

# CITY OF EASTHAMPTON HAZARD MITIGATION PLAN



**Adopted by the Mayor of Easthampton on July 20, 2016**

Prepared by:

**Easthampton Hazard Mitigation Committee**

and

**Pioneer Valley Planning Commission**

60 Congress Street First Floor

Springfield MA 01104

(413) 781-6045

[www.pvpc.org](http://www.pvpc.org)

*This project was funded by a grant received from the Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation Services (formerly the Department of Environmental Management)*

## Table of Contents

<b>1: Planning Process</b> .....	<b>4</b>
Introduction .....	4
Hazard Mitigation Planning Process and Municipal Committee .....	5
Participation By Stakeholders .....	6
Participation by Public and Neighboring Communities .....	8
Local Adoption .....	10
<b>2: Local Profile</b> .....	<b>11</b>
Community Setting .....	11
Infrastructure .....	12
Natural Resources .....	12
Development .....	14
<b>3: Hazard Identification and Risk Assessment</b> .....	<b>16</b>
Natural Hazard Analysis Methodology .....	16
Floods .....	20
Severe Snowstorms / Ice Storms .....	26
Hurricanes .....	30
Severe Thunderstorms / Wind / Tornadoes (including Microburst) .....	34
Wildfire / Brushfire .....	37
Earthquakes .....	42
Dam Failure .....	46
Drought .....	49
Landslide .....	52
Impacts of Climate Change .....	56
Other Hazards .....	62
<b>4: Critical Facilities</b> .....	<b>63</b>
Facility Classification .....	63
Category 1 – Emergency Response Services .....	63
Category 2 – Non Emergency Response Facilities .....	65
Category 3 – Facilities/Populations to Protect .....	65
<b>5: Mitigation Capabilities &amp; Strategies</b> .....	<b>68</b>
Overview of Mitigation Strategies by Hazard .....	69
Existing Mitigation Capabilities .....	71
Deleted Mitigation Strategies .....	76
Prioritized Implementation Plan .....	78
<b>6: Plan Review, Evaluation, Implementation, and Adoption</b> .....	<b>85</b>
Plan Adoption .....	85
Plan Implementation .....	85
Plan Monitoring and Evaluation .....	86
<b>7: Appendices</b> .....	<b>89</b>
Appendix A: Technical Resources .....	89
Appendix B: Documentation of Planning Process .....	93

Appendix C: List of Acronyms .....107  
Appendix D: Critical Facilities Map .....108

**Acknowledgements**

Thanks to the Easthampton Hazard Mitigation Committee for their work updating the City's 2009 Hazard Mitigation plan.

Mayor Karen Cadieux - [mayor@easthampton.org](mailto:mayor@easthampton.org)

City Planner, Jessica Allan - [allanj@easthampton.org](mailto:allanj@easthampton.org)

DPW Director, Joseph Pipczynski - [joepip@easthampton.org](mailto:joepip@easthampton.org)

Thanks also to the Massachusetts Emergency Management Agency (MEMA) for developing the Commonwealth of Massachusetts Hazard Mitigation Plan, ([www.state.ma.us/dem/programs/mitigate/index.htm](http://www.state.ma.us/dem/programs/mitigate/index.htm)) which served as a model for this plan and to the Pioneer Valley Planning Commission for their assistance in securing funding for the City to update this plan and for their assistance in facilitating the plan update.

# 1: PLANNING PROCESS

## Introduction

---

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 City of Easthampton in collaboration with the Pioneer Valley Planning Commission (PVPC), 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 it.

Preparing, and updating every five years, a hazard mitigation plan before a disaster saves communities money and facilitates 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 their plan.

FEMA requires that a community adopt a hazard mitigation plan to be eligible for mitigation funding from the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Pre-Disaster Mitigation (PDM) Program are programs with this requirement.

The City of Easthampton developed their first Hazard Mitigation plan in collaboration with the PVPC in 2007-2008 and it was approved by FEMA on 2/10/2009. The plan expired on 2/10/14. This plan is an update to the 2009 plan. While there have not been any significant changes in development in Easthampton since 2009, the plan update reflects the city staff's work on implementation of the 2009 plan's prioritized mitigation strategies.

## **Hazard Mitigation Planning Process and Municipal Committee**

---

Planning for hazard mitigation in Easthampton involved a three member committee comprised of Mayor Karen Cadieux - mayor@easthampton.org; City Planner, Jessica Allan - allanj@easthampton.org; and DPW Director, Joseph Pipczynski - joepip@easthampton.org. The committee represents City government and the members engaged their colleagues, including the Police and Fire Departments, the Building Department and others, in the local hazard mitigation planning process.

The hazard mitigation planning process for the City 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 a list of prioritized new mitigation strategies to be implemented in the next five years.

### **Committee Meetings**

Meetings of the Hazard Mitigation Committee, which took place at the Municipal Building, 50 Payson Ave, were held on the dates listed below.

#### January 20, 2015

Overview of hazard mitigation planning, identification and organizing of the planning team, identification of critical facilities, discussion of hazard identification and risk assessment, and review of existing mitigation strategies undertaken by the City.

#### February 10, 2015

Re-visitation of critical facilities, discussion of history of natural hazard events, and discussion of potential mitigation strategies to be implemented. Reviewing of draft prioritized list of mitigation strategies, based on conversation at previous meeting.

#### February 24, 2015

Finalization of prioritized implementation strategies, discussion of the plan adoption process and procedures for regular maintenance of the plan.

Agendas and a list of Committee members present for each meeting can be found in Appendix B. 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.

## **Participation By Stakeholders**

---

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

### **Local and regional agencies involved in hazard mitigation activities and surrounding community engagement and input**

The Mayor's office assured input and participation from all City Departments, providing verbal updates on the Hazard Mitigation planning process at her regular meetings with City Department heads, and giving her Department heads the opportunity to comment and provide input on the plan update process. All city staff and departments were also informed of the public meetings on the plan update via the media coverage of the planning process and had the opportunity to participate in those meetings as well as the meetings of the Hazard Mitigation planning committee as all meeting notices were posted per requirements of the State Open Meetings law.

The Pioneer Valley Planning Commission is the regional planning agency for the 43 towns and cities in Massachusetts' Hampden and Hampshire Counties. PVPC regularly engages with the City of Easthampton 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 Easthampton Hazard Mitigation Plan by PVPC ensured that the information from these plans was incorporated into the Hazard Mitigation Planning process, and that information gathered in the course of updating Easthampton's Hazard Mitigation plan will in turn inform all of these regional planning processes.

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 attends all

WRHSAC meetings and all WRHSAC members are aware of the fact that Easthampton was updating its 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.

For the update of this Hazard Mitigation Plan, PVPC provided feedback from WRHSAC on regional mitigation activities and natural hazards pertaining to Easthampton. This was the method through which WRHSAC was engaged in the planning process. (A list of WRHSAC contacts is on p. 95)

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 Easthampton's Hazard Mitigation Plan update process and encouraged to comment. In addition, PVPC is facilitating Hazard Mitigation work in Easthampton's neighboring municipalities of Northampton, Westhampton, Southampton, Holyoke, South Hadley and Hadley at the same time as working with Easthampton, so all these municipalities were aware of and had the opportunity to share hazard mitigation information with one another. We did not receive any comments from these neighboring municipalities on Easthampton's draft plan update.

PVPC staff included summary articles 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 December 2012, April 2013 and January 2015. In this way, businesses, educational institutions and other key stakeholders were educated about and informed of Easthampton's hazard mitigation planning work. We did not receive any comments from any of these organization or entities on the draft Easthampton plan update.

