Known for Excellence. Built on Trust.

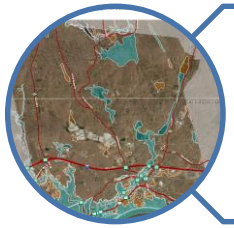
Natural Hazard Mitigation Plan Update

Town of Westbrook

September 16, 2019

Today's Meeting

Natural Hazard Mitigation Plan Overview



Risk Assessment Results

Mitigation Strategy and Actions

Next Steps

Plan Overview

Natural Hazard Mitigation Plan Overview

Planning Goals:

- ✓ Document progress made per the 2014 Plan Update
- ✓ Update Town asset inventory
- ✓ Characterize the natural hazards and climate-change effects updates
- ✓ Assess current and future hazard vulnerability
- ✓ Provide public education and outreach throughout the planning process
- ✓ Revise and develop strategies and actions to mitigate the hazard risks
- ✓ Adopt the Plan Update

Why it matters…

- Eligibility for grant funding
- Public Safety
- Prevent Town losses and operating costs
- Prevent private property loss
- Maintain tax base
- Support Economic Development and Conservation Planning (Plan of Conservation and Development Update)
- Maintain municipal bond rating

Plan Outline

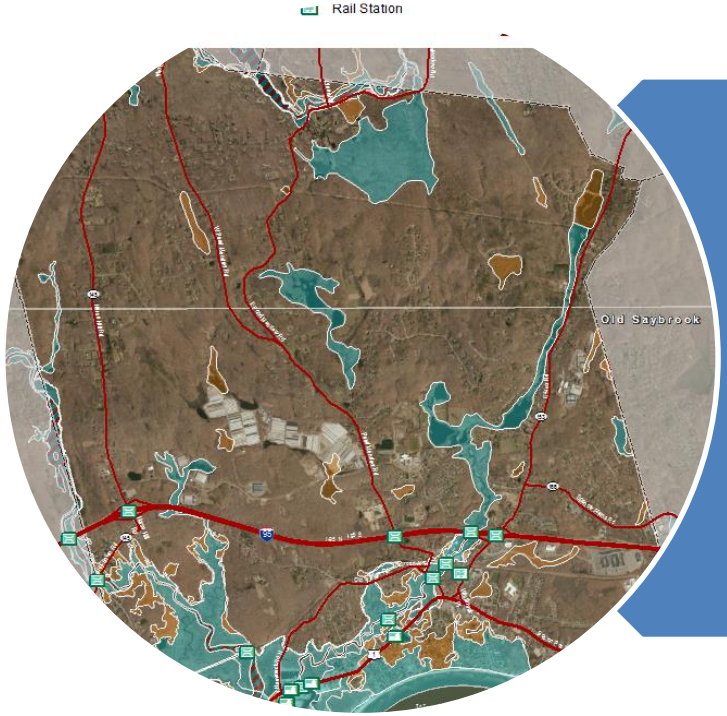
Table of Contents

Planning Process

1. Assess Natural Hazard Risk:
   - Community: Demographics/Social Vulnerability
   - Asset Inventory
   - Natural Hazards Characterization
   - Risk Assessment
2. Mitigation Strategies and Actions
3. Plan Adoption and Maintenance

