

# THE TOWN OF HATFIELD

## NATURAL HAZARD MITIGATION PLAN Update



Adopted by the Hatfield Board of Selectmen on April 26, 2016

**Prepared by:**  
**The Hatfield Natural Hazards Mitigation Planning Committee**

**and**

**The Pioneer Valley Planning Commission**

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## **Acknowledgements**

The Hatfield Board of Selectmen extends special thanks to the Hatfield Natural Hazards Mitigation Planning Committee as follows:

John Pease, Local Emergency Planning Committee (LEPC)

Cindy Doty, Emergency Management Director

Stephen Gaughan, Ambulance

William A Belden, Fire Chief

R. Scott Pomeroy, Animal Control

Jane Betsold, Council on Aging

Charles G. Kellogg, Community member

Ruth Kellogg, Community member

Thomas Osley, Police Chief

Mike Dekoschak, Police

Kerry Flaherty, Board of Health

Marlene Michonski, Town Administrator

Phil Genovese, Director-Department of Public Works

The Hatfield Board of Selectmen offers thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Commonwealth of Massachusetts Natural Hazards Mitigation Plan (<http://www.mass.gov/dcr/stewardship/mitigate/plan.htm>) which served as a model for this plan. In addition, special thanks are extended to the staff of the Pioneer Valley Planning Commission for professional services, process facilitation and preparation of this document.

### **The Pioneer Valley Planning Commission**

**Catherine Ratté, Principal Planner**

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**Cover photo: Sandra Pipczynski**

# 1 –PLANNING PROCESS

## Introduction

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The Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA) define Hazard Mitigation as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc. Mitigation efforts undertaken by communities will help to minimize damages to buildings and infrastructure, such as water supplies, sewers, and utility transmission lines, as well as natural, cultural and historic resources. Planning efforts, like the one undertaken by the Town of Hatfield and the Pioneer Valley Planning Commission, make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that may threaten a community.

Preparing a Local Natural Hazards Mitigation Plan before a disaster occurs can save the community money and will facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the Plan. FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding. For example, the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation Program are programs with this requirement.

## **Hazard Mitigation Planning Committee**

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In 2015, the Town of Hatfield completed an update of their 2007 Hazard Mitigation Plan, in collaboration with the Pioneer Valley Planning Commission. All portions of the plan were reviewed and updated as necessary. Planning for hazard mitigation in Hatfield was undertaken by the Hatfield Local Emergency Planning Committee, which includes the following members:

John Pease, Local Emergency Planning Committee (LEPC)  
Cindy Doty, Emergency Management Director  
Stephen Gaughan, Ambulance  
William A Belden, Fire Chief  
R. Scott Pomeroy, Animal Control  
Jane Betsold, Council on Aging  
Charles G. Kellogg, Community member  
Ruth Kellogg, Community member  
Thomas Osley, Police Chief  
Mike Dekoschak, Police  
Kerry Flaherty, Board of Health  
Marlene Michonski, Town Administrator  
Phil Genovese, Director-Department of Public Works

While not all members were able to attend every meeting, the Town EMD and LEPC Chair, Cindy Doty, kept all members informed of work in between meetings.

### **The Hazard Mitigation planning process for the Town included the following tasks:**

- Reviewing and incorporating existing plans and other information.
- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding.
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages.
- Identifying deficiencies in the current strategies and establishing goals for updating, revising or adopting new strategies.
- Adopting and implementing the final Hazard Mitigation Plan.

The key product of this process was the development of an updated Action Plan with a Prioritized Implementation Schedule.

Detail on how each section of the previous plan was reviewed and revised:

The local Hazard Mitigation committee met six times to review, revise and finalize a draft updated plan prepared by the PVPC staff. Because PVPC has facilitated development of thirty-seven local Hazard Mitigation plans in the region, the staff are familiar with sources of natural hazard mitigation data as well as knowledgeable about mitigation planning and the natural hazard vulnerabilities and capabilities in the region. The committee reviewed and commented upon the whole plan, chapter by chapter, at meetings facilitated by PVPC staff. This committee work was supplemented by individual research, reading and review by committee members in time outside of meetings as well as by some additional municipal staff time (not serving on the committee) who performed additional research, data collection and analysis.

Each meeting includes a detailed agenda, copies of which are included in the Appendix.

### **Agencies that have the authority to regulate development**

Hatfield is a small community with limited professional staff. The entities that have the authority to regulate development include the Select Board, the Planning Board, the Conservation Commission, the Board of Health and the Department of Public Works. The Select Board was apprised of this hazard mitigation planning work by the Town Administrator who served on the committee and who staffs the Select Board. The Planning Board was represented on the hazard mitigation plan committee, and the Local Emergency Planning Committee (LEPC) Chair, who served as Hazard Mitigation Planning Committee Chair, EMD Cindy Doty assured inclusion of all those entities in the plan development process. Their input was integrated into the plan.

In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Hatfield, including state agencies, such as Department of Conservation and Recreation and MassDOT. This regular involvement ensured that during the development of the Hatfield Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan. All the agencies that regulate development in Hatfield are committed to integrating the natural hazard mitigation knowledge and strategies gleaned from this planning process into their work to steward development in Hatfield.

## **Hazard Mitigation Committee Meetings**

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Meetings of the Hazard Mitigation Planning Committee, all of which took place at the Hatfield Public Safety Building (except for the first meeting which took place at Town Hall), were held on the dates listed below. Agendas with copies of the sign in sheets for each meeting are included in Appendix B. After review by MEMA, the Hazard Mitigation Committee met to review and incorporate MEMA feedback.

August 3, 2015  
August 10, 2015  
August 17, 2015

August 24, 2015  
August 31, 2015  
January 4, 2016

While not all members of the Hazard Mitigation Committee were able to attend each meeting, all members collaborated on the plan and were updated on progress by fellow Committee members after meetings occurred as necessary

### **Public Meetings with the Board of Selectmen**

In 2011 the Hatfield Board of Selectmen committed to work with PVPC and MEMA to update the Town's Hazard Mitigation plan. Following review by MEMA and conditional approval by FEMA, the Board of Selectmen voted to adopt this plan update on April 26, 2016.

## **Participation by Public and Neighboring Communities**

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Two public planning sessions were held as part of the development of the Hatfield plan – on Monday August 10 at 7 p.m. and Thursday, September 3 at 7 p.m. The first meeting occurred after two meetings of the local Hazard Mitigation planning committee, and the final public input meeting occurred after the Hazard Mitigation Committee had provided input on hazards and mitigation strategies relevant to the community and had prepared a proposed final draft updated plan. Notice of both public meetings was posted at Hatfield Town Hall in compliance with the Commonwealth of Massachusetts' open meeting law. Public meeting agendas and notices can be found in Appendix A. No public attended either meeting.

On August 27, 2015 the Pioneer Valley Planning Commission sent a press release to all area media outlets to inform the public that a draft of the Hatfield Hazard Mitigation Plan had been placed on PVPC's website. The release also indicated that hard copies were available at PVPC's offices and at Hatfield Town Hall, and that all residents, businesses and other concerned parties of Hatfield and adjacent communities were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or the Town of Hatfield.

Citizens, municipal officials and others from neighboring municipalities were encouraged to comment on Hatfield's plan by e-mailing or calling staff contacts at PVPC or the Town of Hatfield. The Pioneer Valley Planning Commission's regional scope ensured that residents and government officials throughout the Pioneer Valley saw the press release and request for comments. At the same that PVPC was working with the Town of Hatfield on their Hazard Mitigation plan, PVPC staff were also working with numerous other member municipalities, including the neighboring community of Northampton, on their local hazard mitigation plans. Surrounding communities were informed of Hatfield's hazard mitigation planning process and had the opportunity to comment on the draft plan. There was no feedback offered by any surrounding communities to the Town of Hatfield in their local hazard mitigation planning process. And as stated above, no public attended either meeting.

Copies of media releases and the presentation from the first public meeting are in the Appendix. For the second meeting (to which no public came) staff prepared copies of the plan as handouts with highlighted excerpts and the mitigation strategy charts.

A list of media organizations that were sent all press releases is included in Appendix A, which are the television stations, radio stations, and newspapers located in western Massachusetts, northern Connecticut, and southern Vermont.

## **Participation by Stakeholders**

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A variety of stakeholders were provided with an opportunity to be involved in the development of the Hatfield Hazard Mitigation Plan. The different categories of stakeholders that were involved, and the engagement activities that occurred, are described below.

### **Regional agencies involved in hazard mitigation activities**

The Pioneer Valley Planning Commission is a regional planning agency for 43 towns and cities in Massachusetts' Hampden and Hampshire Counties. PVPC regularly engages with the Town of Hatfield as part of its regional planning efforts, which include the following:

- Developing the Pioneer Valley Regional Land Use Plan, Valley Vision 2, which advocates for sustainable land use throughout the region and consideration for the impact of flooding and other natural hazards on development.
- Developing the Pioneer Valley Climate Action and Clean Energy Plan, which assesses the impact that climate change will have on the region and recommends strategies for mitigation that can be implemented by local municipalities and businesses.
- Collaborating with state agencies, such as the Department of Conservation and Recreation, to maintain inventories of critical infrastructure throughout the region.

All of these PVPC initiatives considered the impact of natural hazards on the region and strategies for reducing their impact to people and property through hazard mitigation activities. The facilitation of the Hatfield Hazard Mitigation Plan by PVPC ensured that the information from these plans and collaborations was incorporated into the Hazard Mitigation Planning process.

In addition, the Pioneer Valley Planning Commission is actively involved in the Western Region Homeland Security Advisory Council (WRHSAC). WRHSAC, which includes representatives from Western Massachusetts municipalities, Fire Departments, Public Works Departments, Police Departments, area hospitals and regional transit from throughout the four counties of western Massachusetts, is responsible for allocating emergency preparedness funding from the US Department of Homeland Security. The representatives of these disciplines who serve on the WRHSAC are charged with sharing the information discussed at meetings with their colleagues at their regular meetings. PVPC staff attend all WRHSAC meetings and all WRHSAC members are aware of the fact that Hatfield was updating their Hazard Mitigation plan. Meetings of WRHSAC

regularly involve discussion about how to improve emergency preparedness in western Massachusetts, and hazard mitigation activities are included in this discussion.

Hatfield is active in the Hampshire county regional emergency planning committee (REPC) and informed members of their work on this Hazard Mitigation plan.

For the development of this Hazard Mitigation Plan, PVPC staff verbally informed WRHSAC members that they were working on the Hatfield plan as the Council's Planning sub-committee was deliberating about how to disseminate information about their work to sub-regions of the Pioneer Valley.

In addition, PVPC staff regularly present to their Executive Committee and Commission (representatives from the 43 cities and towns that comprise the Pioneer Valley), when new projects are launched and when funding opportunities are available. As result, all the communities in the region were informed of Hatfield's hazard mitigation plan development process and encouraged to comment.

PVPC staff included a summary article on the status of Hazard Mitigation planning in the region in the quarterly Regional Reporter that is mailed to area Chambers of Commerce, all member municipalities, area colleges and universities and other key stakeholders in the region. In this way, businesses, educational institutions and other key stakeholders were educated about and informed of Hatfield's hazard mitigation planning work.

## **Local Mitigation Capabilities**

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The Hatfield Hazard Mitigation Committee used the FEMA Capability Assessment worksheet 4.1 (from the 2013 Local Mitigation Planning Handbook) to comprehensively assess existing mitigation capabilities in the community. The completed worksheet is included in this plan's Appendix and details on existing mitigation capabilities and strategies are described in Chapter 5. Hatfield is well organized and has considerable local capability to mitigate the effects of natural hazards on the community. The community has a number of plans in place that organize data and information for the community and identify recommended actions to facilitate sustainable growth and development. The Fire Department has an ISO rating of 6/6X and the Bond rating for the Town is A+.

## 2 – LOCAL PROFILE<sup>1</sup>

### Community Setting

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The Town of Hatfield is an historic agricultural river town on the west bank of the Connecticut River. Large land grants were made to Governor Bradstreet and Major General Dennison in 1659, and the town's early Colonial settlement in 1660 was compatible with Indian life. The Nonatucks reserved their right to erect wigwams on the common, plant, hunt and fish. In 1662, Thomas Meekins operated a grist mill on the Mill River and in 1669 he added a sawmill. This single area in the town remained an industrial locus for over 200 years.

The first linseed oil mill was patented and established in 1737, and cider mills were opened. Residents raised sheep and cattle and the town was described as a "prosperous town on a strong agricultural base." Hatfield became one of the primary suppliers of beef and of soldiers to the Continental Army. In 1776, 127 men of a population of 582 were serving in the army. In 1786 the town was the site of a 50-community meeting of the rebels involved in Shay's rebellion, who were angered by the hardships and foreclosures brought on by a cash-poor economy. When they weren't fighting or rebelling, residents of Hatfield grew corn and made brooms, which became a major industry in the town. Irish, German and French Canadian immigrants, drawn to work in building the railroads in the state, finished the track and set up as farmers in Hatfield, as did later arrivals from Poland, Austria and Czechoslovakia. These newcomers created the largest immigrant population in the county at 39.6%. The farmers raised wheat and by 1905 were the leading tobacco and onion producers in the state. There are still over 120 tobacco barns in Hatfield.

Benefactors in the town shared their prosperity with their neighbors. Sophia Smith, an heiress to one of the largest fortunes in Hatfield, used her money to create Smith College, while Caleb Cooley Dickinson founded Dickinson Hospital in Hatfield.

Main Street in Hatfield retains a remarkable historic character, with a dense concentration of well preserved 18th and 19th century family homes.

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<sup>1</sup> This information was taken from the Department of Housing and Community Development's narrative profile of Hatfield, which is available at <http://www.mass.gov/dhcd/iprofile/127.pdf>.

According to the 1999 MacConnell Land use data, the total land area of Hatfield is approximately 10,771 acres with roughly 15 percent of those acres as developed land. The remaining land is classified as undeveloped with forest as the largest category (44% of all land in town) with 4,739 acres. Cropland is the second largest category of undeveloped land with 3,339 acres compared to Water and Wetlands, which represent individually, the third and fourth largest amount of undeveloped land in the town with 486 and 204 acres, respectively. Because the Connecticut River is such a prominent feature in town, it should be noted that Hatfield's maximum elevation (MassGIS) is 840 feet.

## **Development**

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During the past five years, Hatfield has experienced commercial and industrial development at the southernmost portion of West Street (at the border with Northampton). The Town has seen single family and condominium development including: Elm Street Meadows Condominiums and Hatfield Village Condominiums, both on Elm Street with single family home development concentrated on Pine Edge off of Elm Street and on Nolan Circle off of Chestnut Street. This development is happening in locations where there is already residential development, so this new development is not anticipated by the local Hazard Mitigation committee to change the communities vulnerability.

## **Infrastructure**

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Hatfield's geography has been a major factor in the development of its infrastructure. The broad, alluvial plains of the Connecticut River attracted farms and farmer, and settlement patterns grew around the fertile soils. The town is easily accessed by Interstate 91, and it serves as a major conduit for goods and people and has two exits within Hatfield's borders. This has spurred industrial and commercial growth in the past, whereas recent growth is modest residential growth. The town has water and sewer utilities, and the boundaries and capacities of these services are shaping and directing growth.

### **Roads and Highways**

The major artery running through town is Interstate 91, which connects Hatfield with Hatfield and Springfield to the south and with towns to the north including Greenfield, Northfield and finally communities in Vermont such as Brattleboro. Hatfield residents can travel both north and south via Route 5 & 10. Because of the river, there is not an east-to-west route available within Hatfield, but residents can travel to Route 9 to access Hadley, Amherst and points east as well as points west.

### **Rail**

Improved rail service, with the re-alignment of the Amtrak train to stop in Northampton will likely increase access to Hatfield and could spur additional residential development. The re-alignment is under a year old, so there is not yet any definitive analysis of its impact. The Amtrak

train currently passes by Hatfield twice a day and the local Hazard Mitigation committee has determined there is an increase in cargo trains as well. Pan Am Railways operates the freight line that runs north-south through Hatfield which serves a handful of commercial and industrial operations in the town.

### **Public Transportation**

The Franklin Regional Transit Authority (FRTA) provides limited bus service along routes 5/10 four times a day. This service is designed to serve employees of C&S Wholesale grocers. The town is not a member of the Pioneer Valley Transit Authority (PVTA).

### **Public Drinking Water Supply**

The Town of Hatfield has a water distribution system with about 37 miles of water mains ranging from 2" to 16" in diameter. Town water sources include two wells, West Hatfield and the Omasta Well, and the Hatfield Reservoir located in West Hatfield. The Town of Hatfield has a reservoir located partially within the western portion of Hatfield, and this source is a major water supply for Hatfield residents. There are two Town wells (Pantry Road and West Street) and some residents have private wells.

### **Sewer Service**

Approximately one-half of Hatfield is tied into the town's sewer system. Sanitary sewer service is provided to homes and businesses only on Elm Street, Main Street, North Street, Colonial Acres, Chestnut Street, Nolan Circle, School Street, and portions of Prospect Street, Bridge Street, King Street, Plantation Road, Elm Court, Old Farms Road, Raymond Avenue, Dwight Street, Church Street, North Hatfield Road and the southernmost portion of West Street.

### **Schools**

Hatfield has an elementary school, Hatfield Elementary, and a High School, Smith Academy.

## **Natural Resources**

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People who live in Hatfield talk about the community's "rural character." This term encompasses agricultural lands, natural resources, open space and recreational properties and historic buildings. One cannot underestimate the strong role Hatfield's farming heritage plays in the town's rural character. According to *National Geographic*, Hatfield has the seventh best agricultural land in the world. The community strongly identifies with its agricultural heritage.

The second and third components involved in preserving Hatfield's rural character are natural resources and open space. Adopting zoning regulations to safeguard floodplains, rivers, wetlands, watersheds and wildlife habitats will not only sustain Hatfield's ecological richness but will also reduce the long-term risks associated with flooding and damage to the town's water supply.

Forested areas are greatest in the section of town west of Interstate 91, with high elevations reaching in the Horse and Chestnut Mountains and along the rocky ledges of The Rocks. In this densely wooded terrain, outcroppings of bedrock alternated with pockets of wetlands, most of which flow into Running Gutter Brook, the primary stream draining Hatfield's western hills. East of the Interstate are the fertile Connecticut Valley lowlands, where the terrain hardly has any slope and the town is only 110 feet above sea level.

## **Water Resources**

Hatfield's public water supply comes from three sources: the town reservoir (capacity of 500,000 gallons per day); the West Hatfield Well (capacity of 350,000 gallons per day); and the Omasta Well (capacity of 150,000 gallons per day). Water supplies are drawn primarily from the reservoir as the per gallon cost to operate the wells is higher than that of the reservoir, even taking into consideration the treatment requirements for the town's surface water supply.

## ***Rivers and Streams***

Hatfield is a town whose land is heavily influenced by watercourses. There are approximately 35 miles of stream and river channel within the town boundaries. About 7.5 miles of the Connecticut River forms the eastern and part of the southern boundaries. The two primary streams in Hatfield and their tributaries form most of the remainder of Hatfield's stream channels. Three major watersheds drain the town's 10,771 acres. Running Gutter Brook in West Hatfield drains one of the town's major watersheds. The Hatfield Reservoir is within this watershed region. Two other minor watersheds in West Hatfield drain into Hatfield. IN one of these watersheds is Mountain Reservoir, a 25 acre water body, only about 1/3<sup>rd</sup> of which is actually in Hatfield.

The second major watershed drains through the Mill River, a primary tributary of the Connecticut River with its headwaters in the Town of Conway. This mature river is joined by flow from Running Gutter Brook. The dam at Prospect Street, the site of former industry, causes the water course to run deep upstream of the dam with wide meanders and broad marshes which are important wildlife habitats.