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

The Easthampton Planning Board and Zoning Board of Appeals (ZBA), staffed by the City Planner Jessica Allan, are the primary City agencies responsible for regulating development in the community. Participation of and feedback to the Planning Board and ZBA was ensured through the participation of the City's planner on the Hazard Mitigation Committee. The Department of Public Works is also a key City agency overseeing development in the City and the participation of the DPW Director on the local Hazard Mitigation planning committee, is the means by which the DPW's input was integrated into the hazard mitigation plan update. Finally, the City's chief executive officer, the Mayor, served on the Hazard Mitigation committee. In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Easthampton, including the municipal entities listed above and state agencies, such as the Department of Conservation and Recreation and MassDOT. This regular involvement ensured that during the update of the Easthampton Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan.

## **Capability Assessment Summary: Existing Authorities Policies, Programs & Resources and Ability to Expand on & Improve Existing Policies & Programs**

The local Hazard Committee, with assistance provided by the PVPC, used the FEMA Capability Assessment worksheet as a guide to systematically document and assess Easthampton's existing hazard mitigation capabilities, and a discussion of existing capabilities is included in chapter 5, culminating in a chart of existing mitigation capabilities.

Easthampton has most of the no cost or low cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in floodplains, stormwater management, tree maintenance, etc. Easthampton also has appropriate staff dedicated to hazard mitigation-related work for a community its size, including the Mayor, an Emergency Management Director, a professionally run Department of Public Works, a Building Inspector, a City Planner, and a Tree Warden, and Easthampton has recommended plans in place, including a Master Plan, an Open Space and Recreation Plan, and a Capitol Improvements Plan and a Comprehensive Emergency Management Plan. Not only does Easthampton have these capabilities in place, but they are also deployed for hazard mitigation as appropriate. The City also has very committed and dedicated volunteers who serve on Boards and Committees. The City collaborates closely with surrounding communities and is party to Mutual Aid agreements through the MEMA. Easthampton is also an active member community of the Pioneer Valley Planning Commission (PVPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at the PVPC.

Easthampton's most obvious hazard mitigation need is for federal funds to implement prioritized actions. While Easthampton is a well-managed fiscally sound City, it is not a wealthy community and with state constraints on municipalities raising their own funds, Easthampton has very limited financial resources to invest in costly hazard mitigation measures. Easthampton is, however, committed to locally matching all HMGP grants received.

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

---

The public and surrounding communities had the opportunity to participate in the City of Easthampton's planning process to update their Hazard Mitigation plan via a variety of means. The PVPC has worked with all its member cities and towns since 2005 to prepare and update Hazard Mitigation plans. The PVPC is governed by a Commission of representatives from the 43 cities and towns that comprise the Pioneer Valley, including Easthampton. PVPC staff secure approval from the Executive Committee of the Commission before launching any new funded initiatives, and notes from these meetings are shared with the Commission. As a result, neighboring communities of Easthampton have been kept up to date throughout the process to update Easthampton's Hazard Mitigation plan. Neither PVPC staff nor the members of the Easthampton Hazard Mitigation committee received any comments or input from neighboring communities during the Hazard Mitigation plan update process.



Similarly, the public in Easthampton was informed of the City's plans to update their Hazard Mitigation plan via a variety of means, including articles in the local paper and postings on the City's Planning Department Facebook page. One resident attended the second Public Meeting discussing Easthampton's Hazard Mitigation plan. She represented the Easthampton Housing Authority and she attended to inquire if Hazard Mitigation funds could be used to purchase a generator for their Cliffview Manner property. She was informed that the City has a plan for purchasing and placing back-up generators at critical facilities and that generators are not generally fund-able using Hazard Mitigation funds, but that there are exceptions. Her request was considered by the Hazard Mitigation committee but at this time, and for the next five years, the City is prioritizing the Council on Aging for location of a generator.

On October 13, 2011, the PVPC sent a media release to all area media outlets announcing the Commission's application to FEMA to secure funding to update existing and prepare new Hazard Mitigation plans for ten communities, including Easthampton.

Two public planning sessions were held as part of the development of the Easthampton plan – on February 10 and February 24, 2015. Both meetings occurred after the Hazard Mitigation Committee had provided input on hazards and mitigation strategies relevant to the community. Notice of both public meetings was posted at Easthampton City Hall in compliance with the Commonwealth of Massachusetts' open meeting law. Public meeting agendas and notices can be found in Appendix B.

On January 29, 2015 the Pioneer Valley Planning Commission sent a press release to all area media outlets announcing that the hazard mitigation planning process was underway and that the first public outreach meeting would be held on February 10. On February 19, 2015 PVPC sent out another press release stating that the second public outreach meeting would take place on February 24, 2015 and that a draft of the final plan had been placed on both the City's and the PVPC's website. Both media releases were picked up by the local paper, The Republican, who printed articles about the planning process and included those articles on their website, Masslive. In addition, the City of Easthampton Planner promoted both public meetings on the City's Planning Department Facebook page and received numerous page views. Appendix B includes documentation. The press release also indicated that hard copies of the plan were available at PVPC's offices and at Easthampton City Hall, and that all residents, businesses and other concerned parties of Easthampton were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or the City.

The two press releases also encouraged citizens and municipal officials from nearby communities to comment on Easthampton's plan by e-mailing or calling staff contacts at PVPC or the City. The Pioneer Valley Planning Commission's regional scope ensured that residents and government officials throughout the Pioneer Valley saw the press release and the request for comments.

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

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process, as discussed in Chapter 6: Plan Review, Evaluation, Implementation, and Adoption.

## **Local Adoption**

---

In 2011, the Easthampton Mayor agreed to collaborate with the PVPC to seek funds from FEMA (via MEMA) to update Easthampton's Hazard Mitigation plan. PVPC was awarded funding in 2012. Updating Easthampton's plan was part of a multi community plan update funding award. Work on Easthampton's plan update began in earnest in 2014. After the plan was provisionally approved by FEMA in 2016, the Mayor adopted the updated plan on July 20, 2016.

## 2: LOCAL PROFILE

### Community Setting

---

#### Geography

Easthampton is located in Hampshire County within the Pioneer Valley region. It is bordered on the north by Easthampton, on the west by Westhampton, on the west and south by Southampton, and on the east by Holyoke. Easthampton is close to the urbanized core of the Springfield metropolitan area.

#### Population Characteristics

According to the 2010 U.S. Census, there are 16,053 Easthampton residents and a total of 7,635 housing units. The median household income is \$55,621 with 5.8 percent of residents below the poverty (American Community Survey 2008-12).

#### Economy

Easthampton residents travel an average of 22.2 minutes to work each day (ACS 2008-12). As of September 2014, the approximate labor force is 9,321 and the unemployment rate was 5.6 percent, below the state unemployment rate of 6.2 percent.

#### Climate

Easthampton is located in Hampshire County, where annual rainfall averages 44 inches and is distributed throughout the year. In addition to rain, snowfall averages 40 inches per season.

Prevailing winds from the south (and from the north/northwest to a lesser extent) reach their highest average speed during the month of April.

In the past few decades, Easthampton and all of New England have seen an increase in the number of extreme rainfall events, defined as large amounts of rain in a short period of time. In Massachusetts, the increase since 1948 has been 81 percent (Environment America Research & Policy Center, 2012).