Figure credit FEMA/Jenny Burmester – Aug 21, 2017

Overview of Findings

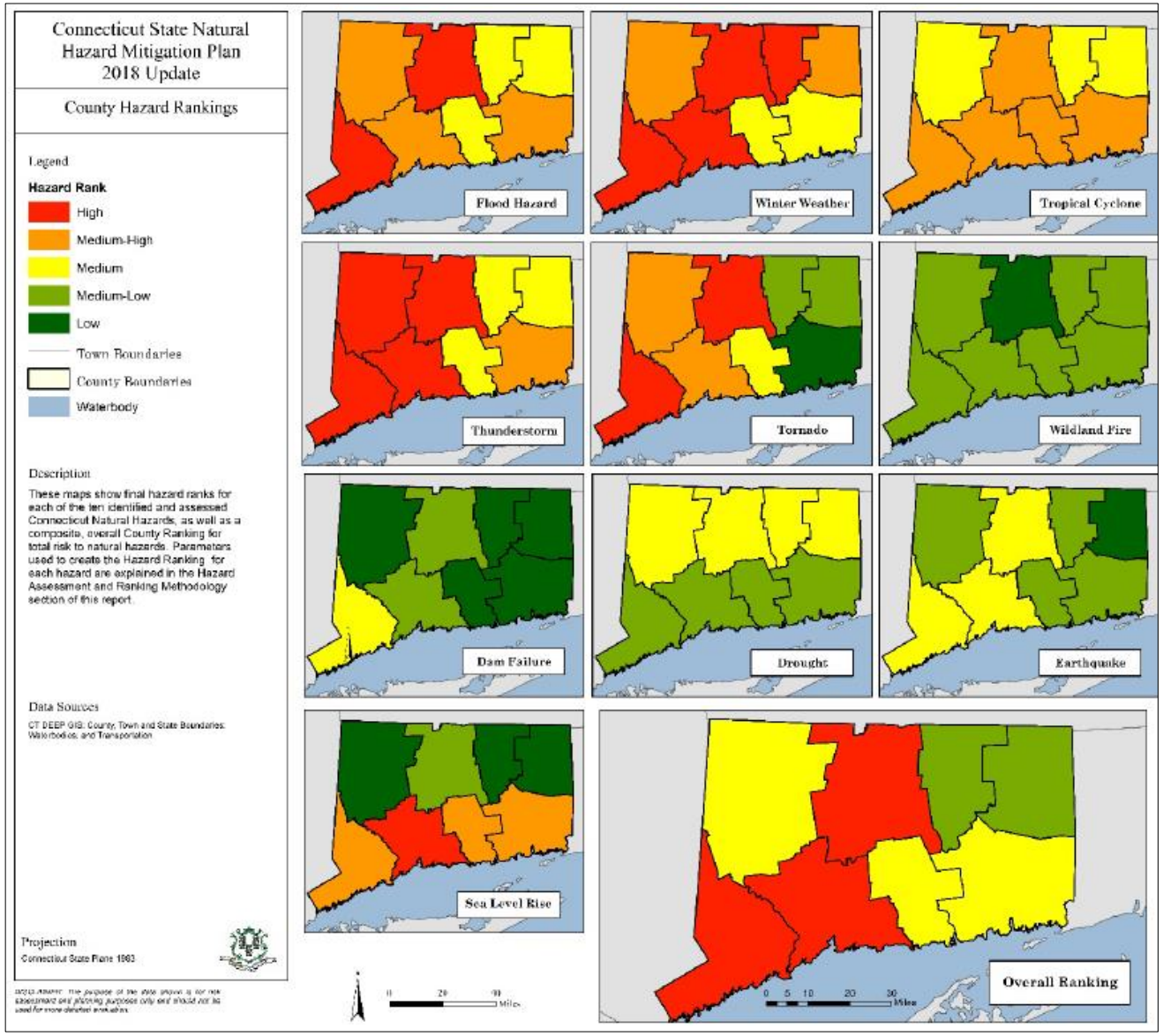


Risk Assessment Results

Significant Natural Hazards – 2019 State Plan Update

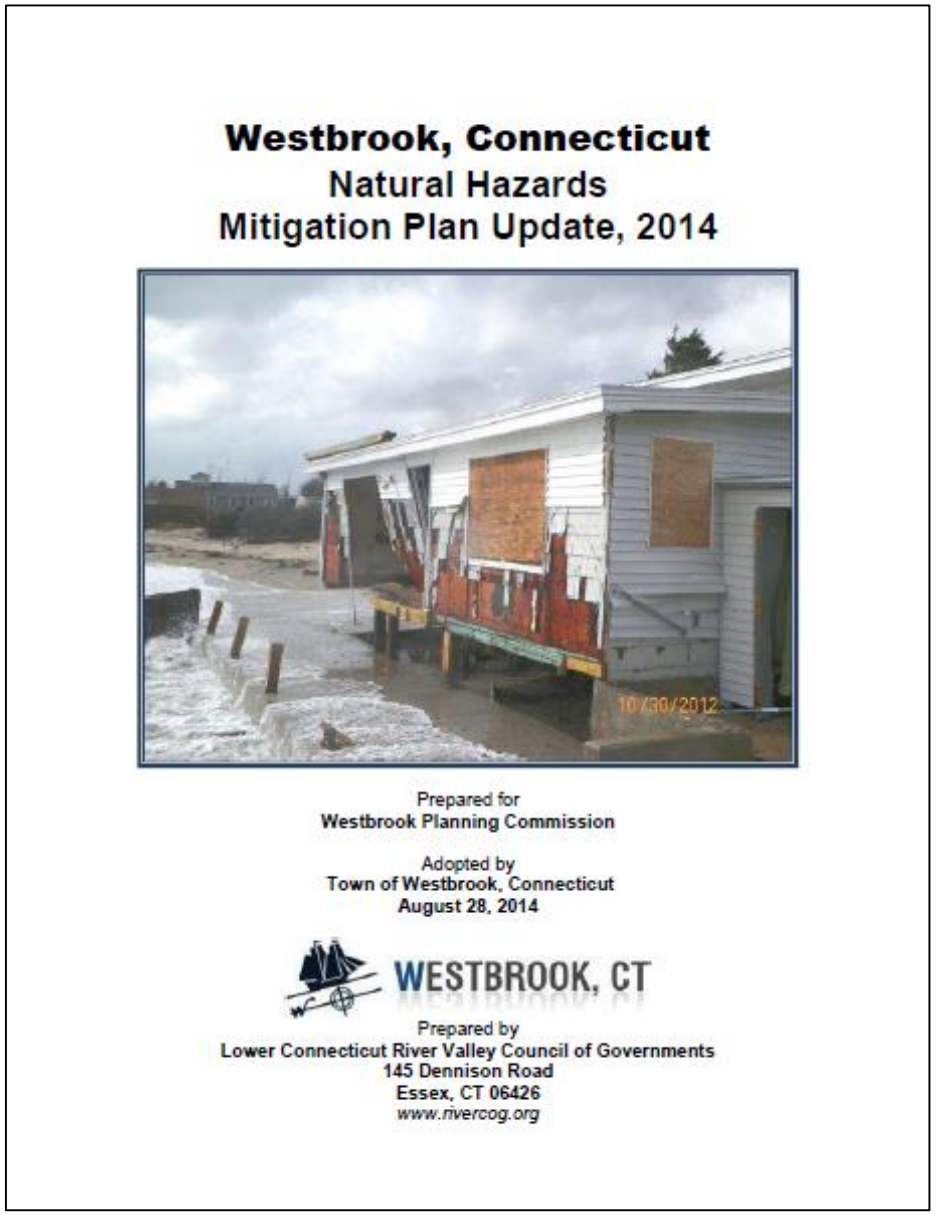
Top-ranked hazards include:

- Tropical Cyclone (Hurricane and Tropical Storm)- MH
- Sea Level Rise - MH
- Thunderstorm-Related Hazards – MH
- Flood Related Hazards - M
- Winter Weather - M
- Drought - ML
- Wildland Fire - ML
- Earthquake - ML
- Dam Failure - L
- Tornado - L



2014 Plan Natural Hazard Categories

- ✓ Flooding
- ✓ High Wind & Tornado
- ✓ Drought
- ✓ Winter Storms
- ✓ Earthquake
- ✓ Hurricane & Tropical Storm
- ✓ Summer Storm
- ✓ Wildfire
- ✓ Tsunami



GZA Plan Natural Hazard Classification and Ranking

1. Likelihood/Frequency
2. Severity/Magnitude
3. Impact Area

Natural Hazard Characterization and Ranking

Frequency:

Very Low: Events that occur less frequently than once in 1,000 years (less than 0.1% per year).

Low: Events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year)

Medium: Events that occur from once in 10 years to once in 100 years (1% to 10% per year).

High: Events that occur more frequently than once in 10 years (greater than 10% per year).

Natural Hazard Characterization and Ranking

Severity:

Minor: Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e., 1 or 2 communities); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.

Serious: Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services are briefly interrupted; some injuries and/or fatalities.

Extensive: Consistent major property damage; major damage to public infrastructure (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and fatalities.

Catastrophic: Property and public infrastructure destroyed; essential services stopped, thousands of injuries and fatalities.

Natural Hazard Characterization and Ranking

Likelihood/Frequency		
Point Value	Category	Characteristics and Frequency
1	Very Low	Events that occur or are exceeded less often than once in 100 years (less than 1% probability)
2	Low	Events that occur or are exceeded from once in 50 years to once in 100 years (1% to 2% probability)
3	Medium	Events that occur or are exceeded from once in 5 years to once in 50 years (2% to 20% probability)
4	High	Events that occur or are exceeded more frequently than once in 5 years (greater than 20% probability)
Severity/Magnitude		
Point Value	Category	Characteristics
1	Minor	Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e., 1 or 2 communities); essential services (utilities, hospitals, schools, etc.) not interrupted; no injuries or fatalities.
2	Serious	Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services are briefly interrupted; some injuries and/or fatalities.
3	Extensive	Consistent major property damage; major damage to public infrastructure (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and fatalities.
4	Catastrophic	Property and public infrastructure destroyed; essential or lifeline services stopped, thousands of injuries and fatalities.
Impact Area Assessment		
Point Value	Category	Characteristics
1	Small	In localized, unpopulated or lightly areas of Town, without structures or critical facilities
2	Medium	Impacting only portions of the Town
3	Large	Town-wide and/or essential and lifeline facilities

Plan Update Hazards Rankings

- 19 natural hazards identified as applicable to Town
- Four hazard categories:
  - ✓ Severe Weather Hazards
  - ✓ Climate-Related Hazards
  - ✓ Geologic Hazards
  - ✓ Secondary Hazards

Severe Weather Hazards:	**Rank**
Severe Wind:	
Hurricanes/Tropical Storms/Nor'easter	3
Thunderstorms	6
Tornadoes	5
Lightning	8
Intense Rainfall	5
Hail	7
Flood:	
Storm Surge	1
Sea Level Rise	2
Urban Drainage Flooding	5
Riverine Flooding	4
Severe Winter Weather	
Snowfall	4
Ice Storms	6
Climate-Related Hazards:	
Extreme Temperature:	
Heat	8
Cold	8
Drought	7
Wildfire	9
Geologic Hazards:	
Earthquake	7
Landslides	0
Tsunami	0
Secondary Hazard:	
Dam Failure	4

Top-Ranked Town Hazards

1. Flooding due to coastal storms 
2. Sea Level Rise 
3. Hurricanes/Tropical Storm/Nor'easters (Severe Wind) 
4. Severe Winter Weather 