The third major watershed is within the north-east corner of Hatfield. The remnant of an old Connecticut River meander remains in this portion of Hatfield and receives the drainage from this watershed before eventually draining to the Connecticut River. This area was originally an oxbow lake which, over the years, has aged due to sedimentation and eutrophication, and the oxbow is now a series of ponds and marshes. It remains a significant wildlife habitat and storage area for the Connecticut River when it floods.

## ***Wetlands***

Combined, there are more than 3,000 acres of wetland, floodplain and open water (most of which is the Connecticut River) in Hatfield, which accounts for about 30% of the town's total area. These wetlands include the open water of streams and ponds, shrub swamps, forested swamps, wet meadows, bogs, marshes, and land within the flood water elevation of the 100-year storm, not all of which is currently considered true vegetated wetland under the Massachusetts Wetlands Protection Act, Chapter 131, Section 40 of the General Laws of the Commonwealth.

Most of the wetlands are in the eastern and northern sections of Hatfield in areas that border the Connecticut River, the Mill River, and the old oxbow meander in the northeast section of Hatfield. The wetlands in West Hatfield are primarily narrow wetlands bordering Running Gutter Brook and its tributaries. However, several small isolated wetlands exist in this area as well which also help to provide important wetland wildlife habitat.

The limits of the 100-year storm flood zone are primarily located within the eastern and northern portions of Hatfield along the Connecticut River and Mill River, and coincident with the majority of Hatfield's wetlands. However, some of the 100-year flood zone exists along Running Gutter Brook in West Hatfield. Under current law, development is sharply curtailed within both the 100-year storm flood elevation and wetlands that have been defined under the Wetlands Protection Act. Therefore, with diligent application of the applicable Federal and State laws, these areas represent open space buffers to development.

## ***Beaver Dams***

In the 2008 plan, Beaver dams were identified as a potential flooding hazard, however this concern has subsided. Several wetland areas have been flooded by beaver dam construction, but to date, has not caused any problems for residents. The Commonwealth of Massachusetts requires a special permit for individuals to trap beavers. Affected individuals must contact the Board of Health and Conservation Commission for advice and permission to alleviate any beaver problems.

## ***The Great Pond***

A Connecticut River oxbow, the Great Pond is the largest natural freshwater body in town. It has approximately 200 acres of open water, wooded swamp and marshes, all of which serve as rare species habitat and refuge for migrating waterfowl.

## ***Aquifers***

The Town's groundwater supply is feed by the three watersheds listed above. The town relies on the two wells located over Hatfield's aquifer in emergency and periods of peak demand, such as the warmest months of summer.

## **Floodways**

Water levels in Hatfield's rivers, streams, and wetlands rise and fall seasonally and during high rainfall events. High water levels are typical in spring, due to snowmelt and ground thaw. This is the period when flood hazards are normally expected. Low water levels occur in summer due to high evaporation and plant uptake (transpiration). At any time, heavy rainfall may create conditions that raise water levels in rivers and streams above bank full stage, which then overflow adjacent lands.

Floodways include the watercourses (rivers and streams) and adjacent relatively low-lying areas subject to periodic flooding (the 100-year flood zone and 500-year flood zone). These adjoining lands are flood hazard zones and they vary in their predicted flood frequency. The 100-year flood zone has a one in 100 statistical probability (or one percent chance) of being flooded in a single year or is predicted to be flooded one year out of a 100-year period; while the 500-year flood zone is based on a 500-year period. Hatfield's gently sloping terrain, especially in the eastern section of town, permits the formation of broad floodplains.

The National Flood Insurance Program has produced maps that identify floodways across America. The following areas have been designated as floodways in Hatfield:

- (1) Running Gutter—From Rocks Road down to the Mill River;
- (2) The Mill River from the Hatfield's northernmost town line south down Brad Street Depot Road, continuing down to West Hatfield Cemetery, continuing down with a broad flood plain to the Connecticut River;
- (3) Cow Bridge Brook from Great Pond into the Connecticut River;
- (4) Great pond and its tributary streams;

The Town Hall, Town Fire Station, Town Library and Town Police Station are all located within the Connecticut River's 500 year floodplain.

## **Flood Control Structures**

The existing flood control earthen levee, Hatfield Dike, was built in 1938 along the bank of the Connecticut River. As of 2006, natural erosion of the banks of the Connecticut River had brought the river to within 15 feet of the toe of the dike. In 2011 the Town received federal hazard mitigation funds to re-surface the toe of the Hatfield Dike and maintenance and repair is an ongoing need.

## **National Flood Insurance Program**

The National Flood Insurance Program has produced maps that identify floodways across America. Hatfield is a participating member of the National Flood Insurance Program, and had the following NFIP policy and claim statistics as of 2016:

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file with the Hatfield Planning Board.

- FIRMs have been effective since May 31, 1974 with the current map in effect since April 3, 1978.
- Hatfield has 49 in-force policies in effect for a total of \$10,399,100 worth of insurance.
- There have been a total of 5 NFIP losses claimed for which \$25,823.41 has been paid.
- As of 2016, there have been 0 Repetitive Loss Properties in Hatfield.
- The town will maintain compliance with the NFIP throughout the next 5-year Hazard Mitigation Planning cycle by monitoring its Flood Plain Overlay District and ensuring that the district accurately reflects the 100-year flood plain and FEMA Flood Insurance Rate Map (FIRM).

The Flood Insurance Rate Maps in Hampshire County are scheduled to be updated by FEMA in the next few years. When these maps are updated, the Town of Hatfield will adjust its zoning to accommodate changes to the location of floodplains.

## **Forests**

Forty-four percent, or 4,721 acres, of Hatfield's total area is forested land. Different forest types offer differing values to the wood products industry, for wildlife habitat, and for recreation, which is the reason for differentiating between them. There are approximately 135 species of trees and woody shrubs naturally occurring in Hatfield. Several species have an economic importance to the lumber industry and are used locally, as well as exported out of the region to other states and markets. Eastern white pine and northern red oak head the list of commercially valuable species. Pine is used widely in the construction and the paper industry. Red oak is in demand for veneer for paneling, flooring, trim detail in homes and buildings and furniture.

Because pine and oak are so valuable, they have been selected as the standard to measure a forests' potential productivity. In Hatfield 1,000 ± acres is classified as prime, while 500 ± is of state and local importance.

## 3 – HAZARD IDENTIFICATION & ANALYSIS

The following section includes a summary of disasters that have affected or could affect Hatfield. Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to develop this list. Identified hazards are the following:

- Floods
- Severe snowstorms / ice storms
- Hurricanes
- Severe thunderstorms / wind /tornadoes
- Wildfires / brushfires
- Earthquakes
- Dam failure
- Drought
- Extreme Temperatures

### **Natural Hazard Analysis Methodology**

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This chapter examines all hazards identified by the Massachusetts State Hazard Mitigation Plan. The analysis is organized into the following sections: Hazard Description, Location, Extent, Previous Occurrences, Probability of Future Events, Impact, and Vulnerability. A description of each of these analysis categories is provided below.

#### **Hazard Description**

The natural hazards identified for Hatfield are: floods, severe snowstorms/ice storms, hurricanes, severe thunderstorms / wind / tornadoes, wildfire/brushfire, earthquakes, dam failure, and drought. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

#### **Location**

Location refers to the geographic areas within the planning area that are affected by the hazard. Some hazards affect the entire planning area universally, while others apply to a specific portion, such as a floodplain or area that is susceptible to wild fires. Classifications are based on the area that would potentially be affected by the hazard, on the following scale:

Location of Occurrence, Percentage of Town Impacted by Given Natural Hazard	
Location of Occurrence	Percentage of Town Impacted
Large	More than 50% of the town affected
Medium	10 to 50% of the town affected
Small	Less than 10% of the town affected

### Extent

Extent describes the strength or magnitude of a hazard. Where appropriate, extent is described using an established scientific scale or measurement system. Other descriptions of extent include water depth, wind speed, and duration.

### Previous Occurrences

Previous hazard events that have occurred are described. Depending on the nature of the hazard, events listed may have occurred on a local, state-wide, or regional level.

### Probability of Future Events

The likelihood of a future event for each natural hazard was classified according to the following scale:

Frequency of Occurrence and Annual Probability of Given Natural Hazard	
Frequency of Occurrence	Probability of Future Events
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

### Impact

Impact refers to the effect that a hazard may have on the people and property in the community, based on the assessment of extent described above. Impacts are classified according to the following scale:

Extent of Impacts, Magnitude of Multiple Impacts of Given Natural Hazard	
Extent of Impacts	Magnitude of Multiple Impacts
Catastrophic	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

### Vulnerability

Based on the above metrics, a hazard index rating was determined for each hazard. The hazard index ratings are based on a scale of 1 through 5 as follows:

- 1 – Highest risk
- 2 – High risk
- 3 – Medium risk
- 4 – Low risk
- 5 – Lowest risk

The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable. However; many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability.

**Table 3-6  
Hazard Identification and Analysis Worksheet for Hatfield**

TYPE OF HAZARD	FREQUENCY OF OCCURRENCE	LOCATION OF OCCURRENCE	IMPACT	HAZARD RISK INDEX RATING
Flooding	Limited	Medium	Limited	3 – Medium Risk
Severe Snowstorms/Ice Storms	High	Large	Limited	3 – Medium Risk
Severe Thunderstorms / Winds / Tornadoes	Severe Thunderstorms: Moderate; Winds: Moderate; Tornadoes: Low	Medium	Limited	Severe Thunderstorms: 3 – Medium Risk  Winds: 3 – Medium Risk  Tornadoes: 4 – Low Risk
Hurricanes/Tropical Storms	Low	Large	Critical	Between 3 – Medium Risk and 4 – Low Risk
Wildfire/Brushfire	Low	Small	Minor	4 – Low Risk
Earthquakes	Low	Large	Critical	3 – Medium Risk
Dam Failures / Levee Breach	Very Low	Medium	Critical	3 – Medium Risk
Drought	Low	Large	Minor	4 – Low Risk
Extreme Temperatures	Low	Large	Minor	5-- Low Risk

Source: information adapted from Town of Holden Beach North Carolina Community-Based Hazard Mitigation Plan, July 15, 2003 and the Massachusetts Emergency Management Agency (MEMA).

# Detailed Hazard Profile for Hatfield

## Floods

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### Hazard Description

There are three major types of storms that can generate flooding in Hatfield:

- Continental storms are typically low-pressure systems that can be either slow or fast moving. These storms originate from the west and occur throughout the year.
- Coastal storms, also known as nor'easters, usually occur in late summer or early fall and originate from the south. The most severe coastal storms, hurricanes, occasionally reach Massachusetts and generate very large amounts of rainfall.
- Thunderstorms form on warm, humid summer days and cause locally significant rainfall, usually over the course of several hours. These storms can form quickly and are more difficult to predict than continental and coastal storms.

A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large “sponges” to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into fertile, productive farmland like that found in the Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard.

### Location

There are approximately 1228 acres of land within the FEMA mapped 100-year floodplain and 246 acres of land within the 500-year floodplain within the Town of Hatfield. There are 269 structures located within the Special Flood Hazard Area (SFHA) in Hatfield as of August 9, 2005 the most current records in the CIS for the Town of Hatfield. The estimated number of people living in the floodplain is 616.

### Extent

Floods can be classified as one of two types: flash floods and general floods.

- **Flash floods** are the product of heavy, localized precipitation in a short time period over a given location. Flash flooding events typically occur within minutes or hours after a

period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).

- **General floods** may last for several days or weeks and are caused by precipitation over a longer time period in a particular river basin. Excessive precipitation within a watershed of a stream or river can result in flooding particularly when development in the floodplain has obstructed the natural flow of the water and/or decreased the natural ability of the groundcover to absorb and retain surface water runoff (e.g., the loss of wetlands and the higher amounts of impervious surface area in urban areas).

The average annual precipitation for Hatfield and surrounding areas in western Massachusetts has been approximately 46 inches during the past several years.

Water levels in Hatfield's rivers, streams, and wetlands rise and fall seasonally and during high rainfall events. High water levels are typical in spring, due to snowmelt and ground thaw. This is the period when flood hazards are normally expected. Low water levels occur in summer due to high evaporation and plant uptake (transpiration). At any time, heavy rainfall may create conditions that raise water levels in rivers and streams above bank full stage, which then overflow adjacent lands.

### **Previous Occurrences**

Flooding has occurred previously at these Hatfield locations

#### **Chestnut Street**

The Mill River crossing on Chestnut Street was submerged in the October, 2005 floods. In 2014 the area flooded again, but no one was isolated or harmed. There are no residential structures in this area, and no damage to property was reported. The inconvenience and safety risks that would accompany losing this east-west route would place a strain on emergency service personnel if it were to continue for a longer duration during a more drastic event.

#### **South Street and Valley Street**

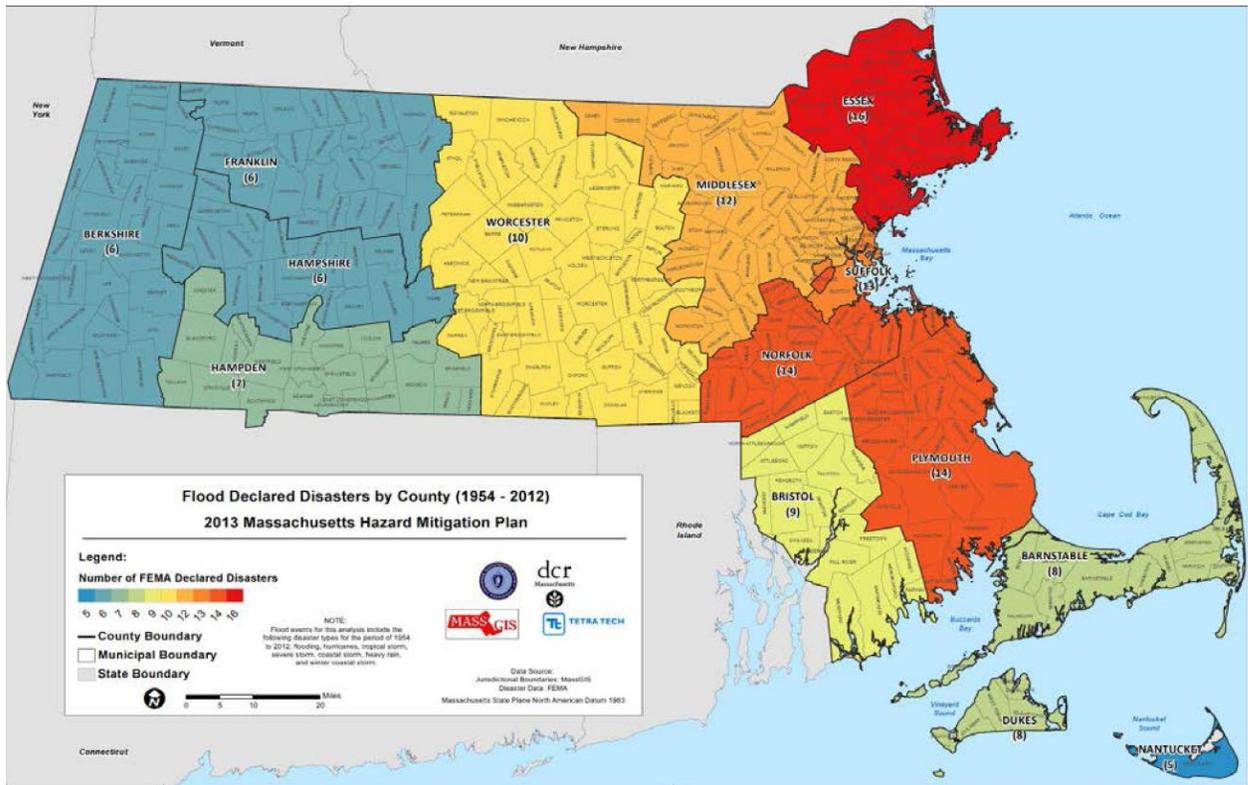
The fields next to these streets experience frequent flooding in high rain events.

#### **King Street**

The problem culvert on King Street has been repaired since the 2008 plan and the repair has mitigated localized flooding.

The most severe flooding event in the recent memory of the members of the local Hazard Mitigation committee is the flood of May 1984, which happened after a period of extended rain. Schools were closed for two days and Elm Street was the only main road or thoroughfare that was not flooded. Bridge Street, Cronin Hill, Depot Road and North Main Street were all flooded at some point. There were no injuries reported.

## FEMA Flood Declared Disasters by County, 1954-2012



Source: Massachusetts Hazard Mitigation Plan

The National Weather Service maintains water level gages on the Mill River and Connecticut River to monitor flooding. The NWS has various flooding classifications based on water level. These classifications and their definitions are:

**Action Stage** - the stage which, when reached by a rising stream, represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. y any affected people if the stage is above action stage.

**Minor Flooding** is defined to have minimal or no property damage, but possibly some public threat. A Flood Advisory product is issued to advise the public of flood events that are expected not to exceed the minor flood category. Examples of conditions that would be considered minor flooding include:

- water over banks and in yards
- no building flooded, but some water may be under buildings built on stilts (elevated)
- personal property in low lying areas needs to be moved or it will get wet
- water overtopping roads, but not very deep or fast flowing
- water in campgrounds or on bike paths
- inconvenience or nuisance flooding
- small part of the airstrip flooded, and aircraft can still land
- one or two homes in the lowest parts of town may be cut off or get a little water in the crawl spaces or homes themselves if they are not elevated

**Moderate Flooding** is defined to have some inundation of structures and roads near the stream. Some evacuations of people and/or transfer of property to higher elevations may be necessary. A Flood Warning is issued if moderate flooding is expected during the event. Examples of conditions that would be considered moderate flooding include:

- several buildings flooded with minor or moderate damage
- various types of infrastructure rendered temporarily useless (i.e. fuel tanks cannot be reached due to high water, roads flooded that have no alternates, generator station flooded)
- elders and those living in the lowest parts of the village are evacuated to higher ground
- access to the airstrip is cut off or requires a boat
- water over the road is deep enough to make driving unsafe
- gravel roads likely eroded due to current moving over them
- widespread flooding, but not deep enough to float ice chunks through town
- water deep enough to make life difficult, normal life is disrupted and some hardship is endured
- airstrip closed
- travel is most likely restricted to boats

**Major Flooding** is defined to have extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations are necessary. A Flood Warning is issued if major flooding is expected during the event. Examples of conditions that would be considered major flooding include:

- many buildings flooded, some with substantial damage or destruction
- infrastructure destroyed or rendered useless for an extended period of time
- multiple homes are flooded or moved off foundations
- everyone in threatened area is asked to evacuate
- National Guard units assist in evacuation efforts
- erosion problems are extreme
- the airstrip, fuel tanks, and the generator station are likely flooded
- loss of transportation access, communication, power and/or fuel spills are likely
- fuel tanks may float and spill and possibly float downstream
- ice chunks floating through town that could cause structural damage
- high damage estimates and high degree of danger to residents

## **Probability of Future Events**

Based upon previous data, there is a “limited” chance of flash flooding or general flooding occurring in Hatfield. The area within the 100-year flood plain has a 1 percent chance of flooding in any given year.

Based on previous occurrences there is an approximately 7 percent chance a year of localized, flash flooding.

Climate scientists predict that in the next few decades, climate change will increase the frequency and intensity of all storms that can cause flooding. Currently, floods are the most costly natural hazard in the United States, and climate change will only increase this damage. More information about the effect of Climate Change can be found in the Pioneer Valley Planning Commission's Climate Action Plan, available at [www.sustainableknowledgecorridor.org](http://www.sustainableknowledgecorridor.org).

The Massachusetts State Climate Change Adaptation Report has additional information about the impact of climate change and can be accessed at [www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html](http://www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html).