Extreme rainfall is a cause of flooding, which is a major concern of this plan. In the last five years, there has also been an increased occurrence of tornadoes and large storms that generate strong wind gusts. A microburst occurred in Easthampton on October 8, 2014.

## **Infrastructure**

---

### **Roads and Highways**

Major transportation routes include Interstate 91, Route 10, Route 5, and Route 141. Route 10, or Easthampton Street, travels southwest from the Easthampton city line into neighboring Southamptton. Route 141, also called Holyoke Street or Mountain Road, begins in the center of the city and bisects the city north to south. Interstate 91 and Route 5 travel north-south and parallel the Connecticut River.

### **Rail**

Pan Am Railways operates a north-south line which travels through city, mostly along Route 5. Restoration of passenger rail service along this line is scheduled for 2015, though there will not be a station stop in Easthampton.

### **Public Transportation**

Within Easthampton, there is both fixed route transit service, provided by the Pioneer Valley Transit Authority (PVTA), and door-to-door accessible van service (paratransit) for elderly and disabled residents.

### **Water and Sewer**

The City of Easthampton provides public water and sewer service. The Barnes Aquifer is a sole source aquifer supplying drinking water to Easthampton through five active wells: the Nonotuck Park well, the Brook Street well, the Hendrick wellfield and Pines well off Hendrick Street, and the Maloney well off of Lovefield Street. The Nonotuck Park well and Brook Street wells are high quality sources that are pure enough to enter the distribution system without any treatment or chemical additions. As of 2014, they account for about 50 percent of the total daily supply. Water from the Pines well and the Hendrick wellfield are treated using packed tower aeration technology.

## **Natural Resources**

---

### **Watersheds**

Easthampton is part of the Connecticut River Watershed and more specifically, the Manhan River subwatershed. In Easthampton, the Manhan River is the main tributary stream to the Connecticut River. The North Branch of the Manhan, Hannum Brook, and Basset Brook flow into the Manhan from the north. From the south, Broad Brook, White Brook, Wilton Brook and Brickyard Brook flow into a series of man-made ponds in the center of city. These waters eventually reach the Manhan River about a mile above where it empties into the Oxbow and Connecticut River.

### **Surface Waters**

The pond system in Easthampton was created to supply industrial waterpower. There are three distinct water bodies:

- Nashawannuck Pond, which receives water from the Broad, Wilton and White Brook watersheds
- Upper Mill Pond or Rubber Thread Pond, which is fed by the Wilton Brook
- Lower Mill Pond, which drains tributaries to the Manhan River and is fed by the Plum and Brickyard Brook watersheds

The high rates of development and corresponding increase in impervious surfaces in the Nashawannuck Pond watershed have led, over the years, to water quality and aesthetic problems with the Pond, though many existing mitigation measures have been put in place to control these problems.

### **Aquifer Recharge Areas**

A delineation of the Zone II area was completed for the Hendrick St. wellfield. A Zone II area is defined by the Massachusetts Department of Environmental Protection as the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated. This delineation serves as the foundation for the City's Aquifer Protection Overlay Zone, which restricts development in that area.

### **Wetlands**

The bulk of wetlands in Easthampton are the floodplains of the Manhan River. There are also pockets of wetlands scattered throughout the city, including marshes and shrub swamps off of Florence Road, around Bassett Brook, and the Oxbow. These wetlands and floodplains are important for their natural resource and their economic value to the community. They provide flood storage, pollution filtration, and habitat for wildlife. Development on wetlands and flood plains impairs their function and causes costly and sometimes irreparable damage to people, property, and wildlife. Vernal pools, temporary pools of water which form in the spring and usually dry up in the summer, are another important wetland resource. They are particularly important habitat for amphibians. Few vernal pools have been certified in Easthampton, leaving these resources vulnerable to impacts as they may not be easily identified during other seasons of the year.

### **Forest**

Forests once covered the area, but were harvested and cleared in the late 1700s to make way for farming. The slopes of the Mount Tom Range, the protected lands of the New England Forestry Foundation, and stretches of land along the Manhan River are currently the largest areas of forested land in Easthampton. In 1999, there were approximately 3690 acres of forest in Easthampton, according to state land use data. The microburst of October 2014 caused significant damage to trees along Hendricks Street and possible changes to the micro-climate as a result of the microburst is being assessed.

## Development

---

### Zoning

Easthampton has 11 base zoning districts and 4 overlay districts. The base districts define the allowed uses and dimensional requirements in all parts of the city, while the overlay districts provide for additional restrictions in certain areas. The zoning districts are as follows:

- Residential - Rural A (R-80): Single family, aquifer district
- Residential - Rural B (R-40): Single family, aquifer district
- Residential - Rural C (R-35): Single family
- Residential - Suburban A (R-15): Single and 2 family
- Residential - Suburban B (R-10): Single and 2 family
- Residential – Urban (R-5): Multifamily
- Downtown Business (DB): Commercial, mixed
- Highway Business (HB): Commercial, planned mixed
- Neighborhood Business (NB): Mixed
- Industrial (I): Industrial
- Mixed Use/Mill Industrial (MI): Mixed
- Aquifer Protection District (AP): Overlay district that protects aquifer
- Floodplain and Manhan River Protection Districts (FL): Overlay district that protect floodplain areas around the Manhan River
- Wireless Communications Services District (WCSD): Overlay district addressing industrial, business and city owned land for telecommunications
- Smart Growth Zoning Overlay District (SGZD): Overlay district that encourages smart growth and create affordable housing for all ages and incomes

### Current Development Trends

Approximately 17 percent of Easthampton’s land is permanently protected. Approximately 35 percent of the land is forested, most of which is fragmented, except near the eastern border where Mt. Tom State Reservation is located and in the northwestern corner of the city. Most parts of Easthampton are at least partially developed, with the most concentrated development adjacent to Routes 10 and 141. The least developed areas, located near the northern and eastern borders, are undeveloped primarily because of steep slopes, streams and wetlands, or protected lands.

Commercial development is primarily located along the major transportation spines: from Route 141 to Cottage and Union Streets terminating at the downtown center at Main Street, and along Route 10 connecting to Easthampton. Housing choices range from apartments to single family homes in rural settings. Easthampton continues to have a significant manufacturing and industrial base compared to its more agrarian neighbors. The arts and cultural scene has flourished in recent years, attracting artists and small entrepreneurs.

According to Census Building Permit Data, after a building boom from 2005 to 2007 during which an average of 70 construction permits were issued per year, development has slowed in the past 5 years. The average number of building permits issued annually from 2008 to 2012 was fewer than 10. In 2013, 14 building permits were issued.

The local Hazard Mitigation Committee has determined that the limited amount of new development in the City has not impacted the Town's vulnerability.

### **National Flood Insurance Program**

Easthampton is a participating member of the National Flood Insurance Program, and had the following NFIP policy and claim statistics as of 2014.

- Flood Insurance Maps (FIRMs) are used for flood insurance purposes and are on file with the Easthampton Planning Board.
- FIRMs have been effective since August 15, 1979, with no updates since this date.
- Easthampton has 25 in-force policies in effect for a total of \$ 5,087,600 worth of insurance.
- There have been a total of 27 NFIP claims for which \$477,873 has been paid.
- There are five homes defined as "Repetitive Loss Properties" insured under the NFIP within Easthampton, all located near the Oxbow of the Connecticut River.

The City 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 floodplain and FEMA Flood Insurance Rate Map.