Example – Severe Wind

Nor'easters, Tropical Storms and Hurricanes

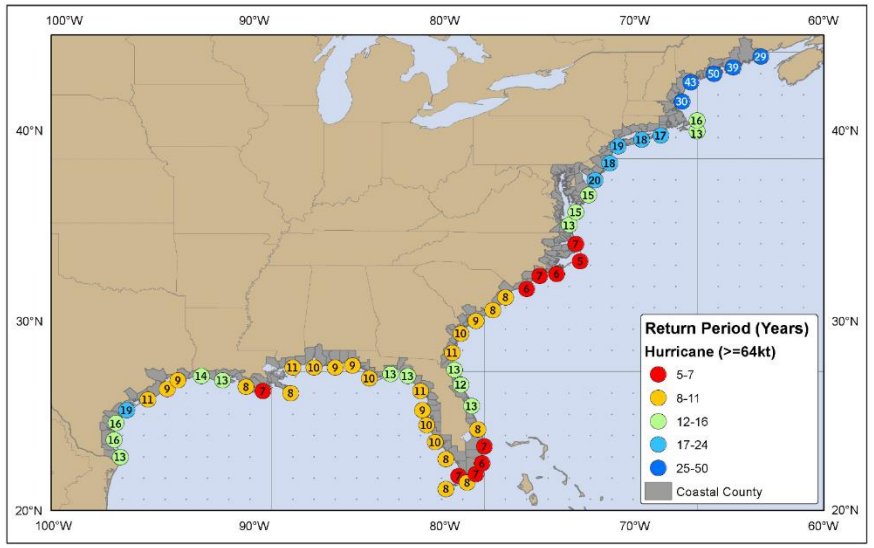
Tornadoes

Thunderstorms: macrobursts and microbursts

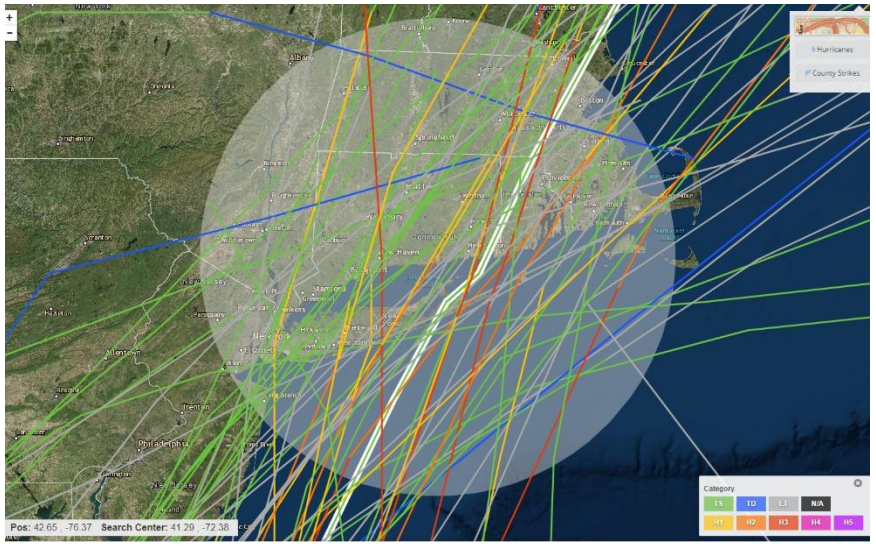
Example – Severe Wind

- **Wind Advisory**: 1) sustained winds of 31 to 39 mph for an hour or more; and/or 2) wind gusts of 46 to 57 mph for any duration.
- **High Wind Watch/Warning**: 1) sustained winds of 40 mph for one hour or more; or 2) wind gusts of 58 mph or higher for any duration.
- **Hurricane Warning**: sustained winds of 74 mph or higher or frequent (for more than 2 hours) gusts of 74 mph or greater associated with a tropical cyclone.
- **Extreme Wind:** 1) surface winds of 115 mph or greater associated with a derecho or sustained hurricane winds.

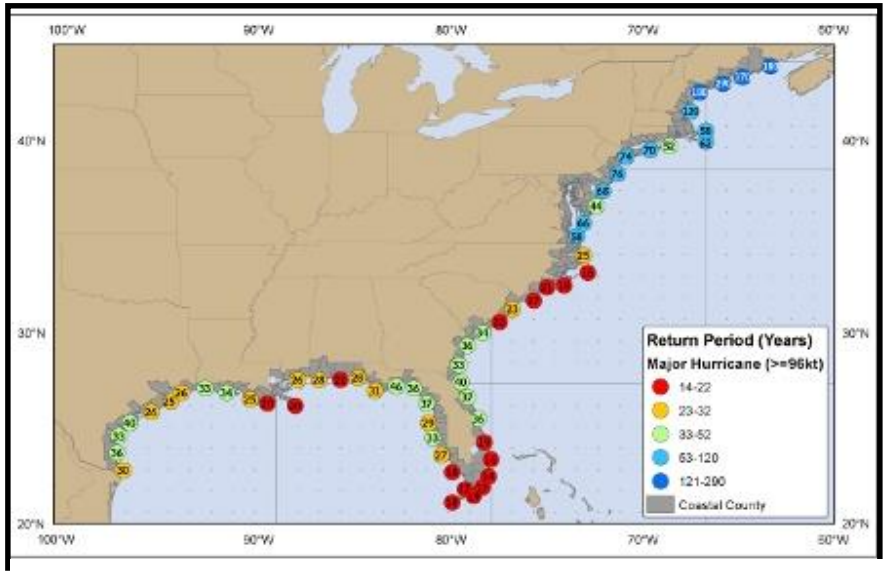
Example – Severe Wind (Hurricanes and Tropical Storms)



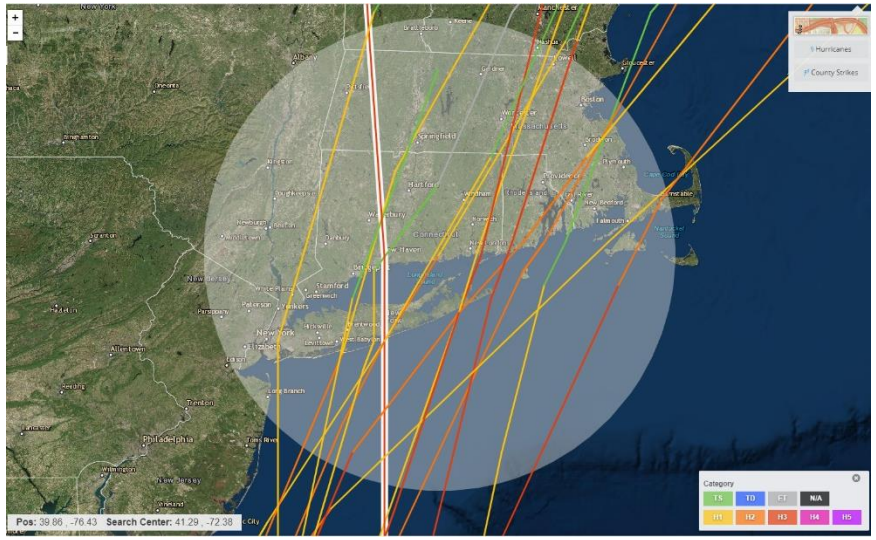
Hurricane Recurrence Interval – All Hurricanes



Hurricanes and Tropical Storms within 100 miles of Westbrook



Hurricane Recurrence Interval – Major Hurricanes



Hurricanes within 100 miles of Westbrook

Example – Severe Wind

Town of Westbrook Natural Hazard Mitigation Plan Update

Natural Hazard	Likelihood/Frequency	Severity/Magnitude	Impact Area
SEVERE WEATHER HAZARDS			
Severe Wind:			
Hurricanes/Tropical Storms/ Nor'easters	• High Wind Warning (>40mph): +/- 100% AEP (1-year recurrence interval); **High**	Minor	Town-wide
	• Hurricane Wind Warning (>74mph): 1% AEP (100-year recurrence interval); **Medium to Low**	Extensive	
	• Extreme Wind Warning (>115 mph) <0.2% AEP (>500-year recurrence interval); **Very Low**	Catastrophic	
Thunderstorms (wind >58 mph)	• Within Middlesex County: 56% AEP or minimum of 1-year to 2-year recurrence interval (29 years with 1 or more events over 52 years); Probability of occurrence within Westbrook is likely lower; **Medium to High**	Minor	Town-wide or portions of Town
Tornadoes			
	• Tornadoes within Middlesex County: 12% AEP or 8-year recurrence interval (8 years with 1 or more events over 68 years); **Medium**		
	• Major tornado within Middlesex County: 1.5% AEP or 70-year recurrence interval; **Low**	Serious to Catastrophic	Town-wide or portions of Town
	• Based on the proportional land area, the Westbrook tornado AEP is about 0.2% and the Westbrook major tornado AEP is very low (less than 0.2%). **Very Low**		