## **Impact**

The Town of Hatfield faces a "limited" impact, with 10 percent or less of the total town area affected by possible flooding. There are approximately 1228 acres of land within the FEMA mapped 100-year floodplain and 246 acres of land within the 500-year floodplain. According to the Community Information System (CIS) of FEMA, there were 269 structures located within the Special Flood Hazard Area (SFHA) in Hatfield with an estimated 616 people living in the floodplain as of 2014, the most current records in the CIS for the Town of Hatfield. To approximate the potential impact to property and people that could be affected by this hazard, the Town's median home value of \$325,000 in 2015 is used.

An estimated 20 percent of damage would occur to each structure in the 100-year flood plain, resulting in a total estimated damage of \$17,485,000 with 616 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

## **Vulnerability**

Based on the above analysis, Hatfield faces a hazard index rating of "3 - medium risk" of a 100-year base flood and annual flooding due to the community's topography and waterways. Hatfield faces a low risk of localized flooding in locations outside of FEMA's Flood Insurance Rate Maps for the town.

## **Severe Snowstorms / Ice Storms**

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### **Hazard Description**

Severe winter storms can pose a significant risk to property and human life. The rain, freezing rain, ice, snow, cold temperatures and wind associated with these storms can cause the following hazards:

- Disrupted power and phone service
- Unsafe roadways and increased traffic accidents
- Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt
- Tree damage and fallen branches that cause utility line damage and roadway blockages
- Damage to telecommunications structures
- Reduced ability of emergency officials to respond promptly to medical emergencies or fires
- Elderly are affected by extreme weather

## **Location**

The entire Town of Hatfield is susceptible to severe snowstorms. Because these storms occur regionally, they impact the entire town.

The following areas have been identified by the Hazard Mitigation Committee as areas where snow drifts form during winter storm events:

North Hatfield Road

Depot Road--the Town did erect a snow fence on this road, but it did not mitigate the snow drifting into the road.

Upper Main Road

Elm Street

Maple Street

Bridge Street

## **Extent**

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The aerial distribution of snowfall and population information are combined in an equation that calculates a NESIS score which varies from around one for smaller storms to over ten for extreme storms. The raw score is then converted into one of the five NESIS categories. The largest NESIS values result from storms producing heavy snowfall over large areas that include major metropolitan centers.

Northeast Snowfall Impact Scale Categories		
Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Source: <http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

### Previous Occurrences

New England generally experiences at least one or two severe winter storms each year with varying degrees of severity. Severe winter storms typically occur during January and February; however, they can occur from late September through late April.

Based on data available from the National Oceanic and Atmospheric Administration, there are 47 winter storms since 1958 that have registered on the NESIS scale. Of these, approximately 26 storms resulted in snow falls in the Pioneer Valley of at least 10 inches. These storms are listed in the table below in order of their NESIS severity.

Winter Storms Producing Over 10 inches of Snow in the Pioneer Valley, 1958-2013			
Date	NESIS Value	NESIS Category	NESIS Classification
3/12/1993	13.2	5	Extreme
3/2/1960	8.77	4	Crippling
2/15/2003	7.5	4	Crippling
2/2/1961	7.06	4	Crippling
1/21/2005	6.8	4	Crippling
1/19/1978	6.53	4	Crippling
12/25/1969	6.29	4	Crippling
2/10/1983	6.25	4	Crippling
2/14/1958	6.25	4	Crippling
2/5/1978	5.78	3	Major
2/23/2010	5.46	3	Major

2/8/1994	5.39	3	Major
1/9/2011	5.31	3	Major
2/18/1972	4.77	3	Major
12/11/1960	4.53	3	Major
2/7/2013	4.35	3	Major
2/22/1969	4.29	3	Major
1/18/1961	4.04	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.5	2	Significant
4/6/1982	3.35	2	Significant
3/4/2013	3.05	2	Significant
3/15/2007	2.54	2	Significant
3/31/1997	2.29	1	Notable
2/2/1995	1.43	1	Notable
1/25/1987	1.19	1	Notable

Source: <http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis>

The local Hazard Mitigation committee affirmed that the most significant snow fall in the community was 24 inches during the Blizzard of 1978 in February.

### **Probability of Future Events**

Based upon the availability of records for Hampshire County, the likelihood that a severe snow storm will hit Hatfield in any given year is “high,” or greater than 50 percent.

Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases. More information about the effect of Climate Change can be found in the Pioneer Valley Planning Commission’s Climate Action Plan, available at [www.sustainableknowledgecorridor.org](http://www.sustainableknowledgecorridor.org).

The Massachusetts State Climate Change Adaptation Report has additional information about the impact of climate change and can be accessed at [www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html](http://www.mass.gov/eea/air-water-climate-change/climate-change/climate-change-adaptation-report.html).

### **Impact**

The Town of Hatfield faces a “limited” impact, or less than 10 percent of total property damaged, from snowstorms.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all residential property in town, \$377,418,559, and the average household size, 2.37 people, is used.

An estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of \$7,548,371 worth of damage and 381 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

### **Vulnerability**

Based on the above assessment, Hatfield faces a hazard index rating of “3 - medium risk” from severe snow storms and ice storms.

# Hurricanes/Tropical Storms

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## Hazard Description

Hurricanes are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour and which generate large amounts of precipitation. Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities.

## Location

Because of the hazard’s regional nature, all of Hatfield is at risk from hurricanes. Ridgetops are more susceptible to wind damage.

## Extent

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Hurricane Wind Scale, which rates hurricane wind intensity on a scale of 1 to 5, with 5 being the most intense.

Saffir-Simpson Scale	
Category	Maximum Sustained Wind Speed (MPH)
1	74–95
2	96–110
3	111–129
4	130–156
5	157 +

Source: National Hurricane Center, 2012

## Previous Occurrences

Hurricanes that have affected the Pioneer Valley are shown in the following table.

Major Hurricanes in the Pioneer Valley		
Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Hurricane of 1938	1938	3
Great Atlantic Hurricane	1944	1
Carol	1954	3
Edna	1954	1
Diane	1955	Tropical Storm
Donna	1960	Unclear, 1 or 2
Groundhog Day Gale	1976	Not Applicable
Gloria	1985	1
Bob	1991	2
Floyd	1999	Tropical Storm
Irene	2011	Tropical Storm
Sandy	2012	Super Storm

### Probability of Future Events

Hatfield’s location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a “low” probability of hurricanes in Hatfield in any given year, between 1 percent and 10 percent. The local Hazard Mitigation committee reports that no hurricanes have tracked directly through Hatfield.

### Impact

A description of the damages that could occur due to a hurricane is described by the Saffir-Simpson scale, as shown below.

Hurricane Damage Classifications			
Storm Category	Damage Level	Description of Damages	Wind Speed (MPH)
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. An example of a Category 1 hurricane is Hurricane Dolly (2008).	74-95
	Very dangerous winds will produce some damage		
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings. An example of a Category 2 hurricane is Hurricane Francis in 2004.	96-110
	Extremely dangerous winds will cause extensive damage		
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland. An example of a Category 3 hurricane is Hurricane Ivan (2004).	111-129
	Devastating damage will occur		
4	EXTREME	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland. An example of a Category 4 hurricane is Hurricane Charley (2004).	130-156
	Catastrophic damage will occur		
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	157+
	Catastrophic damage will occur		

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$377,418,559 is used. Wind damage of 5 percent with 10 percent of structures damaged would result in an estimated \$1,887,092 of damage. Estimated flood damage to 10 percent of the structures with 20 percent damage to each structure would result in \$7,548,371 of damage and 1,054 people affected. The cost of repairing

or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

### **Vulnerability**

Based on the above analysis, Hatfield faces a hazard index rating between “3 – medium” and “4 - high risk” from hurricanes.

## **Severe Thunderstorms / Wind / Tornadoes/Microburst**

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### **Hazard Description**

A thunderstorm is a storm with lightning and thunder produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain, and sometimes hail. Effective January 5, 2010, the NWS modified the hail size criterion to classify a thunderstorm as ‘severe’ when it produces damaging wind gusts in excess of 58 mph (50 knots), hail that is 1 inch in diameter or larger (quarter size), or a tornado (NWS, 2013).

Wind is air in motion relative to surface of the earth. For non-tropical events over land, the NWS issues a Wind Advisory (sustained winds of 31 to 39 mph for at least 1 hour or any gusts 46 to 57 mph) or a High Wind Warning (sustained winds 40+ mph or any gusts 58+ mph). For non-tropical events over water, the NWS issues a small craft advisory (sustained winds 25-33 knots), a gale warning (sustained winds 34-47 knots), a storm warning (sustained winds 48 to 63 knots), or a hurricane force wind warning (sustained winds 64+ knots). For tropical systems, the NWS issues a tropical storm warning for any areas (inland or coastal) that are expecting sustained winds from 39 to 73 mph. A hurricane warning is issued for any areas (inland or coastal) that are expecting sustained winds of 74 mph. Effects from high winds can include downed trees and/or power lines and damage to roofs, windows, etc. High winds can cause scattered power outages. High winds are also a hazard for the boating, shipping, and aviation industry sectors.

Tornadoes are swirling columns of air that typically form in the spring and summer during severe thunderstorm events. In a relatively short period of time and with little or no advance warning, a tornado can attain rotational wind speeds in excess of 250 miles per hour and can cause severe devastation along a path that ranges from a few dozen yards to over a mile in width. The path of a tornado may be hard to predict because they can stall or change direction abruptly. Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester, including towns in eastern Hampshire County. High wind speeds, hail, and debris generated by tornadoes can result in loss of life, downed trees and power lines, and damage to structures and other personal property (cars, etc.).

### **Location**

As per the Massachusetts Hazard Mitigation Plan, the entire town is at risk of high winds, severe thunderstorms, winds, and tornadoes.

## Extent

An average thunderstorm is 15 miles across and lasts 30 minutes; severe thunderstorms can be much larger and longer. Southern New England typically experiences 10 to 15 days per year with severe thunderstorms.

Tornadoes are measured using the enhanced F-Scale, shown with the following categories and corresponding descriptions of damage:

Enhanced Fujita Scale Levels and Descriptions of Damage			
EF-Scale Number	Intensity Phrase	3-Second Gust (MPH)	Type of Damage Done
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
EF1	Moderate	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	Significant	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	Severe	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	Devastating	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

## Previous Occurrences

Because thunderstorms and wind affect the town regularly on an annual basis, there are not significant records available for these events. For tornadoes, there are typically 1 to 3 tornadoes somewhere in southern New England per year. Most occur in the late afternoon and evening hours, when the heating is the greatest. The most common months are June, July, and August, but the Great Barrington, MA tornado (1995) occurred in May and the Windsor Locks, CT tornado (1979) occurred in October.

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester. In 2011, a tornado ranked F3 (Severe Damage) on the Fujita Scale of Tornado Intensity, blew through the towns of West Springfield, Westfield, Springfield, Monson, Wilbraham, Brimfield, Sturbridge, and Southbridge. The tornado and related storm killed 3 people and resulted in hundreds of injuries across the state. Nine incidents of tornado activity (F3 or less) have occurred in Hampshire County since 1954 and one known tornado has

touched down in Hatfield. In 2014 trees were damaged on Linseed Road by a severe thunderstorm and in 2015 a microburst on 7/26/15 caused tree damage on King Street and Main Street.

The local Hazard Mitigation committee reports that no tornadoes have passed through any area of Hatfield.

### **Probability of Future Events**

One measure of tornado activity is the tornado index value. It is calculated based on historical tornado events data using USA.com algorithms. It is an indicator of the tornado level in a region. A higher tornado index value means a higher chance of tornado events. Data was used for Hampshire County to determine the Tornado Index Value as shown in the table below.

<b>Tornado Index for Hampshire County</b>	
Hampshire County	125.73
Massachusetts	87.60
United States	136.45

Source: USA.com, <http://www.usa.com/hampshire-county-ma-natural-disasters-extremes.htm>

Based upon the available historical record, as well as Hatfield' location in a high-density cluster of state-wide tornado activity, it is reasonable to estimate that there is a "very low" (less than 1 percent) frequency of tornado occurrence in Hatfield in any given year.

As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Thus, there is a "moderate" probability (10 percent to 40 percent chance in any given year) of a severe thunderstorm or winds affecting the town.

### **Impact**

The potential for locally catastrophic damage is a factor in any severe weather event. In Hatfield, a tornado that hit residential areas would leave much more damage than a tornado with a travel path that ran along the town's forested areas, where little settlement has occurred. Most buildings in town have not been built to Zone 1, Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, with most of the town's housing built before this date.

To approximate the potential impact to property and people that could be affected by severe weather, tornado, or wind, the total value of all residential property in town, \$377,418,559 is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$3,774,185 worth of damage and 105 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

### **Vulnerability**

Based on the above assessment, Hatfield faces a hazard index rating of 3-medium risk from severe thunderstorms/microbursts and wind, tornadoes.

## **Wildfire / Brushfire**

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### **Hazard Description**

Wildland fires are typically larger fires, involving full-sized trees as well as meadows and scrublands. Brushfires are uncontrolled fires that occur in meadows and scrublands, but do not involve full-sized trees. Both wildland fires and brushfires can consume homes, other buildings and/or agricultural resources. Typical causes of brushfires and wildfires are lightning strikes, human carelessness, and arson.

FEMA has classifications for 3 different classes of wildland fires:

- Surface fires – the most common type of wildland fire, surface fires burn slowly along the floor of a forest, killing or damaging trees.
- Ground fires burn on or below the forest floor and are usually started by lightning
- Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions.

### **Location**

Hampden and Hampshire County have approximately 469,587 acres of forested land, which accounts for 62 percent of total land area. In Hatfield, 62 percent of the land is forested, and is therefore at risk of fire. A large wildfire could damage almost all of the town's land mass in a short period of time. However, Massachusetts receives more than 40 inches of rain per year and much of the landscape is fragmented, and together these two traits make wildfires uncommon in Massachusetts. Nevertheless, in drought conditions, a brushfire or wildfire would be a matter of concern.

### **Extent**

Wildfires can cause widespread damage to the areas that they affect. They can spread very rapidly, depending on local wind speeds and be very difficult to get under control. Fires can last for several hours up to several days.

In Hatfield, 62 percent of the land is forested, and is therefore at risk of fire. A large wildfire could damage almost all of the town's land mass in a short period of time. Certain forested areas of Hatfield are remote and difficult for emergency crews to access. In drought conditions, a brushfire or wildfire would be a matter of concern as a large fire could inflict widespread damage to the land mass, including vital watershed lands, in a short period of time.

As described in the next section, there have not been any major wildfires recorded in Hatfield since 2001. However, based on other major wildfires that have occurred in western Massachusetts, it is estimated that such a fire would likely destroy around 50 to 500 acres of forested land if unrestrained.

**Previous Occurrences**

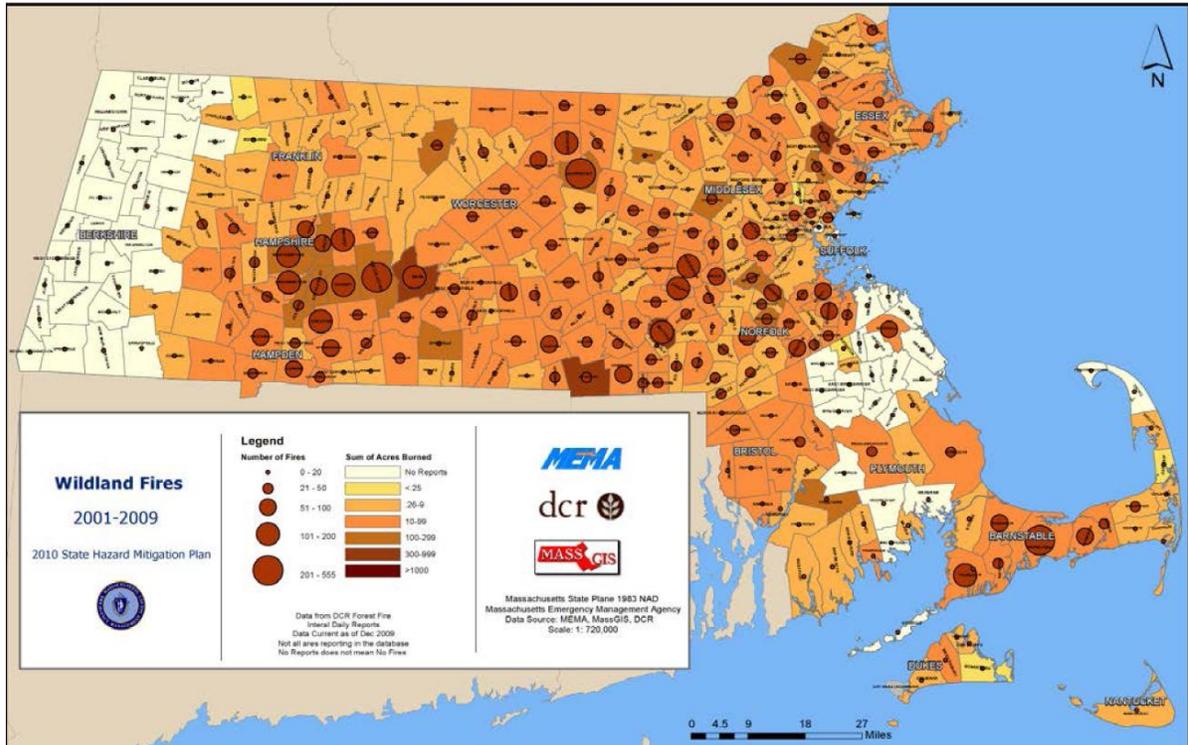
During the past 100 years, there have not been many wildfires occurring in the Pioneer Valley. However, several have occurred during the past 20 years, as shown in the list below:

- 1995 – Russell, 500 acres burned on Mt. Tekoa
- 2000 – South Hadley, 310 acres burned over 14 days in the Litchia Springs Watershed
- 2001 – Hatfield, 40 acres burned
- 2010 – Russell, 320 acres burned on Mt. Tekoa
- 2012 – Eastern Hampden County, dry conditions and wind gusts created a brush fire in Brimfield, and burned 50 acres

Total Fire Incidents in Hatfield	
2008	67
2009	51
2010	56
2011	45
2012	70
2013	5

Source: Massachusetts Fire Incidence Reporting System, 2013 Annual Report plus 2012 Fire Data Analysis County Reporting System-most recent data available

## Wildland Fires in Massachusetts, 2001-2009



Source: Massachusetts Hazard Mitigation Plan-*data only available mapped through 2009*

### Probability of Future Events

In accordance with the Massachusetts Hazard Mitigation Plan, the Town Hazard Mitigation Committee found it is difficult to predict the likelihood of wildfires in a probabilistic manner because the number of variables involved. However, given the proximity of previous wildfires, and their proximity to the Town, the likelihood of a future wildfire is determined to be “medium”.

Climate scenarios project summer temperature increases between 2°C and 5°C and precipitation decreases of up to 15 percent. Such conditions would exacerbate summer drought and further promote high-elevation wildfires, releasing stores of carbon and further contributing to the buildup of greenhouse gases. Forest response to increased atmospheric carbon dioxide—the so-called “fertilization effect”—could also contribute to more tree growth and thus more fuel for fires, but the effects of carbon dioxide on mature forests are still largely unknown.

### Impact

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$377,418,559 is used.

An estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total \$3,774,185 worth of damage and 105 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

### **Vulnerability**

Based on the above assessment, Hatfield faces a hazard index rating of “4 - low risk” from wildfires.

# Earthquakes

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## Hazard Description

An earthquake is a sudden, rapid shaking of the ground that is caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly, without warning, at any time of the year. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people.<sup>2</sup> Ground shaking from earthquakes can rupture gas mains and disrupt other utility service, damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods (dam failure) and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable soil, and mobile homes not tied to their foundations are at risk during an earthquake.<sup>3</sup>

## Location

Because of the regional nature of the hazard, the entire town is equally susceptible to earthquakes.

