced warning of storm forecasts. In fact, a post-storm review of Superstorm Sandy concluded that progress in forecasting may have reached a point of diminishing returns; the critical need now is progress in risk communication.



Five distinct groups of CT coastal residents are identified in the report based on their hurricane attitudes: the “First Out” (21% of the population); the “Constrained” (14%); the “Optimists” (16%); the “Reluctant” (27%); and the “Diehards (22%).” The First Out are the most likely to evacuate during a hurricane whereas the Diehards are the least likely to leave. Each group, however, has unique characteristics.

One fact is clear; all of these distinct groups are much more likely to evacuate if they receive some kind of official notice to evacuate, but the importance of the notice varies across the segments. For the First Out, 89% say they definitely/probably would evacuate for a Category 2 hurricane if they received an official notice, whereas only 48% say they definitely/probably would without such notice – a 41 percentage point difference. The proportion of the Constrained who say they definitely/probably would leave increases by 26 percentage points in the event that they receive official notice, and proportion of Optimists increases by 50 percentage points. The largest effect occurs for the Reluctant, however – only 6% say they definitely/probably would leave for a Category 2 hurricane

# Keeping Your Community Informed

without notice, whereas 78% say they definitely/probably would leave if ordered – a 72 percentage point difference. The Diehards are the least likely to be influenced by an official notice; none say they definitely/probably would evacuate without a notice and only 8% say they would with official notice for a Category 2 hurricane.

Many tools are available on the Division of Emergency Services and Public Protection website for keeping your residents informed. Your residents can sign up to receive weather warnings by clicking on [Learn about CT Alerts](#).

# **AFTER THE FLOOD**

Short Term Recovery Considerations

The National Flood Insurance Program

Disaster Assistance Programs

Long Term Recovery Considerations

# Short-Term Recovery Considerations

## [\*Short-Term Recovery Considerations\*](#)

[\*Back to Dashboard\*](#)

### Important Post-Flood Information for Your Residents

After a flood, many potential dangers remain that can place people at risk. Below are key messages to share with your residents as the flood begins to recede.

- Listen to authorities for information and instructions. If you have evacuated, return home only when authorities say it is safe.
- Avoid driving, except in emergencies, and NEVER drive through floodwaters.
- When you can safely enter your home, photograph flood damage and contact your insurance agent *as soon as possible* to talk through your options.
- Your home may be contaminated with mold or sewage. Wear boots, gloves and a face mask during cleanup (See page 43 for shareable resources about flood cleanup).
- Be aware of the risk of electrocution. Do not touch electrical equipment if it is wet or if you are standing in water. If it is safe to do so, turn off the electricity to prevent electric shock.
- Avoid wading in floodwater, which can contain dangerous debris, contaminants, and animals such as rodents and snakes. Underground or downed power lines can also electrically charge the water.
- Use an emergency generator or other gas-powered machinery ONLY outdoors, away from doors and windows. The Centers for Disease Control have additional guidance about [health and safety risks related to flooding](#) that you may also want to share with your residents.





# Short-Term Recovery Considerations

## Cleaning Up After a Flood

Your residents will need information about how they can safely clean up their homes following a flood. Consider sharing the following resources that can provide the information they will need. These documents can also be helpful for community officials to guide larger community cleanup efforts.

- The Federal Emergency Management Agency's (FEMA) fact sheet [The ABC's of Returning to Flooded Buildings](#) has helpful information about flood clean up, including a suggested supply list, safety tips when re-entering flooded buildings, and more.
- The American Red Cross/FEMA publication [Repairing Your Flooded Home](#) has several chapters devoted to home clean up.
- The National Center for Healthy Housing has developed [Creating a Healthy Home: A Field Guide for Clean-Up of Flooded Homes](#).
- The U.S. Environmental Protection Agency has information on [Mold Clean-Up in your Home](#).



## Road, Culvert, and Bridge Washouts

Connecticut contains 21,557 miles of roadway. State and Federal roadways make-up 4,131 miles and municipal roadways account for the remaining 17,426 miles. Communities are responsible for maintaining non-state-owned roads within their jurisdictions. There are also approximately 500 miles of gravel roads which are more easily subjected to washout during floods, particularly those with undersized culverts.



# Short-Term Recovery Considerations

During very heavy rainfall events and flooding the most common modes of roadway failure are:

1. Road washouts caused by water eroding gravel or asphalt.
2. Failure of bridge supports resulting from erosion at the base of the supports in streams and rivers.
3. Failure of culverts resulting from erosion of wing walls or piping.
4. Slope failure which leads to road collapse or debris blocking roadways.