Strategies and Actions

Hazard Mitigation Strategies & Actions

Mitigation Strategy Approach

1. Hazard Risk Mitigation Goals

2. Hazard Mitigation Implementation and Progress

3. Existing Hazard Mitigation Capabilities

4. Hazard Risk Mitigation Measures/Actions

2019 Plan Update **Goals**

1. Reduction or elimination of injury to or loss of life and property, loss of natural environments, the associated economic impacts from natural hazards
2. Promote Implementation of sound Floodplain Management and Other Natural Hazard Mitigation Principals on a Local Level;
3. Implementation of Effective Natural Hazard Mitigation Projects on a Local Level
4. Increase Research and Planning Activities for the Mitigation of Natural Hazards on a Local Level
5. Increase and Promote Response Preparedness

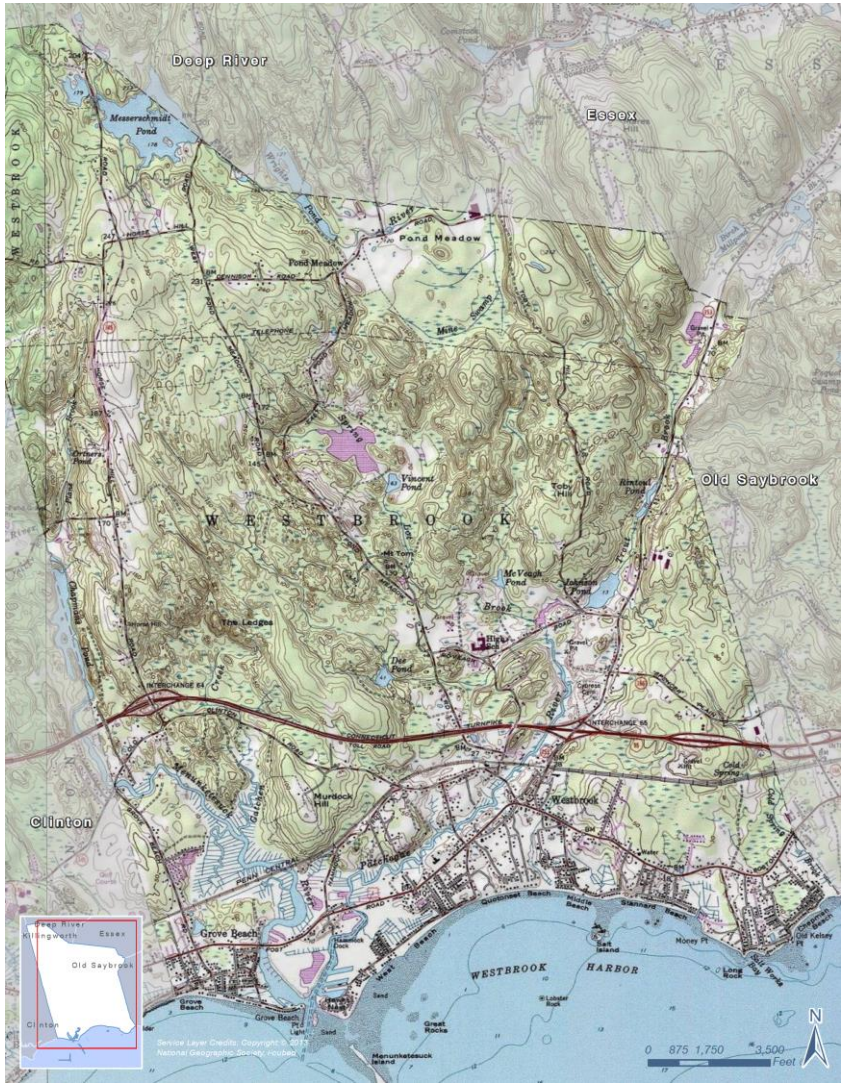
2014 to 2019 Hazard Mitigation **Accomplishments**

Natural Hazard Mitigation Plan Implementation, Maintenance & Review

- ✓ The Town's lead agencies report on implementation of the Plan throughout its annual report.
- ✓ 5-Year Review and 2019 Plan Update.
- ✓ Participated in annual updates to the 5-year capital improvement programs at the State, Regional and municipal levels that resulted in funding hazard mitigation actions.

Planning & Regulatory Standards

- ✓ Maintained, and strengthened (as needed), subdivision and zoning regulations to make safer new roads, lots and structures to natural hazards (NHs) such as flooding, wind-related hazards, etc..
- ✓ Evaluated land use proposals within the Coastal Boundary for consistency with the CT Coastal Management Act.



2014 to 2019 Hazard Mitigation **Accomplishments**

Information Systems, Data Management & Analysis

- ✓ Completed an inventory of storm water catch basins and outfalls in the MS4 area as a part of the asset management program to facilitate maintenance of stormwater systems, develop estimates for upgrades and assess repair costs in the event of damage from NHs.
- ✓ Upgraded existing Permitting Tracking System to enable collection of data regarding development activities in Flood Hazard Areas.
- ✓ Converted paper records maintained by the Land Use Dept. to an electronic format, consistent with any State recommendations.
- ✓ Required structural engineering reports for expansion or alteration of buildings within the V zone from 2014 to 2019.

2014 to 2019 Hazard Mitigation **Accomplishments**

Physical & Infrastructure Improvements

- ✓ Completed the replacement of the Winthrop Rd. Bridge in 2017.
- ✓ Evaluated the Old Mail Trail, Grove Beach Rd. S, Riverview, Menunketesuck, Elm Ave. and other town locations

Natural Systems Protection Improvements

- ✓ AQUIFER RECHARGE: Continued to protect areas of high groundwater recharge potential as identified in the Recharge Mapping Study.
- ✓ Promoted the implementation of riparian buffers for existing and new waterfront development utilizing the Coastal Riparian Landscaping Guide for Long Island Sound

2014 to 2019 Hazard Mitigation **Accomplishments**

Public Information and Outreach

- ✓ OEM WEBPAGE/FACEBOOK/TWITTER: Continued to maintain and update the OEM website and Facebook page with Natural Hazard Preparedness & Recovery Information.
- ✓ ON-LINE MAPPING: The Town continued to publicize the availability of GIS hazard mapping on the town website.

Actions to Reduce Risk and Minimize Impacts During NH Events

- ✓ GROUP HOMES DISASTER PLANS: Westbrook continued to work with Group Homes and other facilities housing populations with unique vulnerabilities.
- ✓ FIREFIGHTER TRAINING AND EDUCATION: The Westbrook Fire Department completed annual training and education of firefighters for brush and forest fires, with consideration for large areas of phragmites.