## Extent

The magnitude of an earthquake is measured using the Richter Scale, which measures the energy of an earthquake by determining the size of the greatest vibrations recorded on the seismogram. On this scale, one step up in magnitude (from 5.0 to 6.0, for example) increases the energy more than 30 times. The intensity of an earthquake is measured using the Modified Mercalli Scale. This scale quantifies the effects of an earthquake on the Earth's surface, humans, objects of nature, and man-made structures on a scale of I through XII, with I denoting a weak earthquake and XII denoting a earthquake that causes almost complete destruction.

Richter Scale Magnitudes and Effects	
Magnitude	Effects
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

<sup>2</sup> Northeast States Emergency Consortium Web site: [www.nesec.org/hazards/earthquakes.cfm](http://www.nesec.org/hazards/earthquakes.cfm).

<sup>3</sup> Federal Emergency Management Agency Web site: [www.fema.gov/hazards/earthquakes/quake.shtm](http://www.fema.gov/hazards/earthquakes/quake.shtm).

Modified Mercalli Intensity Scale for and Effects			
Scale	Intensity	Description Of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

Source: US Federal Emergency Management Agency

**Previous Occurrences**

The most recent earthquakes to affect New England are shown in the table below.

Largest Earthquakes in the Region, 1924 – 2012		
Location	Date	Magnitude
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7

Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Plattsburg, NY	April 20, 2002	5.1
Bar Harbor, NH	October 3, 2006	4.2
Hollis Center, ME	October 16, 2012	4.6

Source: Northeast States Emergency Consortium website,  
[www.nesec.org/hazards/earthquakes.cfm](http://www.nesec.org/hazards/earthquakes.cfm)

New England States Record of Historic Earthquakes		
State	Years of Record	Number Of Earthquakes
Connecticut	1668 - 2007	137
Maine	1766 - 2007	544
Massachusetts	1668 - 2007	355
New Hampshire	1638 - 2007	360
Rhode Island	1776 - 2007	38
Vermont	1843 - 2007	73
New York	1840 - 2007	755
<i>Total Number of Earthquakes within the New England states between 1638 and 1989 is 2262.</i>		

Source: Northeast States Emergency Consortium website,  
[www.nesec.org/hazards/earthquakes.cfm](http://www.nesec.org/hazards/earthquakes.cfm)

Hatfield has not been affected by any earthquakes.

### Probability of Future Events

One measure of earthquake activity is the Earthquake Index Value. It is calculated based on historical earthquake events data using USA.com algorithms. It is an indicator of the earthquake activity level in a region. A higher earthquake index value means a higher chance of earthquake events. Data was used for Hampshire County to determine the Earthquake Index Value as shown in the table below.

Earthquake Index for Hampshire County	
Hampshire County	0.17

Massachusetts	0.70
United States	1.81

Based upon existing records, there is a “low” frequency of earthquakes in Hatfield with between a 1 percent and 2 percent chance of an earthquake occurring in any given year.

### **Impact**

Massachusetts introduced earthquake design requirements into their building code in 1975 and improved building code for seismic reasons in the 1980s. However, these specifications apply only to new buildings or to extensively-modified existing buildings. Buildings, bridges, water supply lines, electrical power lines and facilities built before the 1980s may not have been designed to withstand the forces of an earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code. Approximately 75.4% of Hatfield’s housing stock was built prior to the creation of the 1975 building code.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$377,418,559 is used.

An estimated 100 percent of damage would occur to 20 percent of structures, resulting in a total of \$75,483,712 worth of damage and 2,108 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

### **Vulnerability**

Based on this analysis, Hatfield faces a hazard index rating of “3-medium risk” from earthquakes.

## Dam Failure / Levee Breach

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### Hazard Description

Dams and levees and their associated impoundments provide many benefits to a community, such as water supply, recreation, hydroelectric power generation, and flood control. However, they also pose a potential risk to lives and property. Dam failure is not a common occurrence, but dams do represent a potentially disastrous hazard. When a dam or levee fails, the potential energy of the stored water behind the dam is released rapidly. Most dam and failures occur when floodwaters above overtop and erode the material components of the dam. Often dam and levee breaches lead to catastrophic consequences as the water rushes in a torrent downstream flooding an area engineers refer to as an “inundation area.” The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Many dams in Massachusetts were built during the 19<sup>th</sup> Century without the benefit of modern engineering design and construction oversight. Dams of this age can fail because of structural problems due to age and/or lack of proper maintenance, as well as from structural damage caused by an earthquake or flooding.

The Massachusetts Department of Conservation and Recreation Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

### Location

Hatfield has two dams located within its boundaries, each of which is a legacy of Hatfield’s industrial heritage. Most dams are located on the Mill and Running Gutter River.

Dams in Hatfield	
Dam	Hazard Level
West Whately Reservoir Dam	High Hazard
Francis Ryan Reservoir Dam	High Hazard

### Extent

Often dam or levee breaches lead to catastrophic consequences as the water ultimately rushes in a torrent downstream flooding an area engineers refer to as an “inundation area.” The

number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Dams in Massachusetts are assessed according to their risk to life and property. The state has three hazard classifications for dams:

- *High Hazard:* Dams located where failure or improper operation is likely to cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads.
- *Significant Hazard:* Dams located where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities.
- *Low Hazard:* Dams located where failure or improper operation may cause minimal property damage to others. Loss of life is not expected.

### **Previous Occurrences**

To date, there have been no dam failures in Hatfield.

### **Probability of Future Events**

As Hatfield's dams age, and if maintenance is deferred, the likelihood of a dam failure will increase, but, currently the frequency of dam failures is "very low" with a less than 1 percent chance of a dam failing in any given year.

As described in the Massachusetts Hazard Mitigation Plan, dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hydrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream. Throughout the west, communities downstream of dams are already seeing increases in stream flows from earlier releases from dams. Dams are constructed with safety features known as "spillways." Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. Although climate change will not increase the probability of catastrophic dam failure, it may increase the probability of design failures.

## **Impact**

The town faces a limited impact from failure of dams or levees with a high hazard level, with 5 percent of Hatfield affected.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property in town, \$377,418,559 is used, along with all inhabitants of homes.

An estimated 100 percent of damage would occur to 5 percent of structures, resulting in a total of \$18,870,928 worth of damage and 163 people affected. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

## **Vulnerability**

Based on this analysis, Hatfield faces a hazard index rating of “3 -medium risk” from dam failure or levee breach. In 2013 the Town met with representatives from Northampton and Whately to update joint plans for potential dam breach.

# Drought

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Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

## Location

Because of this hazard’s regional nature, a drought would impact the entire town, meaning the location of occurrence is “large” with over 50 percent of the town affected.

## Extent

The severity of a drought would determine the scale of the event and would vary among town residents depending on whether the residents’ water supply is derived from a private well or the public water system. Massachusetts’ wells are permitted according to their ability to meet demand for 180 days at maximum capacity with no recharge; if these conditions extended beyond the thresholds that determine supply capacity the damage from a drought could be widespread due to depleted groundwater supplies.

The U.S. Drought Monitor also records information on historical drought occurrence. Unfortunately, data could only be found at the state level. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

U.S. Drought Monitor		
Classification	Category	Description
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Source: US Drought Monitor, <http://droughtmonitor.unl.edu/classify.htm>

### Previous Occurrences

In Massachusetts, six major droughts have occurred statewide since 1930.<sup>4</sup> They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table indicates previous occurrences of drought since 2000, based on the US Drought Monitor:

Annual Drought Status	
Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 99% of the state
2003	No drought
2004	D0 conditions in 44% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 57% of the state
2009	D0 conditions in 44% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state

Source: US Drought Monitor

Hatfield has not been impacted by any previous droughts in the state.

### Probability of Future Events

In Hatfield, as in the rest of the state, drought occurs at a “low” probability of between 1 percent and 10 percent in a single given year.

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture based economy), and infrastructure, may affect the severity and length of a drought event.

When evaluating the region’s risk for drought on a national level, utilizing a measure called the Palmer Drought Severity Index, Massachusetts is historically in the lowest percentile for severity and risk of drought.<sup>5</sup> However, global warming and climate change may have an effect on

<sup>4</sup> US Geological Survey Water-Supply Paper 2375. “National Water Summary 1989 – Floods and Droughts: Massachusetts.” Prepared by S. William Wandle, Jr., US Geological Survey.

<sup>5</sup> National Drought Mitigation Center – <http://drought.unl.edu>

drought risk in the region. With the projected temperature increases, some scientists think that the global hydrological cycle will also intensify. This would cause, among other effects, the potential for more severe, longer-lasting droughts.

### **Impact**

Due to the water richness of western Massachusetts, Hatfield is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard. Consequentially, the impact of a drought is “minor,” with minimal damages to people or property likely to occur.

### **Vulnerability**

Based on the above assessment, Hatfield faces a hazard index rating of “4 - low risk” from drought.

## **Extreme Temperatures**

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As per the Massachusetts Hazard Mitigation Plan, extreme cold is a dangerous situation that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat. There is no universal definition for extreme temperatures, with the term relative to local weather conditions. For Massachusetts, extreme temperatures can be defined as those that are far outside the normal ranges. The average temperatures for Massachusetts are:

- Winter (Dec-Feb) Average = 27.51°F
- Summer (Jun-Aug) Average = 68.15°F

Criteria for issuing alerts for Massachusetts are provided on National Weather Service web pages:

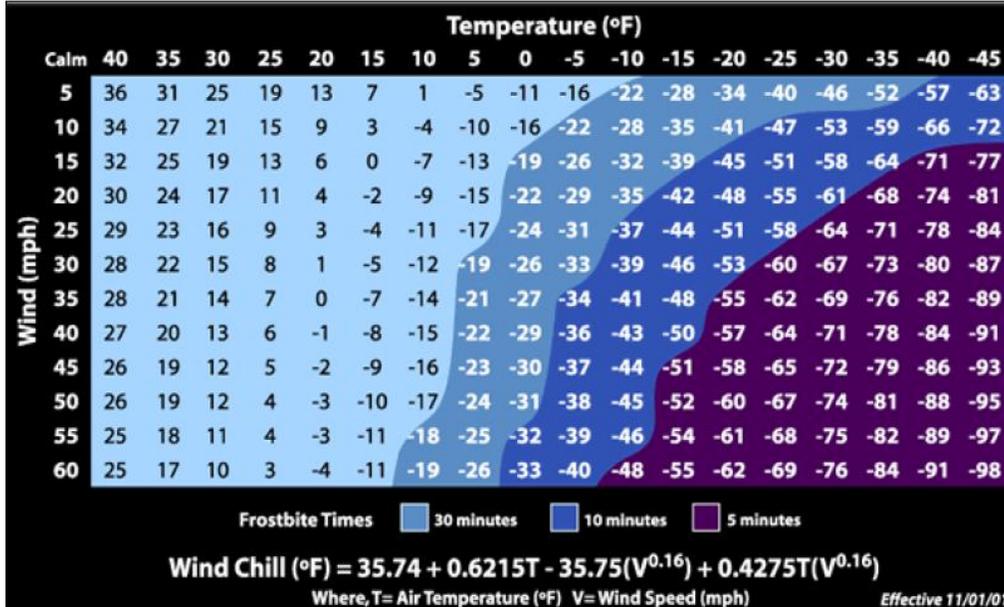
<http://www.erh.noaa.gov/box/warningcriteria.shtml>.

### **Extent**

As per the Massachusetts Hazard Mitigation Plan, the extent (severity or magnitude) of extreme cold temperatures are generally measured through the Wind Chill Temperature Index. Wind Chill Temperature is the temperature that people and animals feel when outside and it is based on the rate of heat loss from exposed skin by the effects of wind and cold. The chart shows three shaded areas of frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops. In Massachusetts, a wind chill warning is issued by the NWS Taunton Forecast Office when the Wind Chill Temperature Index, based on sustained wind, is – 25°F or lower for at least three hours.

Extreme temperatures would affect the whole community.

## Wind Chills



For extremely hot temperatures, the heat index scale is used, which combines relative humidity with actual air temperature to determine the risk to humans. The NWS issues a Heat Advisory when the Heat Index is forecast to reach 100-104 degrees F for 2 or more hours. The NWS issues an Excessive Heat Warning if the Heat Index is forecast to reach 105+ degrees F for 2 or more hours. The following chart indicates the relationship between heat index and relative humidity:

## Heat Index

Relative Humidity (%)		80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	
	40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136	
	45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137		
	50	81	83	85	88	91	95	99	103	108	113	118	124	131	137			
	55	81	84	86	89	93	97	101	106	112	117	124	130	137				
	60	82	84	88	91	95	100	105	110	116	123	129	137					
	65	82	85	89	93	98	103	108	114	121	128	136						
	70	83	86	90	95	100	105	112	119	126	134							
	75	84	88	92	97	103	109	116	124	132								
	80	84	89	94	100	106	113	121	129									
	85	85	90	96	102	110	117	126	135									
	90	86	91	98	105	113	122	131										
	95	86	93	100	108	117	127											
	100	87	95	103	112	121	132											
<b>Category</b>		<b>Heat Index</b>					<b>Health Hazards</b>											
Extreme Danger		130 °F – Higher					Heat Stroke or Sunstroke is likely with continued exposure.											
Danger		105 °F – 129 °F					Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.											
Extreme Caution		90 °F – 105 °F					Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.											
Caution		80 °F – 90 °F					Fatigue possible with prolonged exposure and/or physical activity.											

### Previous Occurrences

The following are some of the lowest temperatures recorded in parts of Massachusetts for the period from 1895 to present (Source: NOAA, [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)):

- Blue Hills, MA- -21°F
- Boston, MA- -12°F
- Worcester, MA- -19°F

The following are some of the highest temperatures recorded for the period from 1895 to present (Source: NOAA, [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)):

- Blue Hills, MA - 101°F
- Boston, MA - 102°F
- Worcester, MA - 96°F

### Probability of Future Events

The probability of future extreme heat and extreme cold is considered to be "low," or between 1 and 10 percent in any given year.

**Impact**

The impact of extreme heat or cold in Hatfield is considered to be "minor," with no property damage and very limited affect on humans.

**Vulnerability**

Hatfield's vulnerability from extreme heat and cold is considered to be, "5 - Lowest Risk."

## **Other Hazards**

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In addition to the hazards identified above, the Hazard Mitigation Committee reviewed the full list of hazards listed in the Massachusetts Hazard Mitigation Plan. Due to the location and context of the City, coastal erosion, landslides, and tsunamis, were determined to not be a threat.

## 4 – CRITICAL FACILITIES

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort.
- Maintains an existing level of protection from hazards for the community.
- Would create a secondary disaster if a hazard were to impact it.

### **Critical Facilities within Hazard Areas**

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Hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding. There are several critical facilities that fall within the 100-year floodplain as shown in the table at the end of this section.

The Critical Facilities List for the Town of Hatfield has been identified by the members of the local Hazard Mitigation Committee. Hatfield's Hazard Mitigation Committee has broken up this list of facilities into three categories. The first category contains facilities needed for Emergency Response in the event of a disaster. The second category contains Non-Emergency Response Facilities that have been identified by the Committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Hatfield. The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster. The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster. The Critical Facilities Map at the end of this Plan identifies these facilities.

### **Category 1 – Emergency Response Services**

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The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations Center**  
Public Safety Building at Hatfield Fire Station- 3 School Street (renovated in 2014)
2. **Fire Station**  
Hatfield Fire Station- 3 School Street
3. **Police Station**  
Hatfield Police Department – 3 School Street
4. **Highway Garage**  
Located at Hatfield Transfer Station – Straits Road
5. **Water Department**  
Hatfield Water Treatment Plant – Reservoir Road
6. **Emergency Fuel Stations**

**2,000 gallons of Diesel at the DPW**  
 2,000 gallons of unleaded at the DPW

**7. Emergency Electrical Power Facility**

- EOC Public Safety Building 3 School Street
- Hatfield Water Treatment Plant – Reservoir Road
- Hatfield Waste Water Treatment Plant – Main Street
- Hatfield Elementary School – Main Street

**8. Emergency Centers (not Red Cross Approved)**

Town is participating in sub-regional shelter planning and for extended sheltering would direct residents to Shelter at Smith Vocational School in Northampton

Center Name & Address	Capacity @ 40 sq. ft. / person	Restrictions (if applicable)
Hatfield Elementary School 33 Main Street	1119	

**9. Hydrants - Fire Ponds - Water Sources**

Numerous locations in Hatfield

**10. Transfer Station**

Hatfield Transfer Station – Straits Road

**11. Utilities**

Hatfield Sewer Department serves half of the Town

**12. Helicopter Landing Sites**

- Rear section of 33 Main Street
- Brockway Smith Company – Chestnut Street
- Omasta Well – Pantry Road

**13. Communications**

- Cell Towers – One Located at Brockway Smith**
- Telephone Crossboxes:
- Central Switching Office – Verizon Building Located on Chestnut Street**

**14. Primary Evacuation Routes**

- Elm Street/Maple Street
- Chestnut Street
- North Hatfield Road
- Depot Road
- N Main Street to River Rd

**15. Bridges Located on Evacuation Routes**

Maple Street Bridge

Chestnut Street Bridge—subject to seasonal flooding.

## **Category 2 – Non Emergency Response Facilities**

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The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Hatfield.

**1. Water Supply**

Running Gutter Brook Reservoir – Horse Mountain

West Hatfield Well, back up

Omasta Well, back up

**2. Sewer Infrastructure (Pump Stations)**

Hatfield Waste Water Treatment Plant – Main Street  
need list from DPW

**3. Problem Culverts**

The DPW reports no problem culverts at this time

## **Category 3 – Facilities/Populations to Protect**

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The third category contains people and facilities that need to be protected in event of a disaster.

**1. Special Needs Population**

103A Prospect Street and 60 Main Street Building 2

**2. Elderly Housing/Disabled**

Capawonk Housing Authority – 2 School Street

139-143 West Street

Hatfield Village 115 Elm Street

**3. Recreation Areas**

Hatfield Reservoir and Watershed – Horse Mountain

State Boat Ramp – Kellogg Hill Road

Hatfield Elementary School Grounds – Main Street

Smith Academy Fields – School Street

Town Park – School / Main Street

Center School Playing Fields

Bashin Rd

**4. Schools**

Hatfield Elementary School – Main Street  
Smith Academy – School Street

**5. Churches**

1<sup>st</sup> Congregational Church – Main Street  
Our Lady of Grace - School Street

**6. Historic Buildings/Sites**

Town Hall -- Main Street  
Hatfield Public Library – Main Street  
Mary Lou and Robert J. Cutter Hatfield Farm Museum – Main Street

**7. Apartment Complexes**

Kenwood – West Street  
115 Elm Street, Hatfield Village  
Elm St Meadows - Elm Street  
Capawonk Housing Authority

**8. Employment Centers**

C&S Wholesale Grocers – Elm Street

**9. Mobile Home Parks**

West Street/Pantry Road – 40-plus units

**Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas**

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding (100-year Flood)	Farm fields in East Hatfield, Mill River below dam, Main Street Historical District	Schools, Sewage Pump Station, Hatfield Dikes Along the Connecticut River affected by erosion	N. Hatfield Rd. Chestnut Street, Depot Road, N. Main St.
Microburst	Chestnut Street West Street, falling debris	None	Route 5
Drought	Entire Town of Hatfield	Minor impact on all services	None
Tornadoes	Variable	Localized damage, depending on extent of storm	Location determines impact
Wildfires/Brushfires	West Hatfield – 3,800 acres	Town Public Water Supply	Old Stage Road, Linseed Road, Rocks Rd. Mountain Rd., Reservoir Rd.