## Helping Your Residents Find Reliable Contractors

Following disasters, building contractors can serve as your ally in helping to communicate with property owners about which permits may be needed and building requirements that may apply. However, unqualified or dishonest contractors may offer disaster victims cut rates or “special deals” that are actually scams. Residents should do their homework and check with the Better Business Bureau and require contractors to provide three recent references. Consider providing your residents with a list of licensed sub-contractors or

provide a link to a website.



Consider distributing guidance to your residents about how to avoid unscrupulous contractors who may visit neighborhoods that have experienced damage following a disaster (See box at right and above).

Disasters can attract fraudulent contractors who may offer to begin work immediately with a cash payment. When hiring a contractor, your residents should:

- only use licensed local contractors who are backed by reliable references.
- get written estimates from at least three contractors that include the cost of labor and materials.
- insist that contractors carry general liability insurance and workers' compensation.
- never pay cash or pay more than half the costs of repairs upfront.

Contracting scams or price gouging after a disaster can be reported to the Federal Emergency Management Agency's Disaster Fraud Hotline at 1-866-720-5721 or [disaster@leo.gov](mailto:disaster@leo.gov).

# The National Flood Insurance Program

## The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is managed by the Federal Emergency Management Agency and is delivered to the public by a network of approximately 60 insurance companies and the [NFIP Direct](#).

Floods can happen anywhere — just one inch of floodwater can cause up to \$25,000 in damage. Most homeowners' insurance does not cover flood damage. Flood insurance is a separate policy that can cover buildings, the contents in a building, or both, so it is important to protect your most important financial assets — your home, your business, your possessions.

The NFIP provides flood insurance to property owners, renters and businesses, and having this coverage helps them recover faster when floodwaters recede. The NFIP works with communities required to adopt and enforce floodplain management regulations that help mitigate flooding effects.

Flood insurance is available to anyone living in one of the 23,000 participating NFIP communities. Homes and businesses in high-risk flood areas with mortgages from government-backed lenders are required to have flood insurance.

To purchase flood insurance, call your insurance company or insurance agent, the same person who sells your home or auto insurance. If you need help finding a provider go to [FloodSmart.gov/flood-insurance-provider](https://www.floodsmart.gov/flood-insurance-provider) or call the NFIP at **877-336-2627**.

Plan ahead as there is typically a 30-day waiting period for an NFIP policy to go into effect, unless the coverage is mandated it is purchased as required by a federally backed lender or is related to a community flood map change.

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# Disaster Assistance Programs

## Individual Assistance

FEMA's Individuals and Households Program (IHP) provides financial and direct services to eligible individuals and households affected by a disaster, who have uninsured or under-insured necessary expenses and serious needs. IHP assistance is not a substitute for insurance and cannot compensate for all losses caused by a disaster. The assistance is intended to meet your basic needs and supplement disaster recovery efforts.

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FEMA

IHP Assistance may include:

- Funds for [temporary housing](#) while you are unable to live in your home, such as rental assistance, or reimbursement for hotel costs.
- A [temporary housing unit](#), if approved for the disaster, when you are not able to use rental assistance due to a lack of available housing resources.
- Funds to support the [repair or replacement of owner-occupied homes](#) that serve as the household's primary residence, including privately-owned access routes, such as driveways, roads, or bridges.
- Funds for [other uninsured or under-insured disaster-caused expenses and serious needs](#), such as repair or replacement of personal property and vehicles, or funds for moving and storage, medical, dental, child care, funeral, and other miscellaneous items approved by your state, territory, or tribal government.
- Funds for [hazard mitigation assistance](#) to help eligible homeowners repair or rebuild stronger, more durable homes.

The Privacy Act requires FEMA to obtain written consent from the applicant in order to share their disaster assistance records with a third party. Applicants who wish to authorize FEMA to share their information with a third party must complete the [FEMA FORM FF-104-FY-21-118: Authorization for the Release of Information Under the Privacy Act](#) and return it to FEMA.



# Disaster Assistance Programs

## The Small Business Administration

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You may receive a phone call to advise you of ways to apply for the [Small Business Administration](#) (SBA). If referred to the SBA, a loan application must be completed and returned in order to be considered for a loan, as well as for certain types of FEMA assistance.