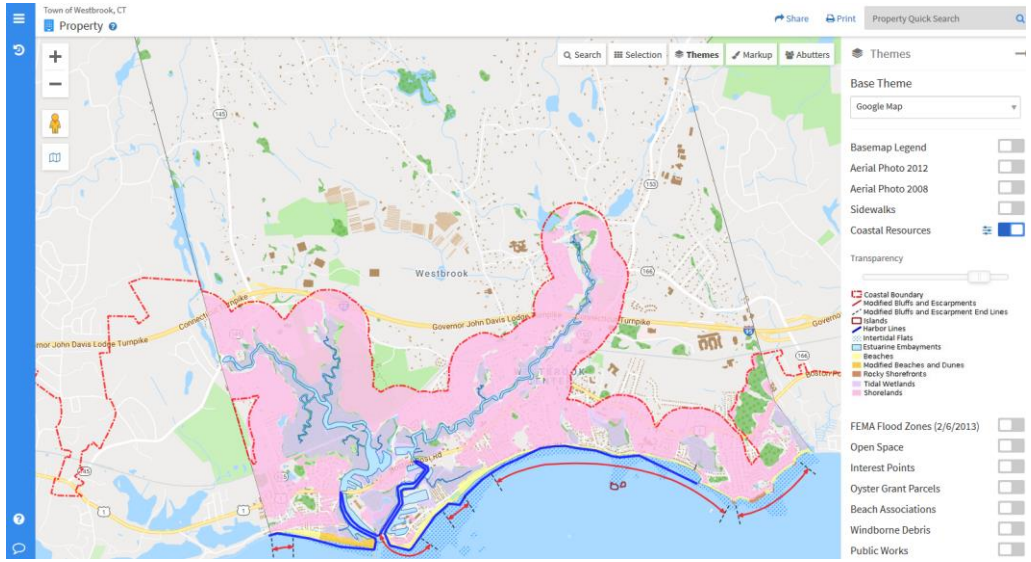
Updated Town Hazard Mitigation **Capabilities**

26 EXISTING PROGRAMS IN PLACE

- Highlights:
  - General Multiple Hazards
    - ❑ 12 Mitigation Capabilities
  - Severe Weather Hazards - Flood Related Hazards
    - ❑ 8 Mitigation Capabilities
  - Severe Weather Hazards – Severe Wind, Snowfall and Ice Storms
    - ❑ 3 Mitigation Capabilities
  - Climate Related Hazards – Fire Related Hazards -
    - ❑ 3 Mitigation Capabilities

Multiple Hazards Mitigation **Capabilities**

- ✓ Design Standards (i.e. enforcement of State Building & Fire Codes)
- ✓ Local Emergency Operations Plan
- ✓ Land Use Regulations: Subdivision and Zoning Regulations
- ✓ Emergency Management Public Notifications
- ✓ Emergency Generators
- ✓ Group Homes Permitting
- ✓ Geographic Information Systems
- ✓ Electronic & Paper Records Preservation



Severe Weather Hazards: Flood Related Hazards Mitigation **Capabilities**

- ✓ Participation in the National Flood Insurance Program (NFIP)
- ✓ Dam Emergency Action Plans
- ✓ Design Standards (Flood Regulatory Enforcement)
- ✓ Stormwater Management
- ✓ Water Quality Monitoring
- ✓ Street Sweeping and Leaf Removal

Coastal Flooding at Grove Beach
image from #Stormhour @ryanhanrahan @RachelFrank_CT @KaitMcGrathNBC @gilsimmons/

Severe Weather Hazards: Wind and Winter Weather Mitigation **Capabilities**

- ✓ Mandatory Wind Code Compliance
- ✓ Tree Trimming
- ✓ Roadway Treatments

Climate Related Hazards: Fire Related Hazards Mitigation **Capabilities**

- ✓ Permits Required for Outdoor Burning
- ✓ Fire Hydrant Regulations
- ✓ Subdivision Review

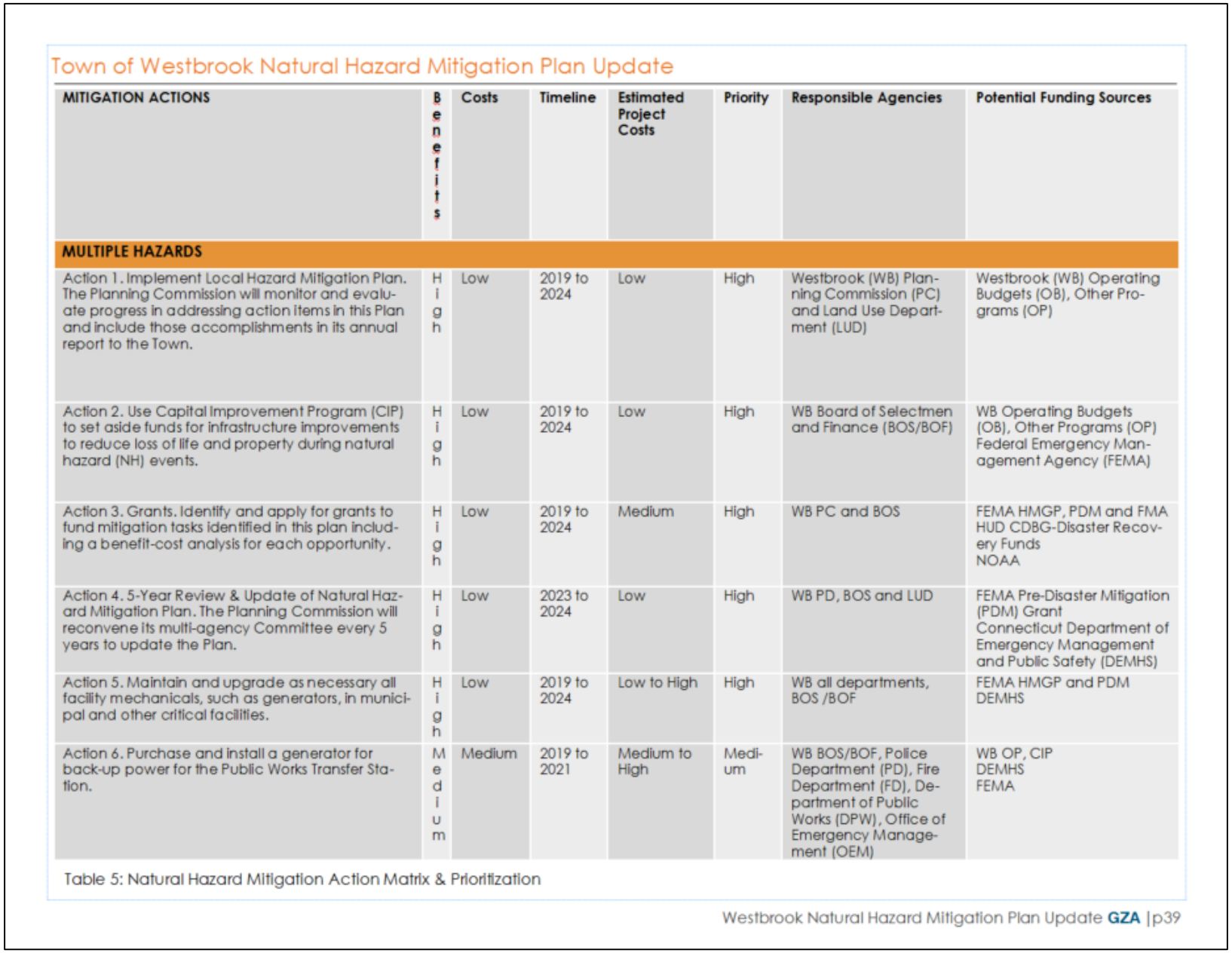
Mitigation Actions **Approach**

1) Identified and integrated ongoing and yet to be completed actions from 2014 HMP Update
2) Focused development of new actions on top ranked hazards
3) Conducted a Benefit/Cost Review to Prioritize Actions
4) Proposed Estimated Timeline for Implementation
5) Prepared Planning Level Estimated Project Costs
6) Identified Responsible Department(s) for Town
7) Identified Potential Funding Sources