**(Critical Facilities Map Located In Back of Plan)**

## 5 – MITIGATION CAPABILITIES/STRATEGIES

One of the steps of this Hazard Mitigation Plan is to evaluate all of the town’s existing policies and practices related to natural hazards and identify potential gaps in protection. After reviewing these policies and the hazard identification and assessment, the Hazard Mitigation Committee developed a set of hazard mitigation strategies it would like to have implemented moving forward. As noted previously, the Town used the FEMA Capability Assessment Worksheet 4.1 from the March 2013 Local Mitigation Planning Handbook to assess existing capabilities, completed form is included in Appendix.

The Town of Hatfield has developed the following goal to serve as a framework for mitigation of the hazards identified in this plan.

### Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to the following hazards: flooding, severe snowstorms/ice storms, severe thunderstorms, hurricanes, tornadoes, wildfires/brushfires, earthquakes, dam failures, and drought.

### Existing Mitigation Capabilities/Strategies

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The Town of Hatfield had many mitigation capabilities/strategies in place prior to the update of this Hazard Mitigation Plan in 2014. These capabilities/strategies are included on the following pages and have been evaluated in the “Effectiveness” column.

Strategies that were completed since the last version of the plan are listed in bold. For a list of completed strategies that were previously identified as part of the prioritized implementation list, see the table of “Deleted and Completed Strategies” later in this section.

## **Flooding**

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The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways. The town currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the town's zoning ordinance, and subdivision regulations. Infrastructure like dams and culverts are in place to manage the flow of water.

### **Management Plans**

The Comprehensive Emergency Management (CEM) Plan for Hatfield lists the following measures for flood planning:

- Identify areas in the community that are flood prone and define methods to minimize the risk. Review National Flood Insurance Maps.
- Disseminate emergency public information and instructions concerning flood preparedness and safety.
- Community leaders should ensure that Hatfield continues to be enrolled in the National Flood Insurance Program.
- Strict adherence should be paid to land use and building codes, (e.g. Wetlands Protection Act), and new construction should not be built in flood-prone areas.
- Ensure that flood control works are in good operating condition at all times.
- Natural water storage areas should be preserved.
- Maintain plans for managing all flood emergency response activities including addressing potentially hazardous dams.

### **Subdivision Rules and Regulations**

Hatfield's most recent draft of its Subdivision Rules and Regulations (November 13, 1996) which govern the subdivision of land were adopted for the purpose of "protecting the safety, convenience, and welfare of the inhabitants of the inhabitants of [Hatfield]...by regulating the laying out and construction of ways in subdivision providing access to the several lots therein, but which have not become public ways, and ensuring sanitary conditions in subdivision and in proper cases parks and open areas. The powers of a planning board and of a board of appeal under the subdivision control law shall be exercised with due regard for the provision of adequate access to all of the lots in a subdivision by ways that will be safe and convenient for travel; for lessening congestion in such ways and in the adjacent public ways; for reducing the

danger to life and limb in the operation of motor vehicles; for securing safety in case of a fire, flood, panic, and other emergencies; for insuring compliance with the applicable zoning ordinances or by-laws; for securing adequate provision for water, sewerage, drainage, and other requirements where necessary in a subdivision; and for co-coordinating the ways in a subdivision with each other and with the public ways in the city or town in which it is located and with the ways in neighboring subdivisions.” The Subdivision Rules and Regulations, found in Appendix F, contain several provisions that mitigate the potential for, and impact of, flooding, including:

- A required preliminary plan that depicts a drainage plan, adjacent natural waterways, existing drainage and utility lines, and the topography of the surrounding area
- Regulated grading of no less than .5% and no more than 6% (for tertiary roads) or 10% (for local roads)
- Required preservation of all existing natural and cultural features, including landscape elements which act as natural flood infrastructure
- A storm water run-off plan that includes the installation of catch-basins every 300’ that can sustain a 50-year storm

### **Hatfield Zoning By-Laws**

The Town of Hatfield has established a set of bylaws designed “to promote and regulate the use of land, buildings and structures to the full extent of the independent constitutional powers of cities and towns and to protect the health, safety and general welfare of Hatfield's present and future inhabitants (Hatfield Zoning Bylaws, Amended 2013).” The Zoning By-Laws include several provisions that mitigate the potential for flooding, as illustrated below.

- The Site Plan Review process requires the submission of an erosion control plan that details practices aimed at minimizing adverse impacts on sedimentation and vegetation to preserve natural hydrology
- The Floodplain Overlay District encompasses flood zones A and A1-30, imposing wetland restrictions and permitting only low-impact uses by-right, such as agriculture and conservation in order to protect the natural floodplain and reduce future losses
- The Riverfront Overlay District preserves the natural floodplains in Hatfield by permitting only low-impact uses by-right
- The Water Supply Protection District preserves Hatfield’s natural hydrology by ensuring it is not impinged upon by development that could be detrimental to the environment and place structures within floodways
- Stormwater Management Performance Standards and Bylaw seek to reduce the volume of run-off by limiting modifications to the environment and requiring development to include effective infrastructure that can sustain during a 50-year storm.

- An Open Space Development By-Right Bylaw encourages the physical clustering of residential structures, subsequently preserving open space, in order to maintain pervious surfaces and natural flood infrastructure
- Transfer of Development Rights encourages developers to build in areas which are not increasingly environmentally sensitive and prone to flooding.

### **Wetlands Protection**

The Town of Hatfield follows the standards established by the Wetlands Protection Act, which protects water bodies and wetlands through the town Conservation Commission. The Town also has instituted its Stream and Lake Protection District, an overlay district that provides restrictions on the location of septic tanks and leach fields, as well as on the impacting of the flood storage capacity of the land.

### **Hatfield Open Space and Recreation Plan**

Recent efforts by the Town of Hatfield Conservation Commission and others have resulted in the creation of municipal plans that are useful for flood hazard mitigation purposes. Hatfield is just now completing an update to the 2008 Open Space and Recreation Plan, which, when approved, will be current until 2020. The intent of the document is not to address hazard mitigation or flood control in a direct or comprehensive way; however, it inventories the natural features and environments in the town, many of which, such as wetlands, aquifer recharge areas, farms, rivers, streams, and brooks, contain floodplain, dam failure inundation or localized flooding areas.

The plan highlights the importance of balancing future development with the preservation of the community's natural and scenic resources. The preservation of open space and farmland will provide flood storage capacity, which reduces the amount of impervious surfaces in an area, as well as other benefits not directly related to natural hazard mitigation.

The following 5-year goals of the 2008 Plan that impact the Natural Hazards Mitigation Plan, and their status as reflected in the final draft version of the 2014 Updated Plan, are as follows:  
 Goal C: Advocate for protection and restoration of the Hatfield Dam (Status - Ongoing)  
 Goal D: Protect Hatfield's water supply by prioritizing and acquiring land within the Running Gutter watershed (Status - Acquired 2 parcels in 2010 and in the process of protecting 2 additional parcels in 2013); by prioritizing and acquiring land within the Town Well's Zone II or other permanent conservation restriction (Status - Ongoing); and by seeking Tax Title Taking on remaining "Owner Unknown" parcels in Running Gutter watershed (Status - 2 parcels of approximately 30 acres identified and they are currently in tax title taking process).

New significant 5-year goals identified in the updated 2014 Plan include:

Goal C: Protect Wetlands and Floodplain

Objective: Promote the value of the wetlands and floodplains in the community • Action - Reach out to owner of the Mill River dam to determine its condition and develop a consensus between Town and landowner regarding the future of the dam;

Objective: Prevent residential and nonagricultural development from occurring in the floodplains to ensure adequate flood storage capacity and prevent public hazards • Action - Identify at risk parcels along public roads and acquire the properties or development rights.

Goal D: Protect Water Supply

Objective: Promote the value of continued drinking water protection • Action - Educate the public about the Towns' water supply through signage at the Terry Blunt Watershed and Conservation Area;

Objective: Permanently protect open space within the primary recharge areas to the Town Wells and Running Gutter Reservoir watershed • Action - Prioritize and acquire land within the Town Well's Zone II or other permanent conservation restriction.

Goal E: Protect Woodlands

Objective: Support sustainable forestry practices on private & town-owned lands to ensure healthy forest ecosystems & control of invasive species, and prevent down gradient erosion and flooding • Action - Annually contract with a forest management consultant for the purposes of implementing best forestry practices on town owned lands.

### **National Flood Insurance Program**

The National Flood Insurance Program has produced maps that identify floodways across America. Hatfield is a participating member of the National Flood Insurance Program, and had the following NFIP policy and claim statistics as of 2013:

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file with the Hatfield Planning Board.
- FIRMs have been effective since May 31, 1974 with the current map in effect since April 3, 1978.
- Hatfield has 52 in-force policies in effect for a total of \$11,759,800 worth of insurance.
- There have been a total of 5 NFIP losses claimed for which \$25,823.41 has been paid.
- As of 2014, there have been 0 Repetitive Loss Properties in Hatfield.
- The town will maintain compliance with the NFIP throughout the next 5-year Hazard Mitigation Planning cycle by monitoring its Flood Plain Overlay District and ensuring that the district accurately reflects the 100-year flood plain and FEMA Flood Insurance Rate Map (FIRM).

The Flood Insurance Rate Maps in Hampshire County are scheduled to be updated by FEMA in the next few years. When these maps are updated, the Town of Hatfield will adjust its zoning to accommodate changes to the location of floodplains.

### Existing Flooding Mitigation Measures

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
<p style="text-align: center;">Comprehensive Emergency Management Plan</p>	<p>The CEM Plan lists the following measures for flood planning: Identify areas in the community that are flood prone, review National Flood Insurance Maps, disseminate emergency public information and instructions concerning flood preparedness and safety, adhere to land use and building codes, ensure that flood control works are in good condition, and preservation of natural are in good operating condition at all times.</p>	<p style="text-align: center;">Entire Town.</p>	<p style="text-align: center;">Effective.</p>	<p style="text-align: center;">None.</p>

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
<p><b>Subdivision Rules and Regulations</b></p>	<p>Requires a Preliminary and Definitive Plan for new subdivisions, including location of all wetlands, cultural properties, natural lands, and proposed storm drainage of land.</p> <p>Hatfield’s Development Impact Statement (DIS) requires a storm drainage system that is designed to handle a 50 year storm.</p>	<p>Entire town.</p>	<p>Somewhat effective for mitigating or preventing localized flooding of roads and other infrastructure.</p> <p>Somewhat effective for controlling impacts from stormwater runoff.</p>	<p>None.</p> <p>None.</p>

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
<b>Zoning Bylaws:</b>				
<b>Erosion Control</b>	Requires that the site design, materials, and construction processes be designed to avoid erosion damage, sedimentation or uncontrolled surface water runoff and regulates slope and vegetative cover.	Entire town.	Somewhat effective for controlling surface runoff and erosion problems.	None.
<b>Site Plan Review</b>	Requires that plans show storm drainage.  Requires that the development process minimize the impact on wetlands, floodplain lands, aquifer recharge areas and town infrastructure.		Somewhat effective for controlling surface runoff and erosion problems.	None.
<b>Floodplain Overlay District</b>	Purpose includes to preserve natural flood control characteristics and flood storage capacity of the flood plain and to preserve and maintain the ground water table and water recharge areas within the flood plain.	Areas delineated by the Hatfield Flood Insurance Rate Map	Somewhat effective for minimizing impacts of development on flood levels within flood plain.  Effective method of	None.

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
<b>Open Space Development Allowed by Right</b>	Allows development of land in a subdivision pattern, but preserves open space by requiring that 40% of the land be set aside and protected with either a Conservation Restriction or Agricultural Preservation Restriction.	Entire Town	preserving a portion of the Town's flood storage lands.	None.
<b>Special Permits</b>	Prior to issuing of a Special Permit, the Planning Board or Zoning Board will consider potential impacts on the natural environment and on neighborhood character and social structures.	Entire town.	Somewhat effective for ensuring that permitted projects do not increase flooding potential.	Consider adding more specific impacts to address including topographic change, removal of cover vegetation, risk of erosion or siltation and increased storm water runoff.
<b>Town of Hatfield Open Space and Recreation Plan</b>	Inventories natural features and promotes natural resource preservation in the town, including areas in the floodplain; such as wetlands, aquifer recharge areas, farms and open space, rivers, streams and brooks.	Entire town.	Effective in identifying sensitive resource areas, including floodplains.  Encourages forestland and farmland protection, which will	None

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
			help conserve the town's flood storage capacity.	
<b>Participation in the National Flood Insurance Program</b>	As of 2013, there were 52 policies in effect in Hatfield for a total of \$11,759,800	Areas identified by the FEMA maps.	Somewhat effective, provided that the town remains enrolled in the National Flood Insurance Program.	<b>The town should evaluate whether to become a part of FEMA's Community Rating System.</b>  <b>Carry forward</b>
<b>Beaver Management Strategy</b>	Removing beaver dams, when necessary, can protect the property and lives of Hatfield residents.	Areas within the 100-Year Floodplain.	Would be effective in controlling the negative impacts of flooding caused by beaver activity.	None
<b>Water Supply Protection District</b>	Restrict Development in primary and secondary recharge areas of groundwater aquifers and the watershed areas of the Town (Running Gutter Brook) Reservoir and the Mountain Street Reservoir	Municipal Drinking Water Supply	Effective tool for preventing development along sensitive lands and floodplains.	None
<b>Riverfront Overlay District</b>	Restricts development and land use types along Hatfield's riverfront parcels; regulations same as Floodplain Overlay, but also excludes seasonal camps.	Hatfield Riverfront Overlay District – March 17, 2003	Somewhat effective for minimizing impacts of development on flood levels within flood plain.	None

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
<b>Transfer of Development Rights</b>	Allows developers to buy development credits and transfer them to areas that have been selected for their ability to handle greater levels of development. This mechanism protects open space and directs development to existing centers.	Entire Town	Effective tool for preventing the loss of critical flood storage lands.	None
<b>Subdivision Regulations – Design Standards for Roads</b>	Standards include street grade regulations (.05 to 6 percent maximum).	Entire town.	Effective.	None.

## **Severe Snowstorms/Ice Storms**

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Winter storms can be especially challenging for emergency management personnel even though the storm has been forecast. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors National Weather Service (NWS) alerting systems when winter storms are expected.<sup>6</sup>

### **Management Plans**

The CEM Plan for Hatfield lists the following generic mitigation measures for severe winter storms:

- Develop and disseminate emergency public information concerning winter storms, especially material which instructs individuals and families how to stock their homes, prepare their vehicles, and take care of themselves during a severe winter storm.

To the extent that some of the damages from a winter storm can be caused by flooding, all of the flood protection mitigation measures described in Table 4-1 can also be considered as mitigation measures for severe snowstorms/ice storms.

### **Restrictions on Development**

There are no restrictions on development that are directly related to severe winter storms. The Town of Hatfield Subdivision Rules and Regulations set grade limits on streets as part of its Section 4000 Required Improvements, and restrictions on utility placement (Section III. Procedure for the Submission and Approval of Plans, Sub-Section V, Design Standards), which, although not specified as weather hazard mitigation, can serve to minimize accident potential and power loss from severe winter storms:

### **Other Mitigation Measures**

The Town is participating in sub-regional sheltering with other Hampshire County communities and is confident of sheltering capabilities in the event of extended power outages.

### **State Building Code**

For new or recently built structures, the primary protection against snow-related damage is construction according to the State Building Code, which addresses designing buildings to withstand snow loads. The Town of Hatfield has measures in place for building inspections.

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<sup>6</sup> Comprehensive Emergency Management Plan for the Town of Hatfield, 2001.

### Existing Severe Snows and Ice Storm Mitigation Measures

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Comprehensive Emergency Management Plan	The CEM Plan lists the following mitigation measure for severe winter storms: Develop and disseminate emergency public information concerning winter storms, especially material which instructs individuals and families how to stock their homes, prepare their vehicles, and take care of themselves during a severe winter storm.	Entire town.	Effective.	None.
Subdivision Regulations – Utilities (electric and telephone)	The town requires all utilities for new subdivisions to be underground.	Entire town.	Somewhat effective for ensuring that utility service is uninterrupted by severe storms in new areas of residential development.	None.
State Building Code	Hatfield follows the Massachusetts State Building Code.	Entire town.	Effective.	None.

## **Hurricanes / Severe Thunderstorms / Wind / Tornadoes**

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Hurricanes, severe thunderstorms, and tornadoes all generate high winds that can fell trees, down electrical wires, and generate hurtling debris. This common characteristic means that the same set of mitigation strategies applies equally to all four hazards. For example, current land development regulations, such as restrictions on the height of telecommunications towers, can help prevent wind damages from all four types of hazards. In addition to wind damage, hurricanes can generate significant flooding that damages buildings, infrastructure and threatens human lives. All of the existing mitigation measures listed in the Flooding section are also hurricane mitigation measures.

### **Management Plans**

The Comprehensive Emergency Management (CEM) Plan for Hatfield includes the following mitigation measures for hurricanes, severe thunderstorms, wind, and tornadoes:

- Develop and enforce building codes to enhance structural resistance to high winds.
- Develop and disseminate emergency public information and instructions concerning disaster safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.

### **Zoning**

Although the Town of Hatfield does not maintain an independent zoning ordinance that governs the design of wireless communication facilities, the facilities are overseen by the Special Permit and Site Plan review process.

- **5.4 SPECIAL PERMITS WITH SITE PLAN APPROVAL**
- Section 5.4.7 Site Plan Approval Decisions and Criteria
- 5.4.7.9 Electric lines, telecommunications lines and other such utilities shall be underground

### **Restrictions on Development**

The only restrictions on development that are wind-related are the provisions in the zoning bylaw related to the burying of utilities when a special permit requires site plan review.

### **Mobile Homes**

According to the Town of Hatfield's Zoning Bylaws, mobile homes are not allowed in Hatfield. However, a pre-existing trailer park is located in town and future planning efforts should take into consideration any potential impacts of a natural hazard on residents of this trailer park.

## **State Building Code**

For new or recently built structures, the primary protection against wind-related damage is construction that adheres to the State Building Code, which, when followed, results in buildings that withstand high winds. The Town of Hatfield has measures in place to guarantee building inspection services are provided.

**Existing Hurricane / Thunderstorm / Wind / Tornado Mitigation Measures**

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Comprehensive Emergency Management Plan	The CEM includes the following mitigation measures: 1) Develop and enforce building codes to enhance structural resistance to high winds and 2) develop and disseminate emergency public information and instructions concerning disaster safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.	Entire town.	Effective.	None.
Site Plan Review for tele-communications facilities	Special Permit and Site Plan Review process applicable to the design and construction of new wireless communication facilities	Entire town.	Somewhat Effective, no independent zoning ordinance	

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Subdivision Regulations – Utilities (electric and telephone)	The town requires all utilities for new subdivisions to be underground.	Entire town.	Somewhat effective for ensuring that utility service is uninterrupted by severe storms in new areas of residential development.	None.
Zoning Regulations regarding new mobile homes	Mobile homes are not an allowed use.	Entire town.	Does not address the potential for wind-related damage to mobile homes.	None.
State Building Code	The Town of Hatfield has adopted the Massachusetts State Building Code.	Entire town.	Effective.	None.

## **Wildfires/Brushfires**

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Wildfire and brushfire mitigation strategies involve educating people about how to prevent fires from starting, as well as controlling burns within the city.

### **Management Plans**

The Hatfield Comprehensive Emergency Management Plan does not include any specific information on wildfires.

### **Regulatory Measures**

**Burn Permits:** The Hatfield Fire Department issues burn permits to town residents with the following stipulations: the burn permit must be issued on the day that the burn has been scheduled, the forecast cannot call for a windy day, and a burn permit will not be issued if the season has been particularly dry.

**Subdivision Review:** The following measures are required in Hatfield's Land Use Regulations for the Development Impact Statement for a subdivision and/or a special permit application:

Appendix A: Development Impact Statement [The impact of the proposed subdivision is to be described according to the following criteria...]:

Section III Support Systems

f. Fire Protection – Discuss the type and capacity of fuel storage facilities, location of storage areas for hazardous substances, special requirements, and distance to fire station.