If SBA find that you cannot afford a loan, they will automatically refer you to FEMA's Individuals and Households program. Your file will be reviewed to determine if you qualify for additional grant assistance.

To meet the needs of disaster survivors, FEMA partners with other agencies. FEMA works with the U.S. Small Business Administration (SBA) to offer low-interest disaster loans to homeowners and renters in a declared disaster area. You do not need to own a business to apply for a disaster loan. You may receive a phone call to advise you of ways to apply for the [Small Business Administration](#).

If referred to the SBA, a loan application must be completed and returned in order to be considered for a loan, as well as for certain types of FEMA assistance, such as personal property and vehicle repair or replacement. If the SBA determines you are not eligible for a loan, they will automatically refer you to FEMA's [Individuals and Households program](#) based on their decision. Your file will be reviewed to determine if you qualify for any additional grant (non-loan) assistance.

Since the FEMA Individuals and Households Program does not provide grant assistance to businesses, or rental properties that are not occupied by the owner as a primary residence, FEMA applications of this type are automatically referred to the SBA for disaster loan consideration.



U.S. Small Business  
Administration

# Long Term Recovery Considerations

## Mitigation Options for Communities

The period following a flood is an opportunity for carefully planned efforts to rebuild for the future. The resources on this page can serve as a starting point to help your community build back safer, stronger, and smarter.

The Federal Emergency Management Agency's (FEMA) publication [Mitigation Ideas: A Resource for Reducing Risk from Natural Hazards](#) outlines different ways to reduce risk from floods and other disasters in your community.

The Environmental Protection Agency (EPA) has developed tools to help communities improve resilience to flooding. The [EPA Flood Resilience Checklist](#) is a self-assessment tool that can be used to evaluate community vulnerability and resilience to flood hazards. You can use this resource as a starting point for your own community.



*Preserved salt marsh buffer, Great Bay (Source: NH Coastal Adaptation Workgroup)*

Using Green Infrastructure to Improve Flood Resilience Green infrastructure is a nature-focused approach to water management that protects, restores, or mimics the natural water cycle.

Benefits of green infrastructure practices can include reduced flooding and erosion, and improved air, soil, and water quality. Practices include preserving natural floodplain areas, planting trees, and in coastal areas, creating living shorelines. Learn more using these resources:

[Green Infrastructure Options to Reduce Flooding](#) (National Oceanic and Atmospheric Administration, Office for Coastal Management)

[Connecticut Greenways](#) (Department of Energy and Environmental Protection)

[Rails to Trails Conservancy](#)



# Long Term Recovery Considerations

Mitigation Options for Your Residents While buildings that are Substantially Damaged or Improved must be elevated (or in some cases floodproofed) to at least the [Base Flood Elevation](#) (BFE) and meet other applicable local ordinance requirements, it doesn't have to stop there. Seize the moment to encourage property owners to take steps that go further to protect their property from future floods.

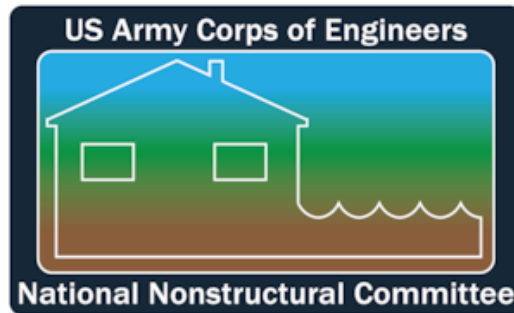
Residents can learn about different options available to them to protect their home from flooding in these FEMA publications:

[Protect Your Property from Flooding: Low-Cost Projects You Can Do Yourself](#)

[Protecting Your Home and Property From Flood Damage: Mitigation Ideas for Reducing Flood Loss](#)

[The Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home From Flooding](#)

[Home Builder's Guide to Coastal Construction](#)



Additionally, the U.S. Army Corps of Engineers' [National Nonstructural Committee](#) has developed a Flood Damage Reduction Matrix and User Guide available through the Committee's webpage that can help people make smart choices about protecting their property. The matrix lists types of flood protection measures and the suitability of each depending on type of flooding, building and site characteristics, cost, and other factors. The implications on flood insurance premiums is also provided for each measure.