2014 Mitigation **Actions**

	Figure 29: Comprehensive Mitigation Action Items[1,2]	Category*	Natural Hazards: Flooding	High Wind & Tornado	Drought and Wildfire	Winter Storm	Earthquake	Hurricane	Sea Level Rise	Tsunami	Heat Wave	Status	Responsible Party**[4,5]	Schedule: A. Daily B. Monthly C. Annually D. 2013-2016 E. 2017-2019	Cost*	Possible Funding Source*** (where applicable)	Weighted STAPLEE Criteria: Costs (0)/ Benefits (1): Social	Technical	Administrative	Political	Legal	Economic	Environmental	STAPLEE Total
	Aquifer Recharge. Continue to protect areas of high groundwater recharge potential as identified in the Recharge Mapping Study conducted by Wesleyan through open space acquisition and minimization of impervious surfaces.	3	x		x			x				Enforced through Water Resource District Zoning & Stormwater Mgmt. regulations	CC, ZC, PC	A	$	HMGP, PDM, FMA, CIP	1	1	1	1	1	1	1	7
	Marsh Migration. Identify areas where tidal marshes are likely to advance upslope as sea levels continue to rise and develop conservation strategy.	2	x			x		x	x			New	CC, PC	D	$	HMGP, PDM, FMA, RFLP, CIP	1	0	1	1	1	1	1	6
	Shore Protection Systems. Conduct a study of existing shore protection systems along the entire Westbrook coast to analyze overall impacts and develop recommendations for mitigation including identification of opportunities for compensation for the hardening of one part of the shoreline by removing the equivalent extent of flood and erosion control structures from another part of the shoreline.	1	x			x		x	x			New	BOS, CC, HC, DPW, TE	D	$$	HMGP, PDM, FMA, RFLP, CIP	1	1	1	1	1	1	1	7
	5. Physical and Infrastructure Improvements																							
	Stormwater Maintenance. Continue to provide for annual maintenance of stormwater infrastructure, including catch basins, detention basins and outfalls.	2	x			x		x	x			Catch basins maintained annually	BOS/BOF, DPW	C	$$	OB	1	1	1	1	1	1	1	7
	Emergency Generators. Assess the adequacy of emergency generators in all critical facilities including private telecommunication towers and gas stations. Make upgrades as necessary.	1	x	x	x	x	x	x	x	x	x	New	BOS/BOF, BOE, OEM	D	$$$	HMGP	1	1	1	1	1	0	1	5
R	**MicroGrid.** Investigate feasibility of linking critical facilities (i.e. gas station, grocery store, emergency shelter, hospital, public safety).	1	x	x		x	x	x		x	x	New	EC, TE, OEM	D	$	HMGP, CIP, OP	1		0	0	1	0	1	3
	Culvert Capacity. Assess existing culvert capacity for extreme precipitation events and develop plan for upgrades.	1	x					x	x			New	BOS/BOF, DPW, TE	D	$$	HMGP, CIP, STIP	1	0	1	1	1	0	1	5
	SFHA Structure Inventory. Conduct an inventory of the elevation of all homes (including basements and crawl spaces as defined in Sect. 5 of Zoning Regs.) in the special flood hazard area with relation to base flood elevation to assess the need for mitigation and develop program to address.	2	x					x	x			New	PC, LUD, TE	D	$$	HMGP, FMA, PDM, RLP	0	0	1	0	1	0	1	3
	Road Evaluation. Evaluate the following roads to develop plans for improvement or elevation for emergency access and evacuation in flood conditions.	1	x					x	x			New	BOS/BOF, DPW, OEM, TE	D+E	$$$	HMGP, LOCIP, STIP, RTP	1	1	1	1	1	0	1	6

Coastal Community Resiliency and Climate Adaptation Study **Actions**



Town of Westbrook Natural Hazard Mitigation Plan Update

MITIGATION ACTIONS	Benefits	Costs	Timeline	Estimated Project Costs	Priority	Responsible Agencies	Potential Funding Sources
MULTIPLE HAZARDS							
Action 1. Implement Local Hazard Mitigation Plan. The Planning Commission will monitor and evaluate progress in addressing action items in this Plan and include those accomplishments in its annual report to the Town.	High	Low	2019 to 2024	Low	High	Westbrook (WB) Planning Commission (PC) and Land Use Department (LUD)	Westbrook (WB) Operating Budgets (OB), Other Programs (OP)
Action 2. Use Capital Improvement Program (CIP) to set aside funds for infrastructure improvements to reduce loss of life and property during natural hazard (NH) events.	High	Low	2019 to 2024	Low	High	WB Board of Selectmen and Finance (BOS/BOF)	WB Operating Budgets (OB), Other Programs (OP) Federal Emergency Management Agency (FEMA)
Action 3. Grants. Identify and apply for grants to fund mitigation tasks identified in this plan including a benefit-cost analysis for each opportunity.	High	Low	2019 to 2024	Medium	High	WB PC and BOS	FEMA HMGP, PDM and FMA HUD CDBG-Disaster Recovery Funds NOAA
Action 4. 5-Year Review & Update of Natural Hazard Mitigation Plan. The Planning Commission will reconvene its multi-agency Committee every 5 years to update the Plan.	High	Low	2023 to 2024	Low	High	WB PD, BOS and LUD	FEMA Pre-Disaster Mitigation (PDM) Grant Connecticut Department of Emergency Management and Public Safety (DEMHS)
Action 5. Maintain and upgrade as necessary all facility mechanicals, such as generators, in municipal and other critical facilities.	High	Low	2019 to 2024	Low to High	High	WB all departments, BOS /BOF	FEMA HMGP and PDM DEMHS
Action 6. Purchase and install a generator for back-up power for the Public Works Transfer Station.	Medium	Medium	2019 to 2021	Medium to High	Medium	WB BOS/BOF, Police Department (PD), Fire Department (FD), Department of Public Works (DPW), Office of Emergency Management (OEM)	WB OP, CIP DEMHS FEMA

Table 5: Natural Hazard Mitigation Action Matrix & Prioritization

Westbrook Natural Hazard Mitigation Plan Update **GZA** |p39

Plan Update Mitigation and Resilience **Actions**

65+ mitigation actions:

- 30 Multiple Hazards Actions
  - 15 High Priority Actions
- 20 Flood-Related Hazards Actions
  - 13 High Priority Actions
- 12 Sea Level Rise Hazards Actions
  - 8 High Priority Actions
- 3 Secondary Hazards: Dam Failure
  - 3 High Priority
- 8 Climate Related Hazards: Drought, Wildfire & Extreme Temperatures
  - 6 High Priority Actions
- 2 Severe Winter Weather
  - 1 High Priority Action

Multiple Hazards **High Priority Actions**

- ✓ **Local Hazard Mitigation Plan**: The BOS/BOF will monitor and evaluate progress in implementing action items in this Plan and include those accomplishments in its annual report to the Town.
- ✓ **5-Year Review & Update of Natural Hazard Mitigation Plan**
- ✓ **Maintain and upgrade as necessary for all facility mechanicals, such as generators, in municipal and other critical facilities.**
- ✓ **Keep up-to-date inventory of town assets** in the Town's comprehensive GIS database including asset categories outlined in this 2019 NHMP Update.