Section 5.3.5 Procedures for Review and Referral of SPA

**Public Education/Outreach:** The Hatfield Fire Department maintains a public outreach program that targets children and seniors with the intention of spreading information about fire safety within these two populations. Furthermore, the City has a safety inspection program that works to ensure that fire safety standards are being met.

### **Restrictions on Development**

There are currently no restrictions on development that are based on the need to mitigate the hazards of wildfires and brushfires.

### Existing Wildfire/Brushfire Hazard Mitigation Measures

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Burn Permits	Residents are permitted to obtain burn permits over the phone. State police personnel provide information on safe burn practices.	Entire town.	Effective.	None.
Subdivision Review:  Fire Safety	<p>The Fire Department is involved in the review of subdivision plans.</p> <p>The Town of Hatfield has extensive public water supplies and all residents are within the town's fire prevention operations.</p> <p>Regulations allow lower water flows above certain elevations for sprinkler systems and water storage in houses that are not connected to city water lines.</p>	Entire town.	<p>Effective.</p> <p>Would be effective in providing for an increase in fire suppression capacity.</p> <p>Effective.</p>	None.
Public Education/Outreach	The Fire Department has an ongoing educational program in the schools.	Entire town.	Effective.	None.

## **Earthquakes**

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Although there are five mapped seismological faults in Massachusetts, there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard for which to plan.

Most buildings and structures in the state were constructed without specific earthquake resistant design features. In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the City's recovery from an earthquake.

### **Management Plans**

The Hatfield Comprehensive Emergency Management Plan lists the following mitigation measures for earthquakes:

- Community leaders in cooperation with Emergency Management Personnel maintain an assessment of structures and land areas that are especially vulnerable to earthquake.
- Strict adherence should be paid to land use and earthquake resistant building codes for all new construction.
- Periodic evaluation, repair, and/or improvement should be made to older public structures.
- Emergency earthquake public information and instructions should be developed and disseminated.

### **State Building Code**

State and local building inspectors are guided by regulations put forth in the Massachusetts State Building Code. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975 and included specific earthquake resistant design standards. These seismic requirements for new construction have been revised and updated over the years and are part of the current, 6<sup>th</sup> Edition of the Massachusetts State Building Code. Given that most structures in Massachusetts were built before 1975, of many buildings and structures do not have specific earthquake resistant design features. According to the 2000 U.S. Census, 65 percent of the housing in Hatfield was built before 1970. In addition, built areas underlain by artificial fill, sandy or clay soils are particularly vulnerable to damage during an earthquake.

### **Restrictions on Development**

There are no seismic-related restrictions on development.

### Existing Earthquake Hazard Mitigation Measures

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Comprehensive Emergency Management Plan	The CEM Plan includes measures for earthquake preparation that include keeping an assessment of structures and land areas that are especially vulnerable to earthquakes, strict adherence to building code, periodic evaluation, repair, and/or improvement to older public structures, and dissemination of public information about how to prepare for earthquakes.	Entire town.	Effective.	None.
State Building Code	The City of Hatfield has adopted the 8 <sup>th</sup> Edition of the State Building Code.	Entire town.	Effective for new buildings only.	None

## **Dam Failures / Levee Breach**

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Dam or levee failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has nowhere to flow.

### **Management Plans and Regulatory Measures**

The Hatfield Comprehensive Emergency Management (CEM) Plan contains the following mitigation measures for dam failure:

- Develop and conduct public education programs concerning dam hazards.
- Maintain up-to-date plans to deal with threat and actual occurrence of dam over-spill or failure.
- Emergency Management and other local government agencies should familiarize themselves with technical data and other information pertinent to the dams which impact Hatfield. This should include determining the probable extent and seriousness of the effect to downstream areas.
- Dams should be inspected periodically and monitored regularly.
- Repairs should be attended to promptly.
- As much as is possible burdens on faulty dams should be lessened through stream re-channeling.
- Identify dam owners.
- Determine minimum notification time for down stream areas.
- Contaminate-laden waste (including dams that hold back pollution from traveling downstream).

### **Permits Required for New Dam Construction**

Massachusetts State Law (M.G.L. Chapter 253 Section 45) regulates the construction of new dams. A permit must be obtained from the Department of Conservation and Recreation (DCR) before construction can begin. One of the permit requirements is that all local approvals or permits must be obtained. All new dams must adhere to seismic requirements set forth in the 8<sup>th</sup> Edition of the Massachusetts State Building Code.

### **Dam Inspections and Removal of Dams**

The DCR requires that dams rated as Low Hazards are inspected every ten years and dams that are rated as Medium/Significant Hazards are inspected every five years. High Hazard dams must be inspected every two years.

### **Zoning**

There is no mention made regarding the construction of new dams in Hatfield.

### **Restrictions on Development**

There are no restrictions on dam locations. The DCR issues permits for new dams and does have the authority to deny a permit if it is determined that the design and/or location of the dam is not acceptable.

### Existing Dam Failure Hazard Mitigation Measures

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Comprehensive Emergency Management Plan	The CEM Plan includes a variety of public education and regular maintenance initiatives for dam and levee safety.	Entire town.	Effective.	None.
Permits required for new dam construction	State law requires a permit for the construction of any dam.	Entire town.	Effective. Ensures dams are adequately designed.	None.
Dam Inspections	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Entire town.	Dams located on private land must be inspected by property owner. The City's Conservation Commission is responsible for inspecting two City-owned dams and DPW for three City-owned dams.	None.

## Drought

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Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. Drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place, such as ensuring that groundwater is recharged.

### Management Plans

The Hatfield CEM Plan lists the following generic mitigation measures for drought the town can commit to:

- Seek to balance demand on water supply through land use, zoning and other tools.
- Encourage water conservation and water control measures to ease demand on water supply.
- Improve efficiency and capacity of the water supply system, including lead detection and repair.

The Hatfield CEM Plan lists the following generic preparedness measures for drought:

- Identify potential emergency water sources, such as a purchase from adjoining communities if available.
- Keep abreast of drought forecasts issued by the State Drought Task Force
- Encourage businesses and other bulk users to develop water conservation and shortage plans.

### State Regulations

The Town of Hatfield follows the state's Water Management Act, which limits the amount of water consumption during a state-issued Water Emergency Declaration. For more information visit: [www.mass.gov/eea/agencies/massdep/water/drinking/the-massachusetts-water-management-act-program.html](http://www.mass.gov/eea/agencies/massdep/water/drinking/the-massachusetts-water-management-act-program.html).

### Municipal Operations

Hatfield has implemented a series of policies that can lessen the town's overall demand on its water supply at both peak and normal periods of demand. Customer metering has been applied to 95 percent of the Hatfield Water Department's coverage area, which can allow residents to gauge their water usage.

Hatfield has an active Drought and Emergency Plan, which contains policies and measures for how to cope with water shortages. To prevent water shortages, the town adopted aquifer protection regulations in 1990, which will help to limit development around the town's surface water supply, the town's main source of water; and followed suit in 2002 with wellhead protection regulations for the West Hatfield Well and the Omasta Well.

## **Restrictions on Development**

Floodplain and watershed protection overlays limit development within areas that contribute to aquifer recharge zones and surface water supplies. Furthermore, Title V regulations limit the placement of houses in lands that are unsuitable for water and septic infrastructure.

### Existing Drought Mitigation Measures

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Massachusetts Water Management Act	Regulates amount of water that can be used during a Water Emergency Declaration.	Entire town.	Effective.	None.
Identification and reduction of water system leaks	The Department of Public Works routinely inspects and repairs water system leaks.	Entire town.	Effective.	None.
Intermunicipal emergency water connections	The Town worked in 2012-2014 to enter into a inter-municipal water supply connection agreement with the neighboring city of Northampton based on findings from a hydraulic survey	Entire town.	Effective.	None.

## **Extreme Temperatures**

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Although Massachusetts does not face extreme temperatures like many other places in the country, it is increasingly susceptible to extreme heat and cold. Extreme temperatures can be effectively managed with a combination of public information and education informing residents of techniques they can use to stay cool in the event of extreme heat and the availability of cooling/warming centers as well as public shelters in the event of power outages during extreme temperature events.

Hatfield is an active participant in the Hampshire county regional emergency planning committee (REPC) and is working to identify appropriate regional shelter locations. In the event of extreme heat, residents without air conditioning or the ability to stay cool are encouraged to cool off in air conditioned municipal buildings.

**Existing Extreme Temperature Mitigation Measures**

Existing Action	Description	Area Covered	Effectiveness	Potential Changes
Educate residents on how to stay cool/warm, as appropriate in the event of extreme temperatures	Educational pamphlets distributed to elders as well as use of reverse 911 calling	Entire town.	Effective.	None.

## Strategies from 2008 plan with their status as of 2015

MITIGATION ACTION	RESPONSIBLE DEPARTMENT/BOARD	PROPOSED COMPLETION DATE	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST/ACTUAL	PRIORITY	2015 STATUS
Allocate funding for a Reverse 911 call system. Had Blackboard Connect and then switched to Code Red in 2014	Board of Selectmen, Police and Fire Departments, Emergency Planning Committee	2007	Town Staff/Revenue	\$16,000/\$3,006	High	Completed
Evaluate all Mass Care Shelters and Reception Centers to see if they are earthquake resistant	Building Inspector, Emergency Management Director	2007	Town Staff	N/A	Medium	Completed, in that the region has gone to sub-regional sheltering for overnight
Add flood impact analysis to the Environmental Impact Statement	Planning Board	2007	Town Staff/Volunteers	N/A	Low	Town has floodplain overlay district and determined that the existing overlay district is functioning effectively To Delete
Extend emergency preparedness booklet to all households, use CTY as outlet	EMD, Police and Fire Departments, Council on Aging	2007	Town Staff/Volunteers	N/A	Low	Completed-COA regularly distributes using CodeRed (upgrade from CTY) to older adults and in 2014 did town-wide distribution

Add flood prevention and mitigation to purpose statement for subdivision rules and regulations	Planning Board	2007	Town Staff/Volunteers	N/A	Low	To delete
Ensure shelters have back-up power and water	Building Inspector, EMD	2007	Town Staff	To be Determined	High	Completed
Inventory supplies at existing shelters and obtain written Memoranda of Agreements with local businesses for food and medical supplies	Emergency Planning Committee, Hatfield Elementary Principal, Smith Academy Principal	2008	Town Staff/Volunteers	N/A	High	Completed- Town shelters are used for warming/cooling centers and overnight goes to Smith-Voc in N'Hamp
Make Hatfield NPDES Phase II compliant on time.	Conservation Commission, Planning Board, Board of Selectmen, Department of Public Works	2008	Town Staff/Volunteers	To be Determined	Very High	Completed
Replacement of Undersized Culverts throughout Town	Board of Selectmen, Highway Department	2008	HMGP	To be Determined	Very High	Completed, but still more to replace/repair, see new strategy list
Become a part of FEMA's Community Rating System	Board of Selectmen, EMD	2009	Town Staff	N/A	High	Not Completed- want to research this year
Develop a Beaver Management Strategy	Board of Health, Fire Department, Highway Department, Police Department, Conservation Commission.	2009	Town Staff/Volunteers	N/A	High	DELETE-State law prohibits Beaver trapping
Develop an action plan for toxic chemical releases along transit routes	EMD, LEPC	2009	Town Staff	N/A	High	Keep in - this is an annual; need
Establish an Action Plan that Addresses Chlorine Releases at EPA Tier II Locations	Hampshire Regional Emergency Planning Committee	2010	Town Staff/Volunteers	N/A	High	Completed
Identify all Pre-FIRM structures throughout Town that need to be elevated above the base-flood elevation	Building Inspector, Fire Department	2010	Town Staff Volunteers	N/A	High	Delete--b/c not possible to achieve

Establish a program to identify and clean-up properties within flood zones	Building Inspector, Board of Health	2011	Town Staff	N/A	Medium	Delete-no longer necessary as there was just one problem property
Repair toe of Hatfield Dike	EMD, DPW, Board of Selectmen	2012	Town Staff, HMGP, Army Corps, Capital Budget	\$200,000	High-move to top of list	Partially completed and need to keep in
Maintain Emergency Management Planning Committee	Board of Selectmen, EMD	On-going	Town Staff/Volunteers	N/A	High	Annual need
Implement Open Space and Recreation Plan	Conservation Commission, Planning Board, Board of Selectmen, add Open Space Committee	On-going	Town Staff/Volunteers	To Be Determined	High	Keep in as this is ongoing-progress is being made
Develop and distribute an educational pamphlet on fire safety and prevention.	Fire Department	On-going	Town Staff/Volunteers	N/A	Medium	Completed and this is an annual need but not mitigation

## Prioritized Implementation Plan

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Several of the action items previously identified in the 2007 Hazard Mitigation Plan are currently continuing, either because they require more time to secure funding or their construction process is ongoing. In addition, the Hazard Mitigation Committee identified several new strategies that are also being pursued. These new strategies are based on experience with currently implemented strategies, as well as the hazard identification and risk assessment in this plan. Overall mitigation strategy priorities have not changed since the last version of this plan, with specific mitigation strategies addressing all identified hazards through a combination of planning, public outreach, and infrastructure improvements.

## Prioritization Methodology

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The Hatfield Hazard Mitigation Planning Committee reviewed and prioritized a list of previously identified and new mitigation strategies using the following criteria:

**Application to multiple hazards** – Strategies are given a higher priority if they assist in the mitigation of several natural hazards.

**Time required for completion** – Projects that are faster to implement, either due to the nature of the permitting process or other regulatory procedures, or because of the time it takes to secure funding, are given higher priority.

**Estimated benefit** – Strategies which would provide the highest degree of reduction in loss of property and life are given a higher priority. This estimate is based on the Hazard Identification and Analysis Chapter, particularly with regard to how much of each hazard's impact would be mitigated.

**Cost effectiveness** – in order to maximize the effect of mitigation efforts using limited funds, priority is given to low-cost strategies. For example, regular tree maintenance is a relatively low-cost operational strategy that can significantly reduce the length of time of power outages during a winter storm. Strategies that have identified potential funding streams, such as the Hazard Mitigation Grant Program, are also given higher priority.

**Eligibility Under Hazard Mitigation Grant Program** – The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Funding is made available through FEMA by the Massachusetts Emergency Management Agency. Municipalities apply for grants to fund specific mitigation projects under MEMA requirements

The following categories are used to define the priority of each mitigation strategy:

**Low** – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical

**Medium** – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people

**High** – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete

Several hazard mitigation strategies identified in the previous Hazard Mitigation Plan have not yet been completed, but were changed in priority during the update of this plan by the Hazard Mitigation Committee. The Committee changed priorities by evaluating the entire list of mitigation strategies in a comprehensive manner according to the factors listed above. For strategies that have changed in priority, the previous priority is provided in parenthesis in the “Priority” column.

## Cost Estimates

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Each of the following implementation strategies is provided with a cost estimate. Projects that already have secured funding are noted as such. Where precise financial estimates are not currently available, categories were used with the following assigned dollar ranges:

- **Low** – cost less than \$50,000
- **Medium** – cost between \$50,000 – \$100,000
- **High** – cost over \$100,000

Cost estimates take into account the following resources:

- Town staff time for grant application and administration (at a rate of est. \$35 per hour (avg of staff working on plan update))
- Consultant design and construction cost (based on estimates for projects obtained from city and general knowledge of previous work in Town)
- Town staff time for construction, maintenance, and operation activities (at a rate of est. \$35 per hour (avg of staff working on plan update))

## Project Timeline

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Each strategy is provided with an estimated length of time it will take for implementation. Where funding has been secured for the project, a specific future date is provided for when completion will occur. However, some projects do not currently have funding and thus it is difficult to know exactly when they will be completed. For these projects, an estimate is provided for the amount of time it will take to complete the project once funding becomes available.

**MITIGATION STRATEGIES TO BE IMPLEMENTED**

<b>MITIGATION ACTION</b>	<b>STATUS</b>	<b>ACTION TYPE</b>	<b>HAZARDS MITIGATED</b>	<b>RESPONSIBLE DEPARTMENT/ BOARD</b>	<b>TIMEFRAME</b>	<b>POTENTIAL FUNDING SOURCE(S)</b>	<b>ESTIMATED COST</b>	<b>PRIORITY</b>
Monitor Toe of Hatfield Dike (on CT River) and be prepared to repair as necessary	The Dike is a major flood mitigation structure and it requires ongoing maintenance and occasional repair. Significant repair and maintenance work was undertaken in 2011 and it is anticipated that additional major maintenance will be necessary	Implementation / Maintenance	Flooding, Tropical Storms, Hurricanes, severe thunderstorms	DPW	After securing funding, 8-10 months	HMGP, 25% local match	high	high
Develop a local system for monitoring the status of the Mill River	This is a new strategy for the Town to take on. There are gauges on the river, but the Town wants to establish its own system of regularly monitoring available information to assure up to date information	Programmatic	Flooding, Tropical Storms, Hurricanes	DPW/EMD	2020, 3-6 months	local	low	low
Review problem culvert list and work to upgrade high priority problem culverts	The Town made progress repairing problem culverts in the last five years, but with the increase in severe rain events, they need to be constantly upgraded, repaired, and in some places replaced.	Implementation / Maintenance	Flooding, Tropical Storms, Hurricanes	DPW	After securing funding, target 2018, 6-12 months	HMGP, possibly secure 25% local match from MassDOT ch 90 funds or local	high	high
Become a part of FEMA's Community Rating System--review the CRS Coordinator's Manual (2013), contact ISO/CRS Specialist and complete 'What if' table to assess community cost/benefit of participation <sup>7</sup>	Did not work on this and plan to research costs in 2016	Programmatic	Flooding	Board of Selectmen, EMD	3-6 months	local	low	medium

<sup>7</sup> additional detail on the CRS in Appendix A

**MITIGATION STRATEGIES TO BE IMPLEMENTED**

<b>MITIGATION ACTION</b>	<b>STATUS</b>	<b>ACTION TYPE</b>	<b>HAZARDS MITIGATED</b>	<b>RESPONSIBLE DEPARTMENT/ BOARD</b>	<b>TIMEFRAME</b>	<b>POTENTIAL FUNDING SOURCE(S)</b>	<b>ESTIMATED COST</b>	<b>PRIORITY</b>
Establish a back-up power system for Pumping Stations in the event of power outages, the pumping stations would not operate dramatically increasing the likelihood of flooding	This is a new initiative proposed by the Town	Implementation / Maintenance	All hazards	DPW/EMD	After securing funding, 8-10 months	HMGP 25% local match	high	high
Maintain tree trimming and tree maintenance and inspection system Note: existing capability and very important to continue	This is an ongoing activity and it is the Town's chief mitigation strategy for snow and ice storms. The Town collaborates with and works closely with the Electric utility company.	Implementation / Maintenance	Snow and Ice Storms, Tropical Storms, Hurricanes	DPW	This work will be undertaken annually	local	low	high
Research means to restrict access to area in Town that flood	This is a new strategy the Town is considering to mitigate the need to rescue people who go into areas that have flooded and then are unable to exit	Prevention	Flooding, Tropical Storms, Hurricanes, Severe thunderstorms	EMD/Fire	3-6 months to research	local	low	low

## 6: PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

### Plan Adoption

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Upon completion of the draft Hazard Mitigation Plan, a public meeting was held on September 3, 2015 to receive comments. The Hazard Mitigation Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency for their review. Upon receiving conditional approval of the plan by FEMA, the plan was presented to the Hatfield SelectBoard and adopted.

### Plan Implementation

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The implementation of this plan began upon its formal adoption by the SelectBoard and approval by MEMA and FEMA. Those Town departments and boards responsible for ensuring the development of policies, ordinance revisions, and programs as described in Sections 5 and 6 of this plan will be notified of their responsibilities immediately following approval. The Hazard Mitigation Committee will oversee the implementation of the plan.