## 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT

The following section includes a summary of disasters that have affected or could affect Easthampton. 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
- Landslide

### **Natural Hazard Analysis Methodology**

---

This chapter examines all hazards identified by the Massachusetts State Hazard Mitigation Plan which are identified as likely to affect Easthampton. 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 Easthampton 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 City Impacted by Given Natural Hazard	
Location of Occurrence	Percentage of City Impacted
Large	More than 50% affected
Medium	10 to 50% affected
Small	Less than 10% 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:

Impacts, Magnitude of Multiple Impacts of Given Natural Hazard	
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 – Very high risk
- 2 – High risk
- 3 – Medium risk
- 4 – Low risk
- 5 – Very low 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.

### Hazard Identification and Analysis Worksheet for Easthampton

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Hazard Risk Index Rating
Floods	Small	Very High	Limited	3 – Medium Risk
Severe Snowstorms / Ice Storms	Large	Moderate	Limited	4 – Low Risk
Hurricanes	Large	Low	Limited	3 – Medium Risk
Severe Thunderstorms Wind/Tornado/Microburst	Large	Moderate	Minor/Limited	3 – Medium Risk
Wildfires / Brushfires	Small	Very High	Minor	5 – Very Low Risk
Earthquakes	Large	Very Low	Critical	5 - Very Low Risk
Dam Failure	Small	Very Low	Minor	5 - Very Low Risk
Drought	Large	Low	Minor	5 - Very Low Risk
Landslides	Small	Low	Limited	4 - Low Risk

## Floods

---

### Hazard Description

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

- **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 722 acres of land within the FEMA mapped 100-year floodplain and 172 acres of land within the 500-year floodplain within the City of Easthampton.

The 100-year flood zone covers mostly narrow bands of level floodplain land along the Manhan River (Main and North Branch), Basset Brook, Broad Brook, the Connecticut River, Nashawannuck Pond, and Lower Mill Pond. In several areas, the flood zone widens to encompass farmland, some residential land, and industrial lands.

In addition to the FEMA designated floodplain, the Hazard Mitigation Committee has identified the following specific areas that are in the 100-year floodplain and most prone to flooding on a regular basis.

- **Lower Fort Hill Road**, near the confluence of the Manhan River and the Oxbow of the Connecticut River
- **West Street**, adjacent to the confluence of the Hannum Brook and the Manhan River
- **Meadowbrook Drive**, parallel to the Manhan River floodplain
- **River Street**, adjacent to the Oxbow of the Connecticut River

Based on these locations, flooding has a “small” location of occurrence, with less than 10 percent of land affected.

## **Extent**

The Hazard Mitigation Committee indicated that all locations of localized flooding can receive high water marks of up to several feet during sufficiently large rainstorms. Water levels in Easthampton'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.

The worst flooding recorded in Easthampton's recent history occurred following Hurricane Diane in August 1955. While Easthampton does not have records, the region recorded levels of nearly 20 inches in the greater Springfield area, according to the US Geological survey Report "Floods of August 1955 in the Northeastern States".

Video of the flooding in Easthampton On August 18, 1955 is available here:

<https://www.facebook.com/Easthampton01027TheGoodNewsPage/posts/988516451168776>.

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 Easthampton and surrounding areas in western Massachusetts is 46 inches.

## **Previous Occurrences**

Flooding at Lower Fort Road, West Street, and Meadowbrook Drive occur on an annual basis.

The National Weather Service monitors flooding crests for the Connecticut River, at the nearest National Weather Service station located directly upstream from Easthampton in Northampton, Massachusetts.

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. The type of action taken varies for each gage location. Gage data should be closely monitored by 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 the community 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 the community
- 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 the community that could cause structural damage
- high damage estimates and high degree of danger to residents

The major flood stage for the Connecticut River at the Northampton station is 120 feet, which has been reached three times since 1935. The moderate flood stage is 115 feet, which has been reached 16 times since 1935. The minor flood stage is 112 feet, which has been reached 60 times since 1935. The action stage is 110 feet, which has been reached 11 times since 1935.

**Historical Crests of the Connecticut River in Northampton, Directly Upstream from Easthampton**

3/19/36	129.4 ft	Major flooding
9/22/38	125 ft	Major flooding
5/31/84	120.8 ft	Major flooding
4/6/60	119.9 ft	Moderate flooding
1/1/49	118.6 ft	Moderate flooding
4/1/87	118 ft	Moderate flooding
3/23/48	117.7 ft	Moderate flooding
3/29/53	117.6 ft	Moderate flooding
8/30/11	117.16 ft	Moderate flooding
5/5/40	117 ft	Moderate flooding
10/9/05	116.3 ft	Moderate flooding
3/15/77	116.2 ft	Moderate flooding
6/3/52	116 ft	Moderate flooding
4/3/76	115.7 ft	Moderate flooding
4/23/69	115.5 ft	Moderate flooding
4/1/51	115.4 ft	Moderate flooding
4/24/58	115.3 ft	Moderate flooding
3/24/68	115.2 ft	Moderate flooding
5/1/56	115 ft	Moderate flooding
7/2/73	114.9 ft	Minor flooding
4/7/52	114.8 ft	Minor flooding
4/19/82	114.8 ft	Minor flooding
3/27/79	114.6 ft	Minor flooding
4/4/05	114.6 ft	Minor flooding
3/19/73	114.6 ft	Minor flooding
4/17/96	114.6 ft	Minor flooding
4/1/98	114.6 ft	Minor flooding

4/17/07	114.5 ft	Minor flooding
12/16/83	114.5 ft	Minor flooding
4/18/94	114.4 ft	Minor flooding
4/13/47	114.4 ft	Minor flooding
4/5/59	114.3 ft	Minor flooding
4/24/01	114.3 ft	Minor flooding
12/22/73	114.2 ft	Minor flooding
5/14/96	114.2 ft	Minor flooding
2/26/81	114.2 ft	Minor flooding
4/2/62	114.1 ft	Minor flooding
4/2/04	114 ft	Minor flooding
4/2/77	114 ft	Minor flooding
3/18/90	113.9 ft	Minor flooding
5/6/72	113.9 ft	Minor flooding
1/19/06	113.7 ft	Minor flooding
4/8/84	113.7 ft	Minor flooding
3/22/45	113.5 ft	Minor flooding
4/1/86	113.5 ft	Minor flooding
4/1/93	113.5 ft	Minor flooding
4/14/11	113.46 ft	Minor flooding
11/30/59	113.4 ft	Minor flooding
3/29/76	113.4 ft	Minor flooding
4/17/93	113.4 ft	Minor flooding
4/21/72	113.3 ft	Minor flooding
10/30/03	113.2 ft	Minor flooding
4/17/14	113.12 ft	Minor flooding
3/31/03	113 ft	Minor flooding

10/27/05	113 ft	Minor flooding
1/10/98	112.9 ft	Minor flooding
4/15/08	112.9 ft	Minor flooding
4/18/11	112.81 ft	Minor flooding
4/17/55	112.8 ft	Minor flooding
3/31/10	112.8 ft	Minor flooding
9/8/11	112.7 ft	Minor flooding
4/6/50	112.7 ft	Minor flooding
9/8/11	112.7 ft	Minor flooding
10/21/75	112.6 ft	Minor flooding
4/4/67	112.5 ft	Minor flooding
5/26/79	112.5 ft	Minor flooding
5/7/89	112.5 ft	Minor flooding
4/16/64	112.4 ft	Minor flooding
4/8/89	112.4 ft	Minor flooding
1/28/96	112.4 ft	Minor flooding
12/19/00	112.4 ft	Minor flooding
4/4/63	112.4 ft	Minor flooding

5/5/71	112.2 ft	Minor flooding
4/6/74	112.2 ft	Minor flooding
3/24/10	112.2 ft	Minor flooding
4/26/70	112.1 ft	Minor flooding
8/20/55	112 ft	Minor flooding
4/11/80	112 ft	Minor flooding
4/19/54	112 ft	Minor flooding
12/13/08	111.9 ft	Action Stage
4/5/90	111.8 ft	Action Stage
4/6/00	111.8 ft	Action Stage
5/21/06	111.8 ft	Action Stage
12/1/59	111.8 ft	Action Stage
4/17/02	111.7 ft	Action Stage
12/26/90	111.7 ft	Action Stage
4/30/88	111.6 ft	Action Stage
5/5/83	111.6 ft	Action Stage
4/4/73	111.6 ft	Action Stage
12/26/03	111.5 ft	Action Stage

Source: National Weather Service

### Probability of Future Events

Based upon previous data, there is a very high frequency (over 70 percent probability in any given year) of flash flooding or general flooding occurring in Easthampton.