Multiple Hazards **High Priority Actions**

- ✓ **Capital Improvement Program (CIP)**: Set aside funds for infrastructure improvements to re-duce loss of life and property during natural hazard (NH) events.
- ✓ **Grant Application and Administration Plan (GAAP):** Prepare detailed application plan for grant opportunities, including FEMA Hazard Mitigation Grant, USACE, NOAA, HUD, CIRCA, DOT, DECD and EPA programs. Initiate grant applications.
- ✓ **Recovery and Reconstruction Plan**: Prepare a post-disaster recovery and reconstruction plan to re-establish infrastructure and public services, etc. damaged or destroyed by any NH event, including establishment of a "rainy day" fund in case Federal assistance is insufficient or delayed.

Multiple Hazards **High Priority Actions**

- ✓ Establish a **Disaster Recovery and Reconstruction Rainy Day Fund** in case federal disaster assistance funding is not sufficient or delayed.
- ✓ **Multi-Hazard Public Awareness Program.** Develop and implement a multi-hazard public awareness program. Provide information on all types of hazards, preparedness and mitigation measures, responses during hazard events and financial assistance programs.

Multiple Hazards **High Priority Actions**

- ✓ **Education and Outreach to residents and community stakeholders to:**

  1) promote owner participation in mitigation efforts to protect their property;

  2) educate public on how the Town uses conservation planning, regulations to mitigation natural and climate related hazards;

  3) educate residents and community stakeholders at high risk to impacts from natural hazards on the hazards relative to where they live.

Multiple Hazards **High Priority Actions**

- ✓ **Tenant Notification:** Develop a mechanism for tenants to register for disaster notifications.
- ✓ **Conduct Natural Hazard Mitigation Training on an annual basis.**
- ✓ **Immobile Evacuees Planning**: Review annually the program to evacuate persons without means of transportation, including registration and house numbering.
- ✓ Conduct a **municipal buildings capabilities assessment**. The purpose of the assessment will be to identify buildings for future investment for renovation or new construction to ensure the candidate buildings are in compliance with standards for use as a shelter.

Flood Related Hazards **High Priority Actions**

- ✓ **Continue to participate in National Flood Insurance Program (NFIP)** (or other) training offered by the State and/or FEMA that ad-dresses flood hazard planning and management.
- ✓ Participate in **reviews of regulatory floodplain maps updates** and revisions.
- ✓ Obtain **updated aerial imagery** and planimetric data in order to allow for assessment of such factors as extent of damage from NHs, compliance with building standards, identification of shoreline hardening and shoreline erosion and accretion.
- ✓ **Encourage Repetitive Loss Property Owners to pursue flood mitigation funding** for actions such as elevation or acquisition of structures where appropriate on a voluntary basis.

Flood Related Hazards **High Priority Actions**

- ✓ **Town Beach Dune Restoration.** Evaluate potential alternatives for the restoration of dunes along West Beach to develop a range of solutions that will renew the coastal beach and dune system, provide storm damage protection for local residents, increase flood control for adjacent properties, and restore an important Town resource.
- ✓ **Patchogue & Menunketesuck River Mitigation Plan.** Develop and implement mitigation plans for previously identified nutrient and sediment nonpoint source pollution sites to reduce vulnerability to coastal storms, sea level rise, flooding, and erosion.
- ✓ **Shore Protection and Dune Restoration Systems.** Conduct a study of existing shore protection systems along the entire Westbrook coast to analyze overall impacts and develop recommendations for mitigation including identification of opportunities for compensation for the hardening of one part of the shoreline by removing the equivalent extent of flood and erosion control structures from another part of the shoreline.

Flood Related Hazards **High Priority Actions**

- ✓ **Floodplain Management Studies.** Update Floodplain Management studies for Patchogue River, Town Center and Cold Springs Brook Watersheds.
- ✓ **Road Evaluation:** Evaluate roads to develop plans for improvement or elevation for emergency access and evacuation.
- ✓ **Develop conceptual plans and prioritization for pursuing engineering, design and construction funding of roadways** identified in the 2014 Plan Update.

Flood Related Hazards **High Priority Actions**

- ✓ **Repetitive Loss Area Analysis (RLAA).** Many repetitive loss (RL) structures have been demolished and rebuilt or elevated to higher standards than minimum FEMA requirements. Based on this ex-tensive and successful effort by the Town and residents, it is recommended to perform a formal RLAA to identify the impact to Town's NFIP insurance rate due to repetitive loss. The results from the RLLA will help further support Town and property owner resilience and mitigation activities, including acquiring, relocating and/or flood mitigation of RL properties.
- ✓ **STORMWATER. Analyze the existing stormwater infrastructure under precipitation only and combined coastal flood-precipitation events.** This data is necessary to comprehensively characterize the Town's flood risk and to identify the need for additional catch basins/pump stations/additional tide gates/green infrastructure.

Sea-Level-Rise Hazards **High Priority Actions**

- ✓ **Sea Level Rise.** Seek grants funds or collaborate with an academic institution to research and study the social, economic, environmental and policy-related impacts from SLR.
- ✓ Prepare a **Coastal Community Resilience and Climate Adaptation Study**.
  - ✓ Include development of a **roadway improvement plan** that includes a strategy of improving the portions of key roads that are subject to chronic and high probability floods in the near-term.
  - ✓ Include a **Marsh Migration Analysis** to Identify areas where tidal marshes are likely to advance upslope as sea levels continue to rise and develop conservation strategy.

Sea-Level-Rise Hazards **High Priority Actions**

- ✓ NATIONAL FLOOD INSURANCE PROGRAM (NFIP). Until FEMA changes their mapping guidelines to address sea level rise, provide residents with **Town-specific flood hazard maps** reflecting sea level rise projections for 2050 and 2100, in line with the State of Connecticut.
- ✓ Every 10-years, update future coastal flood risk overlay maps and sea level rise projections.

Sea Level Rise Hazards **High Priority Actions**

- ✓ **Develop program to evaluate and maintain existing groins and sea walls.**
- ✓ Evaluate of the technical **feasibility of constructing dunes and berms** into the plan.
- ✓ **Coordinate with USACE relative to pro-posed, future dredge projects and re-use of dredge materials for Town beach nourishment, salt marsh maintenance and restoration projects.**
- ✓ **Barrier Island Stabilization/Restoration.** Develop and implement plans, in cooperation with local, state and federal landowners, to stabilize and restore Westbrook's three barrier islands; Salt Island (local), Duck Island (CTDEEP) and Menunketesuck Island (USFW).
- ✓ **Salt Island Overlook Habitat Restoration -** Develop & Implement Forest Tree Planting Plan for Salt Island Overlook to restore a coastal forest habitat and increase coastal storm resiliency.

Hurricane-Wind Hazards **High Priority Actions**

- ✓ **Debris Management Plan.** Develop plan to facilitate and coordinate the removal, collection, and disposal of debris following a disaster, to mitigate against any potential threat to the health, safety, and welfare of the impacted citizens, expedite recovery efforts in the impacted area, and address any threat of significant damage to improved public or private property.
- ✓ **Boats.** Identify places where people could store their boats during flooding and hurricane events that would reduce the damages.

Secondary Hazards: Dam Failure **High Priority Actions**

- ✓ **Dam Owners responsible for review and update of Emergency Action Plans (EAP) and Maintenance and Operations Plans** for the 3 High Hazard Dams per state requirements to ensure the plans are up to date & have protocols in place to maintain safe operations of the Dams.
- ✓ **Per the EM emergency operations plan** assess downstream risks due to catastrophic failure.

Climate Related Hazards **High Priority Actions**

DROUGHTS

- ✓ **Coordinate with the CWC on public education and public service** announcements in anticipation of and during times of drought.