### Incorporation with Other Planning Documents

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Existing plans, studies, reports and municipal documents were incorporated throughout the planning process. This included a review and incorporation of significant information from the following key documents:

- ***Hatfield Comprehensive Emergency Management Plan*** (particularly the Critical Infrastructure Section) – the Critical Infrastructure section was used to identify those infrastructure components in Hatfield that have been identified as crucial to the function of the Town; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
- ***Hatfield Open Space, and Recreation, Plan 2011-2018***– this Plan was used to identify the natural context within which the Hatfield mitigation planning would take place. This proved useful insofar as it identified water bodies, rivers, streams, infrastructure components (i.e. water and sewer, or the lack thereof), as well as population trends. This was incorporated to ensure that the Town's mitigation efforts would be sensitive to the surrounding environment. During the OSRP update, the Town can use the work of the Hazard Mitigation Plan to incorporate identified hazard areas into open space and recreation planning. This could either take the form of acquiring parcels of land that are currently un-developed, but situated within an identified hazard area, as permanent open space, thereby minimizing the likelihood that critical infrastructure components will be constructed in an area prone to damage from natural hazards.

- ***Hatfield Zoning Bylaws and Subdivision Regulations*** - The Town's Zoning was used to gather identify those actions that the Town is already taking that are reducing the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts.
- ***Massachusetts' State Hazard Mitigation Plan*** - This plan was used to insure that the City's HMP was consistent with the State's Plan.

The Hazard Mitigation Plan will also be incorporated into updates of the following plans:

- Comprehensive Emergency Management Plan
- Open Space, Recreation, Plan 2008 Plan and 2015 Update

During regular update meetings for the Hazard Mitigation Plan, the Hazard Mitigation Committee will review whether any of these plans are in the process of being updated. If so, the Hazard Mitigation Committee will provide copies of the Hazard Mitigation Plan to relevant Town staff and brief them on the content of the Hazard Mitigation Plan. The Hazard Mitigation Committee will also review current Town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan.

### **Plan Monitoring and Evaluation**

The measure of success of the Hatfield Hazard Mitigation Plan Update 2015 will be the number of identified mitigation strategies implemented. In order for the Town to become more disaster resilient, there must be a coordinated effort between elected officials, appointed bodies, Town employees, regional and state agencies involved in disaster mitigation, and the general public.

The Hatfield Hazard Mitigation Committee will meet on an annual basis or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm for strategies to remove obstacles to implementation. Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different Town departments and/or revise the goals and objectives contained in the plan. The committee will review and update the plan every year, beginning in the Spring of 2016. The meetings of the committee will be organized and facilitated by the Emergency Management Director.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee (Local Emergency Planning Committee-LEPC) will hold all meetings in accordance with Massachusetts open meeting laws. Hard copies of the plan will be available in Town Hall and at the Town Library. The Hazard Mitigation Committee (LEPC) will meet annually to discuss any needs and amendments. Any proposed amendments will be advertised and posted on the Town's website. Any changes will be proceeded by a public hearing and solicitation of public comments.

**CERTIFICATE OF ADOPTION**  
**TOWN OF HATFIELD, MASSACHUSETTS**  
**BOARD OF SELECTMEN**  
**A RESOLUTION ADOPTING THE TOWN OF HATFIELD**  
**NATURAL HAZARD MITIGATION PLAN UPDATE**

WHEREAS, the Town of Hatfield established a Committee to update the Hatfield Natural Hazard Mitigation plan; and

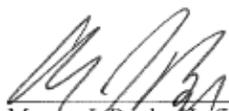
WHEREAS, several public planning meetings were held between June 2015 and January 2016 regarding the development and review of the Hatfield Natural Hazard Mitigation Plan Update; and

WHEREAS, the Hatfield Natural Hazard Mitigation Plan Update contains several potential future projects to mitigate natural hazard damage in the Town of Hatfield; and

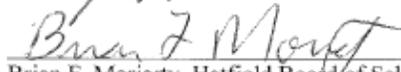
WHEREAS, a duly-noticed public hearing was held by the Hatfield Board of Selectmen on April 26, 2016 to formally approve and adopt the Hatfield Natural Hazard Mitigation Plan Update.

NOW, THEREFORE BE IT RESOLVED that the Hatfield Board of Selectmen adopts the Hatfield Natural Hazard Mitigation Plan Update.

ADOPTED AND SIGNED this 26<sup>th</sup> day of April 2016.



Marcus J. Boyle, Hatfield Board of Selectmen



Brian F. Moriarty, Hatfield Board of Selectmen



Patrick J. Gaughan, Hatfield Board of Selectmen

ATTEST

  
TOWN CLERK

# **APPENDICES**

# Appendix A Technical Resources & Media Outlets

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## TECHNICAL RESOURCES

### 1) Agencies

Massachusetts Emergency Management Agency (MEMA).....	508/820-2000
Hazard Mitigation Section .....	617/626-1356
Federal Emergency Management Agency (FEMA) .....	617/223-4175
MA Regional Planning Commissions:	
Berkshire Regional Planning Commission (BRPC).....	413/442-1521
Cape Cod Commission (CCC).....	508/362-3828
Central Massachusetts Regional Planning Commission (CMRPC).....	508/693-3453
Franklin Regional Council of Governments (FRCOG).....	413/774-3167
Martha’s Vineyard Commission (MVC).....	508/693-3453
Merrimack Valley Planning Commission (MVPC).....	978/374-0519
Metropolitan Area Planning Council (MAPC).....	617/451-2770
Montachusett Regional Planning Commission (MRPC).....	978/345-7376
Nantucket Planning and Economic Development Commission (NP&EDC).....	508/228-7236
Northern Middlesex Council of Governments (NMCOG).....	978/454-8021
Old Colony Planning Council (OCPC).....	508/583-1833
Pioneer Valley Planning Commission (PVPC).....	413/781-6045
Southeastern Regional Planning and Economic Development District (SRPEDD).....	508/823-1803
MA Board of Building Regulations & Standards (BBRS).....	617/227-1754
MA Coastal Zone Management (CZM).....	617/626-1200
DCR Water Supply Protection.....	617/626-1379
DCR Waterways.....	617/626-1371
DCR Office of Dam Safety.....	508/792-7716
DFW Riverways.....	617/626-1540
MA Dept. of Housing & Community Development.....	617/573-1100
Woods Hole Oceanographic Institute.....	508/457-2180
UMass-Amherst Cooperative Extension.....	413/545-4800
National Fire Protection Association (NFPA).....	617/770-3000
New England Disaster Recovery Information X-Change (NEDRIX – an association of private companies & industries involved in disaster recovery planning).....	781/485-0279
MA Board of Library Commissioners.....	617/725-1860
MA Highway Dept, District 2.....	413/582-0599
MA Division of Marine Fisheries.....	617/626-1520
MA Division of Capital & Asset Management (DCAM).....	617/727-4050
Massachusetts Association of Regional Planning Agencies (MARPA).....	413/781-6045
University of Massachusetts/Amherst.....	413/545-0111
Natural Resources Conservation Services (NRCS).....	413/253-4350
MA Historical Commission.....	617/727-8470
U.S. Army Corps of Engineers.....	978/318-8502
Northeast States Emergency Consortium, Inc. (NESEC).....	781/224-9876
Department of Commerce: National Oceanic and Atmospheric Administration: National Weather Service; Tauton, Massachusetts .....	508/824-5116
US Department of the Interior: US Fish and Wildlife Service .....	413/253-8200
US Geological Survey .....	508/490-5000

### 2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP) .....	Massachusetts Emergency Management Agency
406 Public Assistance and Hazard Mitigation .....	Massachusetts Emergency Management Agency
Community Development Block Grant (CDBG).....	DHCD, also refer to RPC
Dam Safety Program.....	MA Division of Conservation and Recreation
Disaster Preparedness Improvement Grant (DPIG) .....	Massachusetts Emergency Management Agency
Emergency Generators Program by NESEC <sup>†</sup> .....	Massachusetts Emergency Management Agency
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP) .....	Massachusetts Emergency Management Agency
Flood Plain Management Services (FPMS).....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP).....	Massachusetts Emergency Management Agency
Mutual Aid for Public Works.....	Western Massachusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) <sup>†</sup> .....	Massachusetts Emergency Management Agency
Power of Prevention Grant by NESEC <sup>‡</sup> .....	Massachusetts Emergency Management Agency
Roadway Repair & Maintenance Program(s).....	Massachusetts Highway Department
Section 14 Emergency Stream Bank Erosion & Shoreline Protection .....	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing .....	US Army Corps of Engineers
Shoreline Protection Program.....	MA Department of Conservation and Recreation
Various Forest and Lands Program(s).....	MA Department of Environmental Protection
Wetlands Programs .....	MA Department of Environmental Protection

<sup>†</sup>NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NESEC for more information.

<sup>†</sup> Note regarding National Flood Insurance Program (NFIP) and Community Rating System (CRS): The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community’s floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners.

Under the Community Rating System (CRS), communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum national standards. Under the CRS, the flood insurance premiums of a community’s residents and businesses are discounted to reflect that community’s work to reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, preserve and/or restore natural functions of floodplains, help insurance agents obtain flood data, and help people obtain flood insurance. The goals of the NFIP are to provide flood insurance to property owners, to encourage flood loss reduction activities by communities, and to save taxpayers’ money. As a part of the NFIP, the CRS provides both incentives and tools to further these goals.

A community receives a CRS classification based upon the total credit for its activities. There are 10 CRS classes. Class 1 requires the most credit points and gives the greatest premium reduction or discount. A community that does not apply for the CRS, or does not obtain the minimum number of credit points, is a Class 10 community and receives no discount on premiums. There are 19 creditable activities, organized under four categories, which are presented in the 300–600 series of the Coordinator’s Manual. The Coordinator’s Manual assigns credit points based upon the extent to which an activity advances the three goals of the CRS.

For additional detail on CRS, go to: [http://www.fema.gov/media-library-data/1406897194816-fc66ac50a3af94634751342cb35666cd/FIA-15\\_NFIP-Coordinators-Manual\\_2014.pdf](http://www.fema.gov/media-library-data/1406897194816-fc66ac50a3af94634751342cb35666cd/FIA-15_NFIP-Coordinators-Manual_2014.pdf) .

Community participation in the CRS is voluntary. Any community in full compliance with the rules and regulations of the NFIP may apply for a CRS classification better than Class 10. A community may apply to participate in the CRS at any time. The application procedures are simple: the community submits a letter of interest and shows that it is implementing activities that would receive at least 500 credit points. The documents go to the ISO/CRS Specialist for that state. The FEMA Regional Office must approve the submittal to ensure that the community is in full compliance with the minimum floodplain management criteria of the NFIP. See also Section 212. Upon receiving FEMA approval, a community verification visit is scheduled by the ISO/CRS Specialist. At this verification visit, the ISO/CRS Specialist reviews all of the community's activities that may deserve credit, even those not in the community's submittal. All CRS credit is verified according to the credit criteria in the Coordinator's Manual in effect at the time of the visit. The verification process is discussed in Activity 230.

### 3) Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	<a href="http://www.colorado.edu/litbase/hazards/">http://www.colorado.edu/litbase/hazards/</a>	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	<a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	<a href="http://nemaweb.org">http://nemaweb.org</a>	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	<a href="http://www.gsfc.nasa.gov/ndrd/disaster/">http://www.gsfc.nasa.gov/ndrd/disaster/</a>	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	<a href="http://ftpwww.gsfc.nasa.gov/ndrd/main/html">http://ftpwww.gsfc.nasa.gov/ndrd/main/html</a>	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	<a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>	General information through the federal-state partnership.
National Weather Service	<a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	<a href="http://h20.usgs.gov/public/realtime.html">http://h20.usgs.gov/public/realtime.html</a>	Provisional hydrological data
Dartmouth Flood Observatory	<a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	<a href="http://www.fema.gov/fema/csb.html">http://www.fema.gov/fema/csb.html</a>	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	<a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a>	Tracking and NWS warnings for Atlantic Hurricanes and other links
National Lightning Safety Institute	<a href="http://lightningsafety.com/">http://lightningsafety.com/</a>	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	<a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	<a href="http://www.ep.es.llnl.gov/wwwep/geohp.html">http://www.ep.es.llnl.gov/wwwep/geohp.html</a>	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	<a href="http://www.tornadoject.com/">http://www.tornadoject.com/</a>	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	<a href="http://www.nssl.uoknor.edu/">http://www.nssl.uoknor.edu/</a>	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	<a href="http://www.iaa.ix.com/ndcmap.html">http://www.iaa.ix.com/ndcmap.html</a>	A multi-disaster risk map.
Earth Satellite Corporation	<a href="http://www.earthsat.com/">http://www.earthsat.com/</a>	Flood risk maps searchable by state.
USDA Forest Service Web	<a href="http://www.fs.fed.us/land">http://www.fs.fed.us/land</a>	Information on forest fires and land management.

#### 4.) Media Organizations Sent Press Releases

##### Media Organizations Sent Press Releases

Media Organization	Address	Town	State	Zip Code
African American Point of View	688 Boston Road	Springfield	MA	01119
Agawam Advertiser News	23 Southwick Street	Feeding Hills	MA	01030
Amherst Bulletin	115 Conz Street	Hatfield	MA	01060
Belchertown Sentinel	1 Main Street	Belchertown	MA	01007
Berkshire Eagle	75 South Church Street	Pittsfield	MA	01202
Brattleboro Reformer	62 Black Mountain Rd.	Brattleboro	VT	05301
CBS 3 Springfield	One Monarch Place	Springfield	MA	01144
Chicopee Register	380 Union Street	West Springfield	MA	01089
CommonWealth Magazine	18 Tremont Street	Boston	MA	02108
Country Journal	5 Main Street	Huntington	MA	01050
Daily Hampshire Gazette	115 Conz Street	Hatfield	MA	01060
El Sol Latino	P.O. Box 572	Amherst	MA	01004
Going Green	PO Box 1367	Greenfield	MA	01302
Hilltown Families	P.O. Box 98	West Chesterfield	MA	01084
Holyoke Sun	138 College Street	South Hadley	MA	01075
Journal Register	24 Water Street	Palmer	MA	01069
La Voz Hispana	133 Maple Street #201	Springfield	MA	01105
Ludlow Register	24 Water Street	Palmer	MA	01069
Massachusetts Municipal Association	One Winthrop Street	Boston	MA	02110
Quaboag Current	80 Main Street	Ware	MA	01082
Recorder	14 Hope Street	Greenfield	MA	01302
Reminder	280 N. Main Street	East Longmeadow	MA	01028
Southwick Suffield News	23 Southwick Street	Feeding Hills	MA	01030
State House News Service	State House	Boston	MA	02133
Tantasqua Town Common	80 Main Street	Ware	MA	01082
The Longmeadow News	62 School Street	Westfield	MA	01085
The Republican	1860 Main Street	Springfield	MA	01102
The Westfield News	62 School Street	Westfield	MA	01085
Town Reminder	138 College Street	South Hadley	MA	01075
Urban Compass	83 Girard Avenue	Hartford	CT	06105
Valley Advocate	115 Conz Street	Hatfield	MA	01061
Vocero Hispano	335 Chandler Street	Worcester	MA	01602

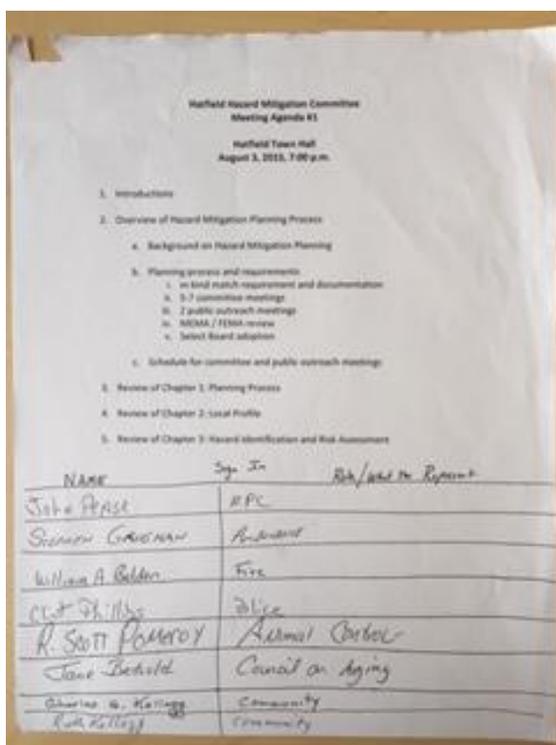
WAMC Northeast Public Radio	1215 Wilbraham Road	Springfield	MA	01119
Ware River News	80 Main Street	Ware	MA	01082
West Springfield Record	P.O. Box 357	West Springfield	MA	01098
WFCR-Public Radio	131 County Circle	Amherst	MA	01003
WGBY-Public TV	44 Hampden Street	Springfield	MA	01103
WGGB ABC40/FOX 6 News	1300 Liberty Street	Springfield	MA	01104
WHMP-FM	15 Hampton Avenue	Hatfield	MA	01060
Wilbraham-Hampden Times	2341 Boston Road	Wilbraham	MA	01095
Worcester Telegram & Gazette	20 Franklin Street	Worcester	MA	01615
WRNX/WHYN/WPKR Radio	1331 Main Street	Springfield	MA	01103
WWLP-TV 22	PO Box 2210	Springfield	MA	01102

# Appendix B Documentation of Planning Process

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**Hatfield Hazard Mitigation Committee**  
**Meeting Agenda #1**                      **Hatfield Town Hall**  
**August 3, 2015, 7:00 p.m.**

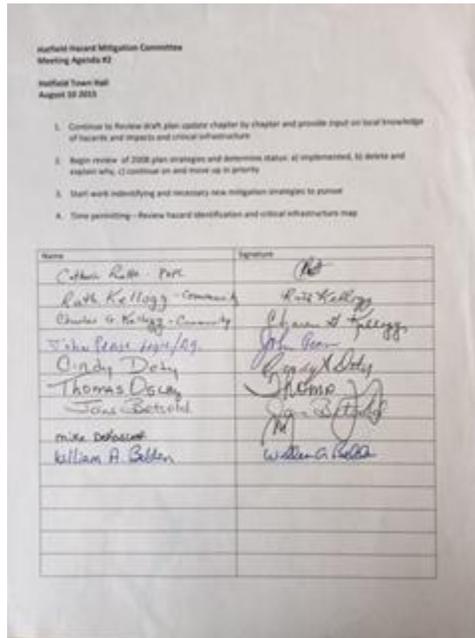
1. Introductions
2. Overview of Hazard Mitigation Planning Process
  - a. Background on Hazard Mitigation Planning
  - b. Planning process and requirements
    - i. in-kind match requirement and documentation
    - ii. 3-5 committee meetings
    - iii. 2 public outreach meetings
    - iv. MEMA / FEMA review
    - v. Select Board adoption
  - c. Schedule for committee and public outreach meetings
3. Begin Review of Chapter 1: Planning Process
4. Review of Chapter 2: Local Profile (time permitting)
5. Review of Chapter 3: Hazard Identification and Risk Assessment (time permitting)



**Hatfield Hazard Mitigation Committee  
Meeting Agenda #2**

**Hatfield Public Safety Building  
August 10 2015**

1. Continue to Review draft plan update chapter by chapter and provide input on local knowledge of hazards and impacts and critical infrastructure
2. Begin review of 2008 plan strategies and determine status: a) implemented, b) delete and explain why, c) continue on and move up in priority
3. Start work indentifying and necessary new mitigation strategies to pursue
4. Time permitting---Review hazard identification and critical infrastructure map