Flooding frequencies for the various floodplains in Easthampton are defined by FEMA as the following:

- 10-year floodplain – 10 percent chance of flooding in any given year
- 25-year floodplain – 2.5 percent chance of flooding in any given year
- 100-year floodplain – 1 percent chance of flooding in any given year
- 500-year floodplain – 0.2 percent chance of flooding in any given year

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 City faces a “limited” impact, with 10 percent or more of total area affected, from flooding.

Based on the City's median home value of \$231,800 (2008-12 ACS) and an estimated 100 percent of damage to 100 percent of structures affected, the City faces the following estimated impacts from flooding:

- Lower Fort Hill Road - no structures, no impact
- West Street - 2 structures, \$463,600
- Meadowbrook Drive - 12 structures, \$2,781,600
- River Street - 5 structures, \$1,159,000

The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate. Water travels under West Street. Approximately ten years ago the culvert at West Street was re-lined inside because water was decaying the interior.

## **Vulnerability**

Based on the above analysis, Easthampton has a hazard index rating of “3 - medium risk” for flooding.

## Severe Snowstorms / Ice Storms

---

### 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 risks:

- 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

### Location

The entire city of Easthampton is susceptible to severe snowstorms, making the location of occurrence “large,” with over 50 percent of land area affected. Easthampton has also had specific problems in the following areas:

- |                                   |                  |
|-----------------------------------|------------------|
| ▪ Florence Road                   | ▪ Park Hill Road |
| ▪ Ballard Street                  | ▪ Plain Street   |
| ▪ Lyman Street                    | ▪ Oliver Street  |
| ▪ O’Neill Street                  | ▪ Clark Lane     |
| ▪ East Street                     | ▪ Fort Hill Road |
| ▪ Line Street, near Phelps Street | ▪ Clapp 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

Easthampton 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 May.

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 on the next page, in order of their NESIS severity.

Winter Storms Producing Over 10 inches of Snow in Easthampton, 1958-2014			
Date	NESIS Value	NASIS 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>

### Probability of Future Events

Based upon the availability of records for Hampshire County, there is a "moderate" frequency (between 10 to 40 percent probability in any given year) that a severe snow storm will occur in Easthampton.

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 impact of a severe snow or ice storm is classified as “limited,” with more than 10 percent of property in the affected area damaged or destroyed.

To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property of \$1,769,793,000 is used. An estimated 10 percent of damage would occur to 10 percent of structures, resulting in a total of \$17,697,930 worth of damage. 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, Easthampton has a hazard index rating of “4 - low risk” from severe snowstorms and ice storms.

# Hurricanes

---

## 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 Easthampton is at risk from hurricanes, meaning the location of occurrence is “large,” or over 50 percent of land area affected. Ridge tops are more susceptible to wind damage. Areas susceptible to flooding are also likely to be affected by heavy rainfall.

## 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 Easthampton are shown in the following table. There is a scientific difference between a hurricane and a super storm. A hurricane has a warm core and a super storm does not.

Major Hurricanes and Storms Affecting Easthampton		
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

Easthampton'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" frequency of hurricanes in Easthampton, or a 1 to 10 percent probability in the next year.

## 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		

The impact of a hurricane would be “critical,” with more than 25 percent of total structures damaged.



To approximate the potential impact to property and people that could be affected by this hazard, the total value of all property of \$1,769,793,000 is used. Wind damage of 5 percent to 10 percent of structures would result in an estimated \$8,848,965 of damage. Flood damage of 10 percent to 20 percent of structures would result in \$35,395,860 of damage. 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, Easthampton faces a hazard index rating of “3 - Medium risk” from hurricanes.

## **Severe Thunderstorms / Wind / Tornadoes (including Microburst)**

---

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 the 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 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. 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.

### **Location**

As per the Massachusetts Hazard Mitigation Plan, the entire city is at risk of high winds, severe thunderstorms, and tornadoes. Because of this, the location of occurrence is "large," with over 50 percent of land area affected.

### **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. Thunderstorms can cause hail, wind, and flooding.

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 Easthampton on an annual basis, there are not significant records available for these events. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year.

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 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.

A powerful microburst affected Easthampton on October 8th, 2014 that involved winds up to 100 miles per hour. The microburst began on the west side of Mount Tom and moved southwest to northeast along the edge of the range. Several homes lost power and were damaged.

## 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.

Tornado Index for Hampshire County	
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, there is a "low" frequency of tornado occurrence, or between a 1 to 10 percent probability, in any given year. There is a "moderate" frequency, or 10 to 40 percent probability in any given year, of a severe thunderstorm or wind.

## Impact

The impact of an event is determined to be "limited," with less than 25 percent of all structures in Easthampton impacted.

The potential for locally catastrophic damage is a factor in any tornado, severe thunderstorm, or wind event. In Easthampton, a tornado that hit the residential areas would leave much more damage than a tornado with a travel path that ran along its forested uplands, where little settlement has occurred. Most structures in Easthampton 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 Easthampton's housing built before this date.

To approximate the potential impact to property that could be affected by severe weather, tornado, or wind, the total value of all property in Easthampton of \$1,769,793,000 is used. For a tornado, an estimated 100 percent of damage would occur to 1 percent of structures, resulting in a total of \$17,697,930 worth of damage. For a severe thunderstorm or wind, an estimated 20 percent of damage would occur to 10 percent of structures, resulting in a total of \$3,539,586 worth of damage. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in these estimates.

## Vulnerability

Based on the above assessment, Easthampton has a hazard index rating of "3 - medium- risk" from severe thunderstorms, winds, and tornadoes.

## Wildfire / Brushfire

---

### Hazard Description

Wildfires 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 wildfires and brushfires can consume homes, other buildings and/or agricultural resources. FEMA has classifications for 3 different classes of wildfires:

- **Surface fires** are the most common type of wildland fire and 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

The wildfire season in Massachusetts usually begins in late March and typically culminates in early June, corresponding with the driest live fuel periods of the year. April is historically the month in which wildfire danger is the highest. However, wildfires can occur every month of the year. Drought, snow pack, and local weather conditions can expand the length of the fire season. The early and late shoulders of the fire season usually are associated with human-caused fires.

### Location

As of 2005, there were 3486 acres of forested land in Easthampton (Source, MassGIS 2012). The Hazard Mitigation Committee identified the area around Christopher Clark Road, adjacent to Mt. Tom State Reservation, as having the potential to be affected by a wildfire. There are no structures along this road, which has approximately 410 acres of land.