You can order free hard copies of most FEMA publications for your community staff and/or your residents directly from the [FEMA Publications Warehouse](#)

Residents Can Stay Safer and Save Money by Building Higher Elevating a building above the BFE for the area is one of the best ways to reduce the risk from flooding. Elevated buildings will have a lower risk of impact from future floods and may have lower flood insurance premiums depending on how high the building is above the BFE. Learn more in The Costs and Benefits of Building Higher. The Federal Housing Administration's (FHA) 203(k) loan program allows for the purchase (or refinance) of a floodprone house and the cost of rehabilitation (including building elevation) through a single loan. Homeowners can learn more in the Association of State Floodplain Managers' FHA 203(k) fact sheet.

# Long Term Recovery Considerations

## Historic Structures

Historic buildings should be evaluated by a team that includes preservation professionals, architects, and engineers as well as local building officials. General guidance for historic properties affected by a disaster is provided below.

Take time to properly evaluate damage before making decisions that are irreversible. Demolition is not always necessary. Community and property owner input should be taken into consideration. Can mitigation strategies be implemented that allow the property to be adapted to its location? Is the property so important, but vulnerable to future hazards, that relocation is an option? The emphasis for any action plan should be to explore historic preservation solutions.

Do not allow any materials to be removed from the site until preservation or building conservation professionals have evaluated what materials should be salvaged. Some decorative elements may not be salvageable for reuse but can provide patterns for reconstruction.

Make certain that damage to historic structures is evaluated by an architect and engineer who is familiar with historic building methods and materials, and is sensitive to them.

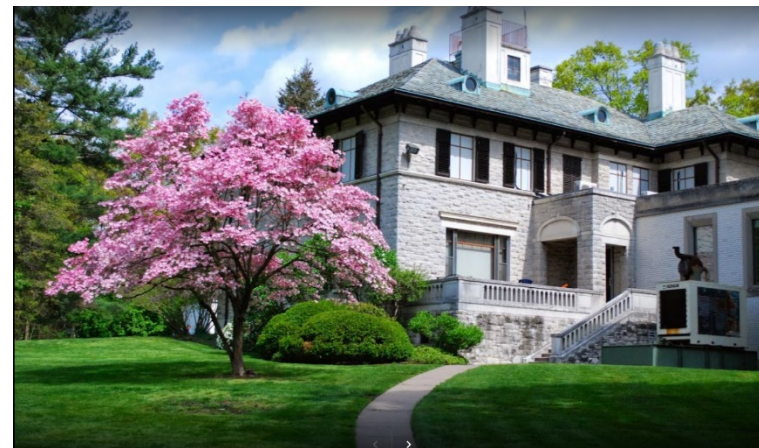
Document damage to historic buildings with photographs prior to any activity.

Consult the [Connecticut Historical Society](#) whenever damage has occurred to historic buildings.

Use the Secretary of the Interior's [Standards for Rehabilitation](#) as your guide in rehabilitating historic properties damaged in a disaster.

The Federal Emergency Management Agency's [Floodplain Management Bulletin on Historic Structures](#) includes guidance on how to minimize the impacts of flooding and details about National Flood Insurance Program requirements that apply to such structures.

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Connecticut Historical Society

# Long Term Recovery Considerations

## U.S. Geological Survey: Post-Flood Assessments

The U.S. Geological Survey (USGS) documents flooding and provides assessments that are crucial in reducing flood hazards. This information can provide situational awareness, and support predictive models, floodplain mapping, and ecological assessments. Below are descriptions of some of the data and assessments available for New Hampshire. A complete list of resources and tools is available on the [USGS Flood Information webpage](#).

High Water Marks (HWMs) Following a flood disaster and Federal Disaster Declaration, USGS flags and surveys HWMs in flooded areas to document the extent of the flooding. HWMs are used for:

- Future flood forecasting.
- Predicting the severity of future floods.
- Delineating or revising FEMA floodplain maps.

## Annual Exceedance Probabilities and Modeled Streamflows

USGS computes and publishes Annual Exceedance Probabilities (AEP) for peak streamflows at long-term USGS stream gages and models peak streamflows to create flood recovery maps. These assessments are used to:

- Provide context to floods and their occurrence.
- Allow for an assessment of risk.
- Allow for development of peak-flow regression equations at un-gaged locations.
- Document the extent of flooding.

The USGS has a policy for post-flood tasks to perform based on the severity of an event. Federal, state, or local officials may request post-flood assessments not ordinarily included in the scope of tasks, which may be performed, funding permitting.

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USGS Surge, Wave, and Tide Hydrodynamics ([SWATH](#)) Network The USGS maintains the SWaTH Network along the New England coast to improve understanding of how overland storm tide and waves evolve and dissipate when they move across natural and manmade landscapes. Information from the network is available through the [USGS Flood Event Viewer](#).