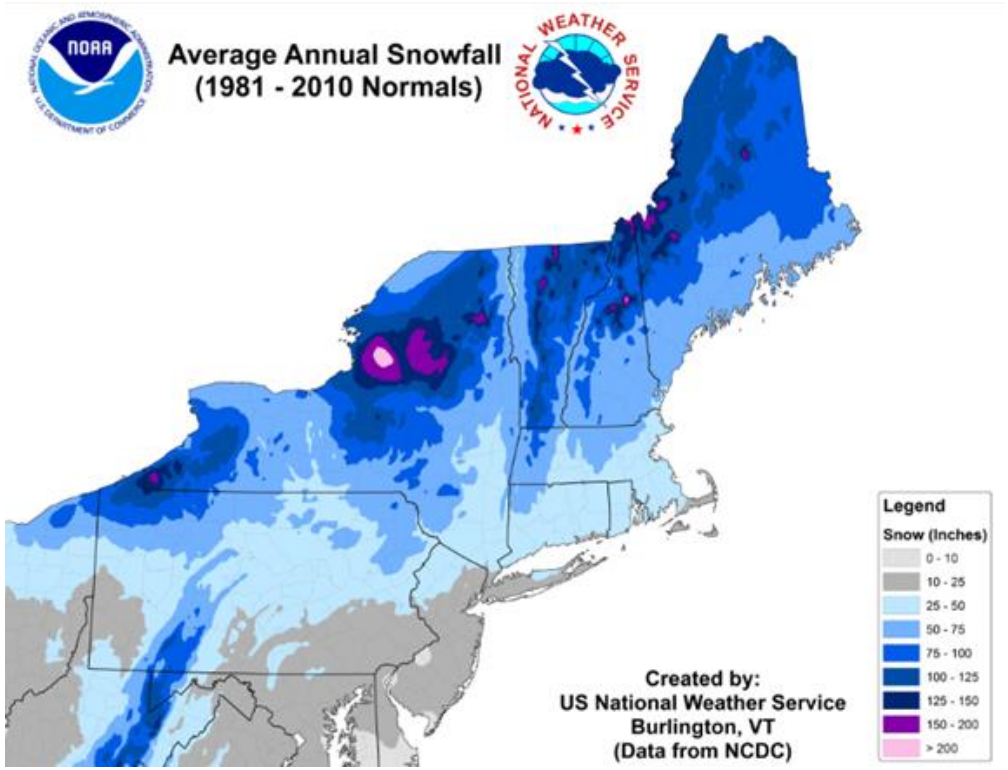
Climate Related Hazards **High Priority Actions**

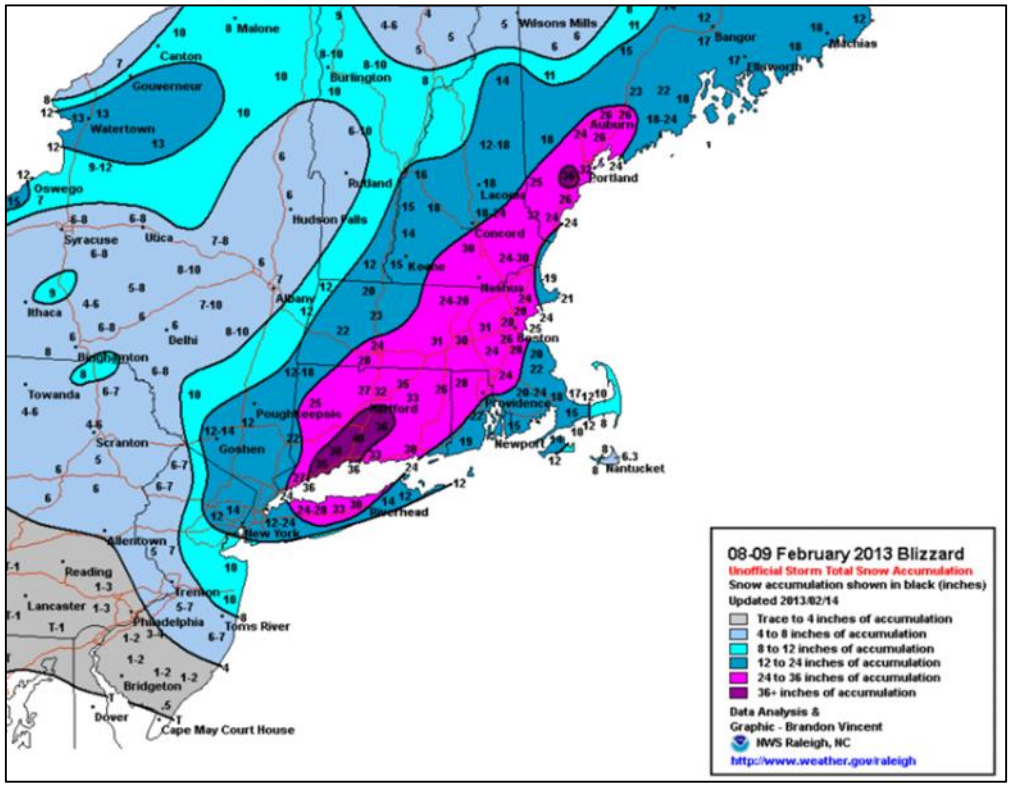
WILDFIRE

- ✓ **Firefighting Infrastructure Analysis**: Evaluate existing firefighting infrastructure to identify needs for improvement to cover gaps in availability.
- ✓ **Forest Management Plans.** Include provisions in existing and future forest management plans to provide emergency access to fire-fighters in the event of wildfires in Town-owned Open Space.
- ✓ **Wildfire Management Plan. Evaluate and consider development** a wildfire management plan and protocol.

Severe Winter Hazards **High Priority Actions**

- ✓ **Maintain adequate supply of sand, salt and other road treatment materials.**





Federal **Funding Opportunities**

- **FEMA Hazard Mitigation Assistance Grants**
  - Hazard Mitigation Grant Program (HMGP)
    - **DR-4385 & 4410 - $275k**
  - Flood Mitigation Assistance (FMA)
    - **FY18- $160 Million**
  - Pre-Disaster Mitigation (PDM)
    - **FY18- $235 Million**

  https://www.fema.gov/hazard-mitigation-assistance
- **HUD Disaster Recovery and Resiliency Grants**
  - Community Development Block Grant (CDBG) Disaster Recovery

  https://www.hudexchange.info/programs/cdbg-dr/

Hazard Mitigation Assistance Guidance

Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program

February 27, 2015

FEMA

Federal Emergency Management Agency
Department of Homeland Security
500 C Street, S.W.
Washington, DC 20472

Federal **Funding Opportunities**

- **EPA Water Infrastructure Finance and Innovation Act**
  - $6Billion in credit that could finance $12Billion in water infrastructure projects – FY2019
- **NOAA Coastal Resilience Grant Program**
  - $12 Million available annually 2015 to 2017
  - Focus Areas
    - Natural and nature-based infrastructure
    - Post-disaster recovery
    - Assessing risk, prioritizing actions

    https://www.coast.noaa.gov/data/resilience/factsheet-resilience-grants.pdf

State and Additional **Funding Opportunities**

- **Connecticut Resilience Programs**
  - **CIRCA Grants -** $100-$300k annually
    - Municipal Resilience Grant Program
    - https://circa.uconn.edu/funds-muni/
    - Matching Funds Program
    - https://circa.uconn.edu/funds/
  - **Connecticut's Clean Water Fund**
  - **Non-point Source (Section 319) Grant Program**
- **Tax Increment Financing**
- **Local and State Tax Revenue**
- **Resilience Bonds**

Next Steps

Next Steps

1. Provide Draft Plan to Town for Town and Public Review
2. Revise Draft Plan and submit to CT DEMHS/FEMA for review
3. Revise Draft Plan submitted to CT DEMHS/FEMA, as needed
4. Submit Final Plan to CT DEMHS/FEMA for final review, as needed
5. Plan Adoption