Based on this data, the location of occurrence is deemed to be “small,” with less than 10 percent of land area affected.

### 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. As of 2005, there were 3486 acres of forested land in Easthampton (Source, MassGIS 2012). Easthampton is approximately 35% forestland most of which is fragmented. Certain forested areas in Easthampton cover remote, impassable areas with rugged terrain that present an insurmountable challenge for firefighters. A large wildfire could damage a large proportion of this land mass, including vital watershed lands, in a short period of time. During a period of prolonged drought, this risk would be exacerbated.

There have not been any major wildfires recorded in Easthampton. 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 area.

Because of the Microburst in October 2014, there is a significant amount of dead wood now on the mountainside of Hendrick Street and Mountain road which causes concern to the Hazard Mitigation Committee, but the City has been very diligent about removing this debris.

The overall extent of wildfires is shown in the table below:

**Extent of Wildfires**

Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L)  Color Code: Green	Fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open or cured grassland may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
CLASS 2: Moderate Danger (M)  Color Code: Blue	Fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Woods fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel – especially draped fuel -- may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
CLASS 3: High Danger (H)  Color Code: Yellow	Fires start easily and spread at a rapid rate	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fine fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
CLASS 4: Very High Danger (VH)  Color Code: Orange	Fires start very easily and spread at a very fast rate	Fires start easily from all causes and immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics - such as long-distance spotting - and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.

<p>CLASS 5: Extreme (E)</p> <p>Color Code: Red</p>	<p>Fire situation is explosive and can result in extensive property damage</p>	<p>Fires under extreme conditions start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.</p>
--	--	---

### Previous Occurrences

Easthampton has a professional Fire Department, and there is no record, recorded or anecdotal, of wildfires in Easthampton. Easthampton has averaged slightly more than 10 brushfires per year since 2001, which is as far back as specific records are available. No damage to structures or people was associated with these brushfires.

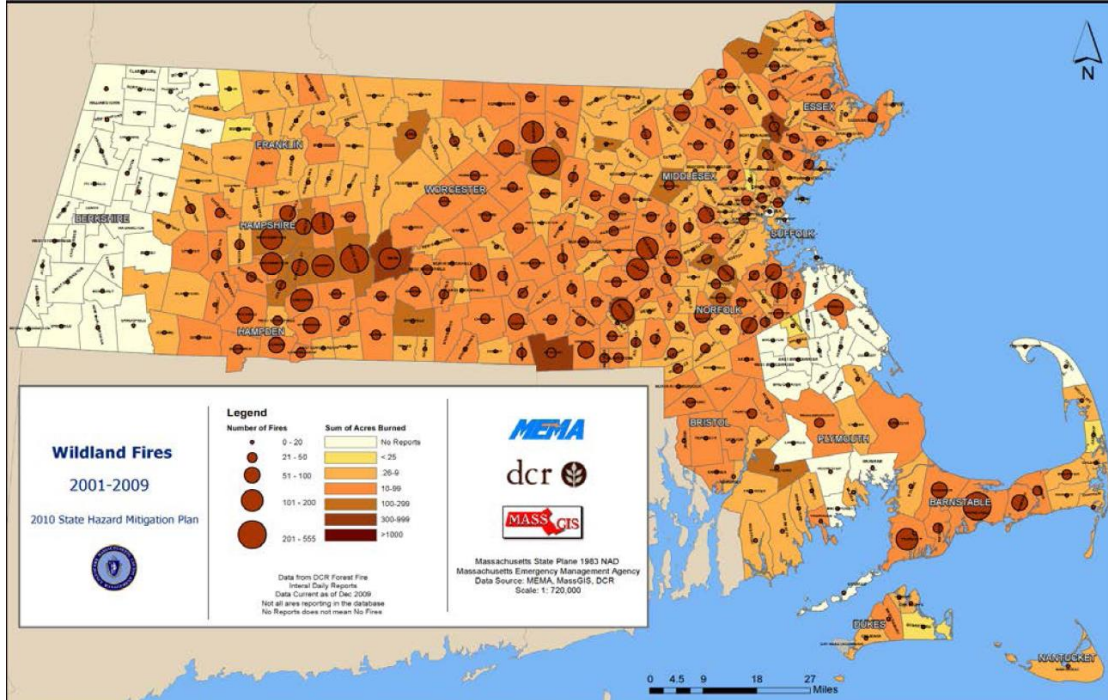
During the past 100 years, there have not been many wildfires occurring in the Pioneer Valley. However, some of the more significant regional wildfires that have occurred in the past 20 years are as follows:

- 1995 – Russell, 500 acres burned on Mt. Tekoa
- 2000 – South Hadley, 310 acres burned over 14 days in the Lithia Springs Watershed
- 2001 – Ware, 400 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 Easthampton	
2008	56
2009	48
2010	52
2011	43
2012	34

Source: Massachusetts Fire Incidence Reporting System, County Profiles, 2012 Fire Data Analysis

## Wildland Fires in Massachusetts, 2001-2009



Source: Massachusetts Hazard Mitigation Plan

### Probability of Future Events

In accordance with the Massachusetts Hazard Mitigation Plan, the Easthampton Hazard Mitigation Committee found it is difficult to predict the likelihood of wildfires in a probabilistic manner because the number of variables involved. However, based on previous occurrences, the Committee determined the frequency of future events to be “low” (1 percent to 10 percent probability in the next year).

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.

Climate change is also predicted to bring increased wind damage from major storms, as well as new types of pests to the region. Both increased wind and the introduction of new pests could potentially create more debris in wooded areas and result in a larger risk of fires.

### Impact

While a large wildfire could damage some of the landmass of Easthampton, these areas are not populated by people, meaning that wildfire affected areas are not likely to cause damage to property or people. For this reason, the City faces a “minor” impact from wildfires, with very few damages likely to occur.



Both wildfires and brushfires can consume homes, other buildings and/or agricultural resources. The impact of wildfires and brushfires are as follows:

- Impact to benefits that people receive from the environment, such as food/water and the regulation of floods and drought
- Impact on local heritage, through the destruction of natural features
- Impact to the economy, due to damage to property and income from land following a wildfire
- Impact through the destruction of people and property

### **Vulnerability**

Based on the above assessment, Easthampton has a hazard index rating of “5 – very low risk” for wildfires and brushfires.

Using a total value of all structures in Easthampton of \$1,769,793,000 and an estimated 20 percent of damage to 1 percent of all structures, the estimated amount of damage from a highly unlikely forest fire is \$3,539,586. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

## Earthquakes

---

### 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. Ground shaking from earthquakes can rupture gas mains and disrupt other utility service. They can also 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 most at risk during an earthquake.

### Location

Because of the regional nature of the hazard, the entire City of Easthampton is susceptible to earthquakes. This makes the location of occurrence "large," or over 50 percent of the total land area affected.

### 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.

Source: FEMA

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: FEMA

## Previous Occurrences

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

Largest Earthquakes Affecting Easthampton, MA, 1924 – 2014		
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
Total number of Earthquakes within the New England states between 1638 and 1989 is 2262.		

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

## 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 “very low” frequency (less than 1 percent probability in any given year) of an earthquake in Easthampton.

## 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. This is particularly true for buildings in downtown Easthampton, most of which could likely be completely destroyed by a significant earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code.

The City faces a “critical” impact from significant earthquakes, with more than 25 percent of Easthampton affected.