# Long Term Recovery Considerations

## National Weather Service: River Forecast Points

After a flood, National Weather Service (NWS) personnel will visit forecast point locations to speak with community Emergency Management Directors to discuss flood impacts. Each forecast point has a set of flood impacts based on levels of past flooding (see graphic below). These impacts can change over time due to changes to the watercourse itself, infrastructure improvements, or other modifications that occur in the floodplain. These impact statements can be changed to reflect the impacts from the latest flooding event. If, at any time, your community Emergency Management Director feels the impact statements do not reflect what is actually occurring, contact the NWS (See Appendix B for contact information) to request changes.

To access NWS flood impacts for a particular forecast point, go to the Advanced Hydrologic Prediction Service (AHPS) website. Click on a forecast point on the map to go the webpage for that location, then scroll down to the Flood Impacts & Photos section (See example below).

The screenshot displays the 'Flood Impacts & Photos' section of the AHPS website. On the left, a list of flood impacts is shown for various forecast points. One impact, labeled '13', is circled in red on the map to its right. The map shows the Connecticut River basin with various forecast points marked by colored squares and circles. A legend on the right side of the map provides details on the symbols and gauges. The legend includes categories such as 'Probability and forecasts available', 'Forecasts available', and '235 total gauges'. It also lists the number of gauges in different flood stages: 0 Major Flooding, 0 Moderate Flooding, 0 Minor Flooding, 3 Near Flood Stage, 180 No Flooding, 10 Flood Category Not Defined, 0 At or Below Low Water Threshold, 42 Forecasts Are Not Current, 0 No forecast within selected timeframe, and 0 Out of Service. The map shows a red circle around a forecast point near Waterbury, CT. The text on the left side of the screenshot reads: 'If you notice any errors in the below information, please contact our Webmaster'. Below this, there are four numbered entries (18, 16.5, 15, 13) describing flood impacts for different forecast points. Entry 13 is circled in red on the map. The map also shows various cities and towns along the Connecticut River, including Springfield, Hartford, Windham, Providence, Waterbury, Norwich, New London, New Haven, Bridgeport, Stamford, and Hicksville. The map includes a 'Collapse' button in the top right corner and a 'Disclaimer' link at the bottom right.

**Flood Impacts & Photos** [Collapse](#)

If you notice any errors in the below information, please contact our Webmaster

18 This is a serious and life threatening flood episode. Follow the direction of your local emergency management officials. If asked to evacuate, do so immediately. All flood protection measures must be rushed to completion in flood prone areas. Widespread inundation is likely from Middletown and Portland downstream through Chester, Old Lyme and Old Saybrook.

16.5 This is a serious and potentially life threatening flood episode. Follow the direction of your local emergency management officials. If asked to evacuate, do so immediately. All flood protection measures must be rushed to completion in flood prone areas.

15 Significant flooding will continue to impact low lying homes and businesses along the river from Wethersfield south through Middle Haddam, downstream to the mouth of the river in Old Saybrook. A portion of Route 9 will flood near the Middletown Portland railroad bridge. Follow the directions of your local emergency management officials.

13 Major river flooding will impact towns along the Connecticut River from Middletown and Portland downstream through Chester and Essex. Many roads near the river will be flooded. Some localized evacuations may be needed. Follow the directions of your local emergency management official. Know alternate routes for travel should roads in your area become flooded.

○ Probability and forecasts available  
□ Forecasts available

**235 total gauges**  
[Show all locations in flood \(0\)](#)

- 0 Gauges: Major Flooding
- 0 Gauges: Moderate Flooding
- 0 Gauges: Minor Flooding
- 3 Gauges: Near Flood Stage
- 180 Gauges: No Flooding
- 10 Flood Category Not Defined
- 0 At or Below Low Water Threshold
- 42 Gauges: Forecasts Are Not Current
- 0 Gauges: No forecast within selected timeframe
- 0 Gauges: Out of Service

[Show all locations](#)

Last map update:  
11/20/2021 at 02:08:16 pm EST  
11/20/2021 at 19:08:16 UTC

[What is UTC time?](#)  
[Map Help](#)  
[Disclaimer](#)

An example of flood impacts (based on flood height in feet) listed for a forecast point circled in red on the AHPS map at right)