**Hatfield Hazard Mitigation Planning Committee  
Meeting #3**

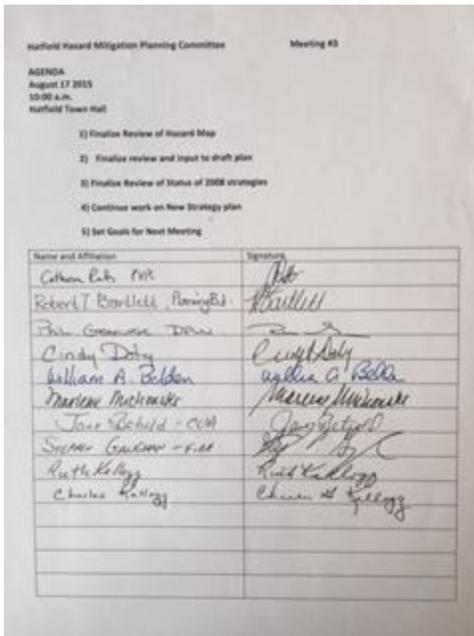
**AGENDA**

**August 17 2015**

**10:00 a.m.**

**Hatfield Public Safety Building**

- 1) Finalize Review of Hazard Map
- 2) Finalize review and input to draft plan
- 3) Finalize Review of Status of 2008 strategies
- 4) Continue work on New Strategy plan
- 5) Set Goals for Next Meeting



**Hatfield Hazard Mitigation Planning Committee  
Meeting #4**

**AGENDA**

**August 24 2015**

**10:00 a.m.**

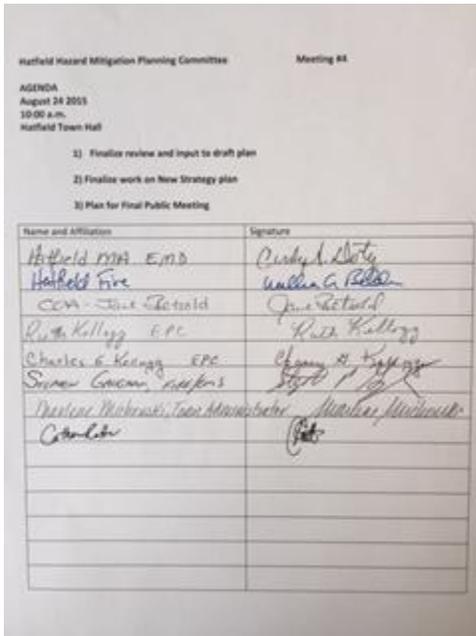
**Hatfield Public Safety Building**

**1) Prioritize Final List of Actions**

- Select Actions which Best Suit Community's Needs
- Include actions that can be implemented quickly

**2) Question and Answer Period**

**3) Set Goals for Next Meeting**



**Hatfield Hazard Mitigation Planning Committee  
Meeting #5**

**AGENDA**

**August 31 2015**

**10:00 a.m.**

**Hatfield Public Safety Building**

- 1) Develop Strategy to Implement Selected Prioritized Actions**
  - Who will be responsible for implementing each prioritized action;
  - When will these actions be implemented?
  - How will the community fund the projects?
- 2) Develop Process for Adoption and Monitoring of the Plan**
- 3) Review & Revise as Necessary Final Draft of the *Hatfield Hazard Mitigation Plan***
- 4) Discuss Next Steps for the *Hatfield Hazard Mitigation Plan* including FEMA/MEMA Review and Adoption by the Board of Selectmen.**
- 5) Question and Answer Period**

**Hatfield Hazard Mitigation Planning Committee  
Meeting #6**

**AGENDA**

**January 4 2016**

**9:00 a.m.**

**Hatfield Public Safety Building**

- 1) Address MEMA review and comments
- 2) Get on agenda of SelectBoard
- 3) Question and Answer Period

01/04/16  
0900

**HATFIELD EMERGENCY MANAGEMENT COMMITTEE**  
*Hatfield Hazard Mitigation Plan Meeting of 1/4/16*

1. Belden, William (Fire Chief) <i>Fire Chief</i>	<i>William Belden</i>
2. Benoit, Jay (CNA/Shopping)	
3. Perkins, Ellen (Board of Health)	
4. Chapin, Ira (Schools)	
5. Daly, Cindy (Donor)	<i>Cindy Daly</i>
6. Flaherty, Kerry (Schools)	<i>Kerry Flaherty</i>
7. Gaughan, Steve (Ambulance)	<i>Steve Gaughan</i>
8. Gannon, Phil (DPW)	
9. Keller, Carol (Medical)	
10. Kellogg, Charles (Communications)	<i>Charles Kellogg</i>
11. Kellogg, Ruth (Fuel Services)	<i>Ruth Kellogg</i>
12. Laska, Ed (Business/PTA)	<i>Ed Laska</i>
13. O'Leary, Thomas (Police Chief)	<i>Thomas O'Leary</i>
14. Paine, Alex (Logistics/Rescue/Aggr)	<i>Alex Paine</i>
15. Pomeroy, Scott (Animal Control)	
<b>ALTERNATES</b>	
16. DeRosier, Michael (Police AD)	
17. Flaherty, Robert (Ambulance AD)	<i>Robert Flaherty</i>
18. Gaughan, Steve (Fire AD)	
19. Laskowski, Tony (DPW AD)	
<i>Additional Attendees</i>	
<i>Risk Management, Town Admin, Medical, Fire/Police</i>	<i>[Signature]</i>

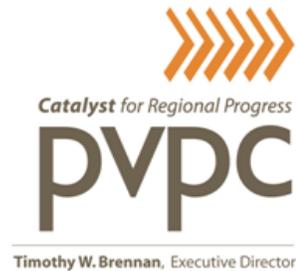
# Appendix C List of Acronyms

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FEMA	Federal Emergency Management Agency
MEMA	Massachusetts Emergency Management Agency
PVPC	Pioneer Valley Planning Commission
EPA	Environmental Protection Agency
DEP	Massachusetts' Department of Environmental Protection
NWS	National Weather Service
HMGP	Hazard Mitigation Grant Program
FMA	Flood Mitigation Assistance Program
SFHA	Special Flood Hazard Area
CIS	Community Information System
DCR	Massachusetts Department of Conservation and Recreation
FERC	Federal Energy Regulatory Commission
TRI	Toxics Release Inventory
FIRM	Flood Insurance Rate Map
NFIP	National Flood Insurance Program
CRS	Community Rating System
BOS	Board of Selectmen
DPW	Department of Public Works
LEPC	Local Emergency Planning Committee
EMD	Emergency Management Director
Con Com	Conservation Commission
Ag Com	Agricultural Commission
EOC	Emergency Operations Center
CEM Plan	Comprehensive Emergency Management Plan
EMA	Emergency Management Agency
RACES	Radio Amateur Civil Emergency Service
WMECO	Western Massachusetts Electric Company
HAZMAT	Hazardous Materials

## Appendix D Documentation of Public Comment Notices

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### MEDIA RELEASE

CONTACT: Catherine Ratté, Principal Planner/Section Manager, (413) 781-6045  
[cratte@pvpc.org](mailto:cratte@pvpc.org)

FOR IMMEDIATE RELEASE  
August 6, 2015

### Town of Hatfield Updating Hazard Mitigation Plan

#### Public Engagement Event

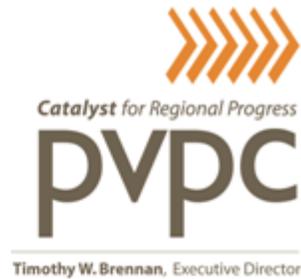
Hatfield residents are invited to provide comments on the update of the Hatfield Hazard Mitigation Plan **on Monday August 10, 7:00 pm** at the Town Hall, 59 Main Street. The plan is being updated by the Town's Local Emergency Planning Committee with assistance from the Pioneer Valley Planning Commission (PVPC) and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). All members of the public, representatives from surrounding communities, and businesses are welcome to attend the event.

The meeting will include an introduction to the hazard mitigation planning process and a summary of existing mitigation initiatives. PVPC staff will be available to answer questions and listen to comments from the public.

This planning effort is being undertaken to help the Town of Hatfield assess the risks faced from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

For more information, please contact PVPC's Catherine Ratté at [cratte@pvpc.org](mailto:cratte@pvpc.org) or (413) 781-6045.

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### **MEDIA RELEASE**

CONTACT: Catherine Ratté, Principal Planner/Section Manager (413) 781-6045  
[cratte@pvpc.org](mailto:cratte@pvpc.org)  
Cindy Doty, Hatfield Emergency Management Director (413) 247-9008  
William A. Belden, Hatfield Fire Chief (413) 247-9008

FOR IMMEDIATE RELEASE  
August 31, 2015

### **Town of Hatfield Schedules Final Public Meeting for Updating Hazard Mitigation Plan**

Hatfield residents are invited to provide comments on the proposed final version of the Hatfield Hazard Mitigation Plan UPDATE 2015 on **Thursday, September 3, 7:00 p.m.** at Town Hall, 59 Main Street.

The plan has been updated by the Town's Local Emergency Planning Committee with assistance from the Pioneer Valley Planning Commission (PVPC) and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). All members of the public, representatives from surrounding communities, and businesses are encouraged to attend the event and provide comments on the plan.

The meeting will include an overview of Hatfield's prioritized hazard mitigation strategies and a summary of existing mitigation initiatives and their status. PVPC staff will be available to answer questions and to listen to comments from the public.

This planning effort is being undertaken to help the Town of Hatfield manage risks faced from natural hazards and to be a more resilient community. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

For more information, please contact PVPC's Catherine Ratté at [cratte@pvpc.org](mailto:cratte@pvpc.org) or (413) 781-6045.

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## Hatfield Hazard Mitigation Plan Update

August, 2015






## Agenda

- Overview and benefits of hazard mitigation
- Plan development process
- Identified hazards and mitigation strategies
- Questions and discussion



## What is Hazard Mitigation?



"Any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards."

**Examples:**

- Limiting development in high-risk areas
- Retrofitting structures to protect them from floods, high winds, etc.
- Minor drainage/flood control projects in areas of localized flooding
- Fire safety education



## Mitigation and Preparedness

Hazard Mitigation	Emergency Preparedness
<ul style="list-style-type: none"> <li>Planning and zoning</li> <li>Open space preservation</li> <li>Education and outreach</li> <li>Drainage improvements</li> </ul>	<ul style="list-style-type: none"> <li>Evacuation plans and emergency shelters</li> <li>Radio communications equipment</li> <li>Emergency response drills</li> </ul>

## Benefits of Hazard Mitigation

- Makes community eligible to apply for MEMA/FEMA grant opportunities for hazard mitigation projects
- Manages Risk
- Having a plan provides an approach for using limited resources more effectively



## Components of a Hazard Mitigation Plan

**Questions considered:**

- What are the hazards in Hatfield?
- How is Hatfield affected by these hazards?
- How effective are current mitigation strategies?
- What new strategies could be implemented?



### Overview of Planning Process

- 5-7 Hazard Mitigation Committee meetings plus multiple consultations and reviews

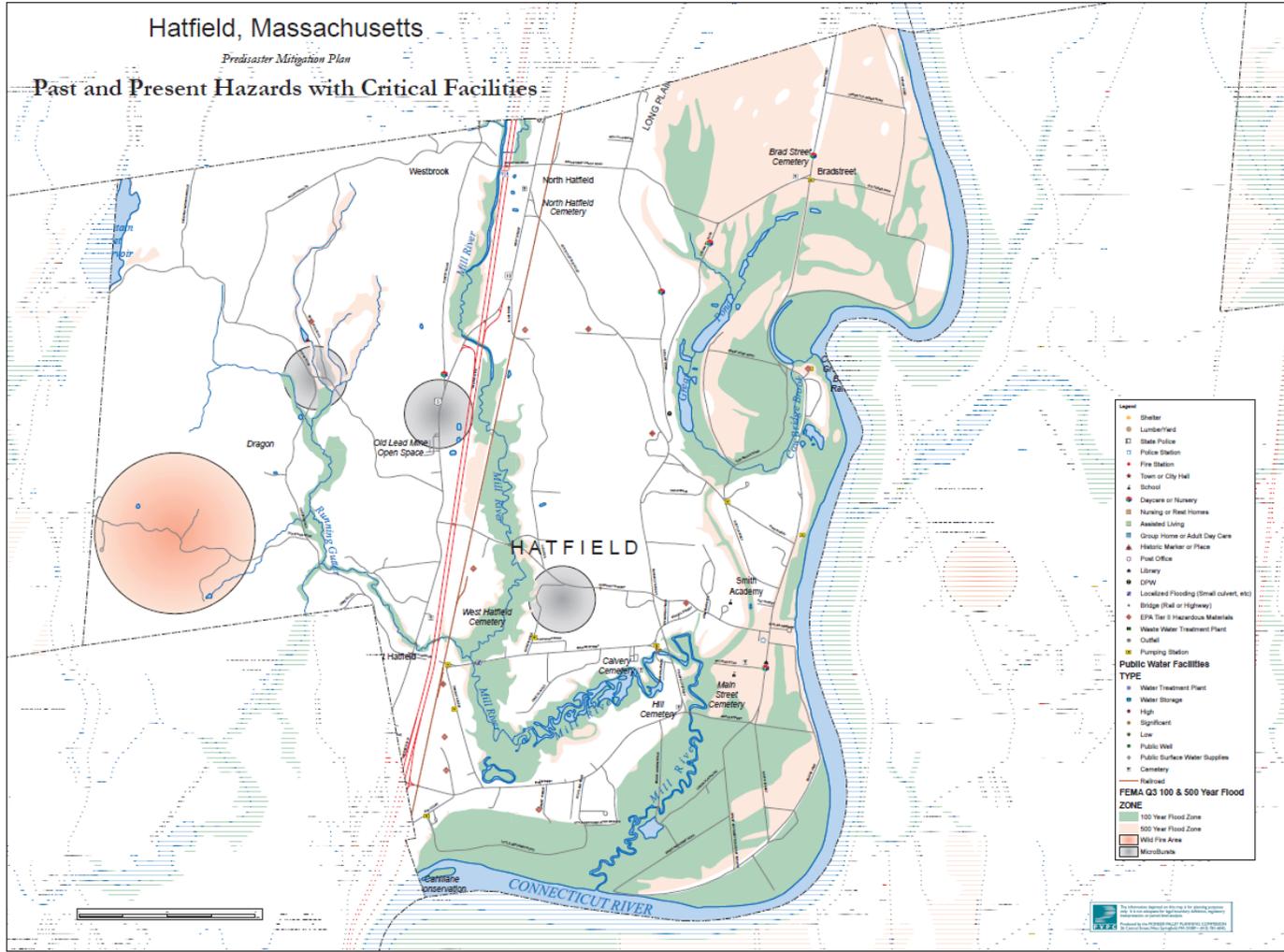
An illustration showing seven stylized human figures sitting around a large, oval wooden table. They appear to be in a meeting or discussion. The figures are colored in various shades of green, pink, and brown. The table is light brown with a darker brown border.

### Overview of Planning Process (continued)

- Two public outreach meetings
- After meetings, the plan will be revised with comments incorporated and submitted to MEMA and FEMA for comment
- Select Board will then review and adopt

For the second public meeting we did not prepare a presentation, but instead came to the meeting with copies of the draft plan as well as copies of the strategy table chart. No one other than Committee members attended.

# Appendix E-Map of Local Hazards and Critical Infrastructure



# Appendix F Capability Assessment

## Capability Assessment Worksheet

Jurisdiction: HATFIELD MA JAN 2016

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible. Complete one worksheet for each jurisdiction.

### Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Please indicate which of the following your jurisdiction has in place.

Plans	Yes/No Year	Does the plan address hazards?		
		Does the plan identify projects to include in the mitigation strategy?	Can the plan be used to implement mitigation actions?	
Comprehensive/Master Plan	Y	No	No	when updated - the process will include consideration of the Haz Mit Plan.
Capital Improvements Plan	Y	N	N	possibly
Economic Development Plan	Y	N	N	when updated, possibly.
Local Emergency Operations Plan	}	Hatfield has a state mandated Comprehensive Emergency Management Plan (CEMP) that serves these purposes and does address Response but NOT mitigation.		
Continuity of Operations Plan				
Transportation Plan				
Stormwater Management Plan	Y	N	useful in identifying potential hazards,	update-y.
Community Wildfire Protection Plan		Not Necessary		
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	Y	Open Space $\frac{1}{3}$ Reviation Plan - describes in Plan.		

# Worksheet 4.1

Capability Assessment Worksheet

Building Code, Permitting, and Inspections	Yes/No	Are codes adequately enforced?
Building Code	Y	Version/Year: Y State Building Code - updated every 3 years
Building Code Effectiveness Grading Schedule (BCEGS) Score	N/A	Score:
Fire department ISO rating	Y	Rating: 6/6X
Site plan review requirements	Y	Y
Land Use Planning and Ordinances	Yes/No	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Zoning ordinance	Y	Y, Y
Subdivision ordinance	Y	Y, Y
Floodplain ordinance	Y	Y, Y
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Y, Y
Flood insurance rate maps	Y	Y, Y
Acquisition of land for open space and public recreation uses	Y	Y, Y
Other		

**How can these capabilities be expanded and improved to reduce risk?**

Discussed @ local Haz Mit. Committee meeting on 1/4/16.  
 In 2015, there was a meeting @ UMASS that a member of the local Haz Mit committee attended. At the meeting, a recommendation was made to leave "old time stream beds" alone, and that engineering plans need to return to pre-development state. Further development of bridges and construction in floodplains may be problematic. The committee will consider this UMASS research in future planning meetings.

### Administrative and Technical

Identify whether your community has the following administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes/No	Describe capability Is coordination effective?
Planning Commission Board	Y	Board functions well.
Mitigation Planning Committee	Y	this committee has worked well
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Town Highway Dept. w/ Electric Co. as describe in Plan
Mutual aid agreements	Y	Statewide mutual aid, Police, Fire.
Staff	Yes/No FT/PT <sup>1</sup>	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Y PT	28 hrs/wk - Y
Floodplain Administrator	N	Cons. Comm - w/ monthly state staff available to assist.
Emergency Manager	Y	Y, Y, Y.
Community Planner	N	Pl. Board
Civil Engineer	N	- hire local engineering firm as needed.
GIS Coordinator	N	-
Other		

1 Full-time (FT) or part-time (PT) position

# Worksheet 4.1

## Capability Assessment Worksheet

Technical	Yes/No	Describe capability Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Y	No outdoor, effective
Hazard data and information	Y	
Grant writing	Y	Town Administrator - hike as needed - Y-HMMP
Hazus analysis	N	
Other		
How can these capabilities be expanded and improved to reduce risk?		
See Plan		

## Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Access/ Eligibility (Yes/No)	Has the funding resource been used in past and for what type of activities?
		Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Annual process Y
Authority to levy taxes for specific purposes	Y	Up to 2 1/2. No ballot? in years. can not be applied to specific areas
Fees for water, sewer, gas, or electric services	Y	water & sewer enterprise fund - only for water + sewer
Impact fees for new development	N	Not legal in MA
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	used for buying equipment that could assist w/ Haz Mit
Incur debt through private activities	N	
Community Development Block Grant	Y	on N. Hatfield Rd. to consider dev. of 60 acres & Re-use study Ctr. School
Other federal funding programs	Y	one successful HMGP grant
State funding programs	Y	water line under 91 - DHCD, sidewalks ch 90, Fire safety, DUR surplus prog.
Other	Y	At Bond rating

How can these capabilities be expanded and improved to reduce risk?

## Education and Outreach

Identify education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Yes/No	Describe program/organization and how relates to disaster resilience and mitigation. Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	N	
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	COA Fire Safety
Natural disaster or safety related school programs	Y	Fire Safety & Disaster Preparedness @ COA + in schools
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues	Y	very active in Regional EPC + Western Region Homeland Security Adv Council.
Other		

How can these capabilities be expanded and improved to reduce risk?

see plan.