While a significant earthquake, estimated to be approximately of magnitude 6.1 or higher, would cause the impact described above, a smaller earthquake would have "minor" impact from a smaller earthquake, with only minor damage to property. As shown in the table of the Richter Scale above, an earthquake of 6.0 or lower would result in at most slight damage to well-designed buildings, which are the vast majority of structures in Easthampton. Earthquakes between 3.5 and 5.4 would be felt but rarely cause damage, and earthquakes smaller than 3.5 would be unlikely to be noticed.

## Vulnerability

Based on this analysis, the hazard index rating for Easthampton is “5 - very low risk” for earthquakes. Using a total value of all structures in Easthampton of \$1,769,793,000 and an estimated 100 percent of damage to 25 percent of all structures (“critical” impact), the estimated amount of damage from an earthquake is \$442,448,250. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

## Dam Failure

---

### Hazard Description

Dams, 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 or levee failure is not a common occurrence, but dams do represent a potentially disastrous hazard. When a dam fails, the potential energy of the stored water behind the dam is released rapidly. Most dam failures occur when floodwaters above overtop and erode the material components of the dam.

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

Easthampton has seven dams located on private and public land. The name and hazard levels of these individual structures are as follows:

Dams in Easthampton		
Location--Ownership	Dam	Hazard Level
50% Public/50% private	Lower Mill Pond Dam/"One Ferry Street"	Significant
50% Public/50% private	Nashawannuck Pond Dam/"Cottage Street Dam"	Significant
Municipal	Easthampton Waterworks Dam	Significant
Unknown	Brakeys Pool Dam	Low
Private	Coleman Pond Dam	Low
Private	Pine Valley Pool Dam	Low
Private	Williston Academy Pond Dam	Low

A dam failure from the three dams classified by the Office of Dam Safety as "Significant"--the Lower Mill Pond Dam, Nashawannuck Pond Dam, or Easthampton Waterworks Dam, is estimated to affect less than 10 percent of the total land area in Easthampton, meaning that the location of occurrence would be categorized as "small."

## Extent

Often dam 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 will likely 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 Easthampton.

## Probability of Future Events

As Easthampton’s dams age, and if maintenance is deferred, the likelihood of a dam failure will increase, but, currently the frequency of dam failures is less than 1 percent in any given year, or “very low.”

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. 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 Hazard Mitigation Committee has determined that Easthampton faces a “minor” impact from dam failure, with minimal damage to property occurring.

## **Vulnerability**

Based on this analysis, Easthampton has a hazard risk index rating of “5 - very low risk” from dam failure. Using a total value of all structures in Easthampton of \$1,769,793,000 and an estimated 10 percent of damage to 1 percent of all structures, the estimated amount of damage from a dam failure is \$1,769,793. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.



# Drought

---

## Hazard Description

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. These impacts can have far-reaching effects throughout the region.

## Location

Because of this hazard's regional nature, a drought would impact the entire city, meaning the location of occurrence is "large," or over 50 percent of total land area affected.

## Extent

The U.S. Drought Monitor 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 Easthampton, six major droughts have occurred since 1930. 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

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

## Probability of Future Events

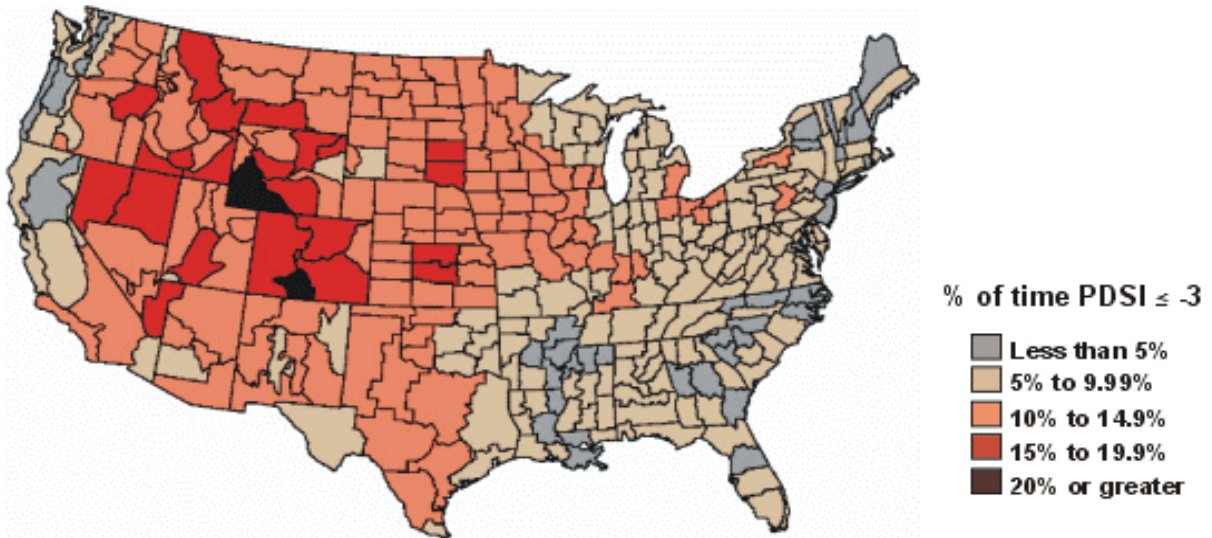
In Easthampton, as in the rest of the state, the frequency of drought is "low," or between 1 and 10 percent probability in any given year.

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. However, global warming and climate change may have an effect on 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.

# Palmer Drought Severity Index

1895–1995

Percent of time in severe and extreme drought



## Impact

Due to the water richness of western Massachusetts, Easthampton 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. Because of this, the Hazard Mitigation Committee has determined the impact from this hazard to be "minor," with minimal damage to people and property.

## Vulnerability

Based on the above assessment, Easthampton has a hazard index rating of "5 – very low risk" from drought.

## Landslide

---

### Hazard Description

Landslides have not previously been identified as a hazard for the City of Easthampton, but on October 8th, 2014 a powerful microburst that involved winds up to 100 miles per hour affected Easthampton. The microburst began on the west side of Mount Tom and moved southwest to northeast along the edge of the range. Several homes lost power and were damaged. The microburst severely damaged the slopes of Mt Tom, raising the possibility of a landslide as a natural hazard for the city of Easthampton. The language below describing landslides is excerpted from the Massachusetts Hazard Mitigation Plan, p. 12-1.

The term landslide includes a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors (USGS, 2013). According to the Massachusetts state geologist, Steve Mabee, slope saturation by water is a primary cause of landslides in the Commonwealth. This effect can be in the form of intense rainfall, snowmelt, changes in groundwater level, and water level changes along coastlines, earth dams, and the banks of lakes, rivers, and reservoirs. Water added to a slope can not only add weight to the slope, which increases the driving force, but can increase the pore pressure in fractures and soil pores, which decreases the internal strength of the earth materials needed to resist the driving forces.