# Appendix A

## FLOOD RESPONSE AND RECOVERY CHECKLIST

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Situation		Action	See Page(s)	Staff Responsible/Notes
<b>Before the Flood (Warning Phase):</b> Threat of flooding exists	<input type="checkbox"/>	Evaluate flood/weather forecasts and stream or tidal gage data.	19 – 22, 27	
	<input type="checkbox"/>	Review Local Emergency Operations Plan, FEMA floodplain maps, floodplain development ordinance, other relevant community documents.	4 - 5, 37 - 39	
	<input type="checkbox"/>	Identify areas, facilities, and infrastructure potentially at risk.	2 - 13	
	<input type="checkbox"/>	Evaluate status of flood control devices and barriers (if applicable).	22	
	<input type="checkbox"/>	Pre-position resources to support the response:		
	<input type="checkbox"/>	Inventory heavy equipment, vehicles, and vessels to support response.		
	<input type="checkbox"/>	Move emergency equipment, fuel, and medical supplies from threatened areas to higher ground.		
	<input type="checkbox"/>	Be sure pets are cared for.	32	



# Appendix A

## FLOOD RESPONSE AND RECOVERY CHECKLIST

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Situation		Action	See Page(s)	Staff Responsible/Notes
During the Flood (Response Phase): Flood is occurring	<input type="checkbox"/>	Evaluate the need for evacuation, relocation, and sheltering.	42	
	<input type="checkbox"/>	Establish shelters, if necessary.	43	
	<input type="checkbox"/>	Disseminate public information about preparedness, areas at risk, evacuation routes, and shelters.	44	
	<input type="checkbox"/>	Activate incident management team, and establish command center at Emergency Operations Center.	38	
	<input type="checkbox"/>	Monitor status of structures or obstructions that pose a threat to dams, such as ice jams.	6	
	<input type="checkbox"/>	Issue evacuation orders, if warranted.		
	<input type="checkbox"/>	Activate Community Emergency Response Team (CERT) as needed		
	<input type="checkbox"/>	Limit travel in affected areas.		
	<input type="checkbox"/>	Conduct search and rescue in flooded areas.	42	
	<input type="checkbox"/>	Secure evacuated areas (if applicable).		
	<input type="checkbox"/>	Estimate the extent of damage. Safely document with pictures of flooding.		
	<input type="checkbox"/>	Keep community leaders (e.g. Community Administrator, Board of Selectmen) informed.		
<input type="checkbox"/>	Continue to disseminate public information about weather, flood status, road closures, available shelters, evacuation orders, safety measures.	18, 44		



# Appendix A

## FLOOD RESPONSE AND RECOVERY CHECKLIST

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Situation		Action	See Page(s)	Staff Responsible/Notes
<b>After the Flood (Recovery Phase):</b> Flood has occurred	<input type="checkbox"/>	Disseminate public information about safety considerations and cleanup, permitting and rebuilding requirements, how to apply for assistance.	47 - 50	
	<input type="checkbox"/>	Coordinate recovery activities with state and federal agencies.		
	<input type="checkbox"/>	Participate in FEMA/state preliminary damage assessments (if applicable).		
	<input type="checkbox"/>	Identify safety hazards and undertake corrective action.		
	<input type="checkbox"/>	Assess condition of structures, including bridges, culverts, dams.	48 - 49	
	<input type="checkbox"/>	Assess status of water/septic systems and conduct water quality testing.		
	<input type="checkbox"/>	Arrange for debris removal, especially in culvert/drainage areas.		
	<input type="checkbox"/>	Work to restore damaged utilities and roadways.		
	<input type="checkbox"/>	Assess flood damage and identify damaged properties within the Special Flood Hazard Area.	4	
	<input type="checkbox"/>	Make substantial damage determinations for damaged properties in the Special Flood Hazard Area and notify property owners of determinations.	4	
	<input type="checkbox"/>	Require floodplain development permits for all development activity in Special Flood Hazard Areas.	4	
	<input type="checkbox"/>	Ensure all other federal and state permits are obtained for development and rebuilding efforts by property owners and for municipal projects.		

# Appendix A

	Action	See Page(s)	Staff Responsible/Notes
<input type="checkbox"/>	Monitor rebuilding efforts to ensure compliance with all community regulations, including floodplain development regulations.	4	
<input type="checkbox"/>	Secure additional staff resources via Mutual Aid program (if needed).	39	
<input type="checkbox"/>	Identify forms of assistance to apply for based on community needs.	51 - 54	
<input type="checkbox"/>	Perform an incident critique to identify procedural changes and resource needs for future events.		