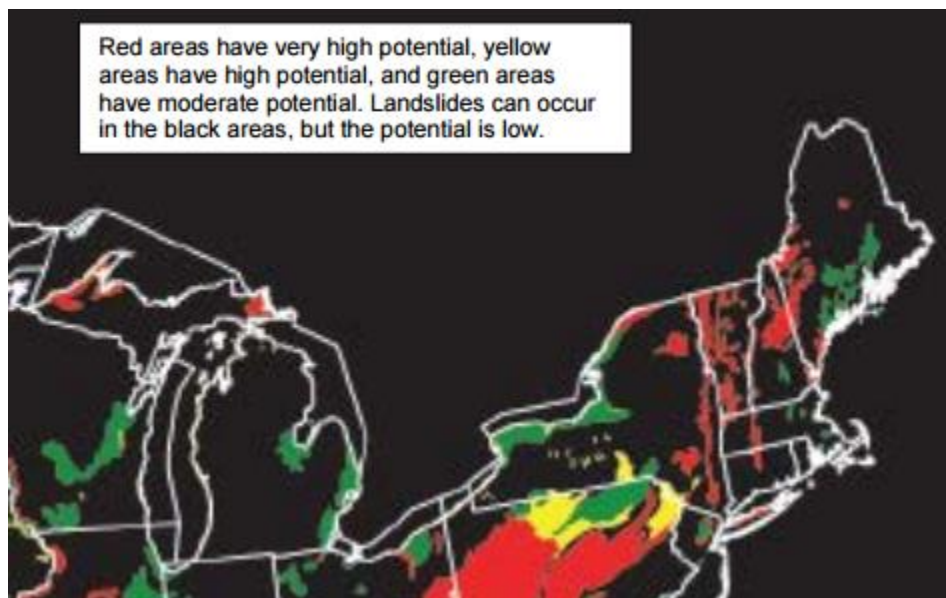
Landslides in Massachusetts can be divided into four general groups, construction related, over steepened slopes caused by undercutting due to flooding or wave action, adverse geologic conditions, and slope saturation. Construction related failures occur predominantly in road cuts excavated into glacial till where topsoil has been placed on top of the till. This juxtaposition of materials with different permeability often causes a failure plane to develop along the interface between the two materials resulting in sliding following heavy rains. Examples can be found along the Massachusetts Turnpike. Other construction related failures occur in utility trenches excavated in materials that have very low cohesive strength and associated high water table (usually within a few feet of the surface). This occurs in sandy deposits with very few fine sediments to give the material cohesive strength and can occur in any part of the state. Undercutting of slopes during flooding or coastal storm events is a major cause of property damage. Streams and waves erode the base of the slopes causing them to over steepen and eventually collapse. This is particularly problematic in unconsolidated glacial deposits, which covers the majority of the state. Areas where this type of failure is occurring include Cape Cod, Nantucket, Martha's Vineyard, Scituate, Newbury, and along some of the major river valleys. Adverse geologic conditions exist anywhere there are lacustrine or marine clays. Clays have relatively low strength. When over steepened or exposed in excavations these areas often produce classic rotational landslides. The clays often formed in the deepest parts of many of the glacial lakes that existed in Massachusetts following the last glaciation. Some of the major glacial lakes are Bascom, Hitchcock, Nashua, Sudbury, Concord, and Merrimack. The greater Boston area is also underlain by the Boston Blue Clay, a glacio-marine clay.

Another occurrence of landslides in Massachusetts results from slope saturation. This occurs following heavy rains and dominantly in areas with steep slopes underlain by glacial till or bedrock. Bedrock is relatively impermeable relative to the unconsolidated material that overlies it. Similarly, glacial till is less permeable than the soil that forms above it. Thus, there is a permeability contrast between the overlying soil and the underlying, and less permeable, unweathered till and/or bedrock. Water

accumulates on this less permeable layer increasing the pore pressure at the interface. This interface becomes a plane of weakness. If conditions are favorable failure will occur” (Mabee, 2010).

## Location

The entire U.S. experiences landslides, with 36 states having moderate to highly severe landslide hazards. Expansion of urban and recreational developments into hillside areas leads to more people being threatened by landslides each year. The figure below shows landslide potential mapped by the USGS for the eastern U.S. Landslides are common throughout the Appalachian region and New England. The greatest eastern hazard is from sliding of clay-rich soils. Based on the U.S. data set for landslides, it appears that areas along the Connecticut River in western Massachusetts, and the greater Boston area have the highest risk to landslide. The figure below, excerpted from the Massachusetts Hazard Mitigation Plan, illustrates the landslide incidence and susceptibility zones in Massachusetts.



The figure below illustrates the landslide incidence and susceptibility zones in Massachusetts.

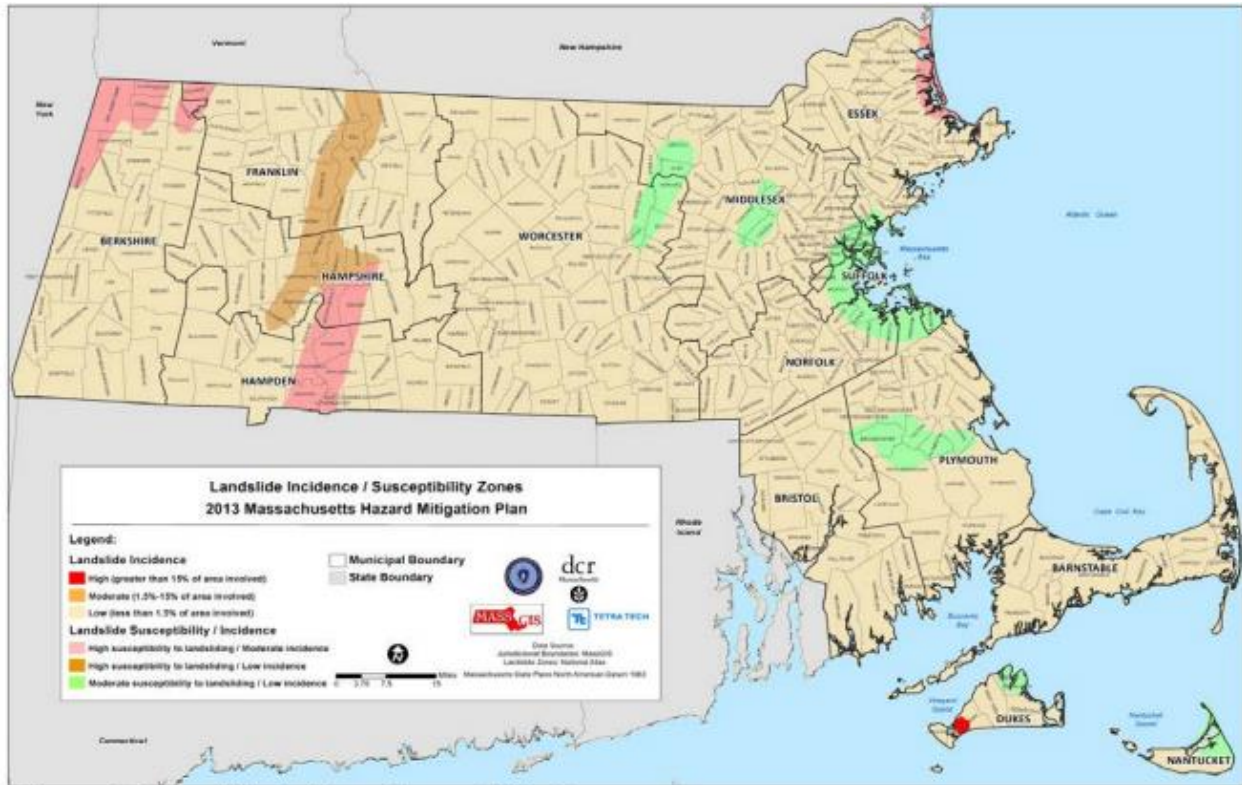


Figure 12-2. Landslide Incidence/Susceptibility Zones

## Extent

To determine the extent of a landslide hazard, the affected areas need to be identified and the probability of the landslide occurring within some time period needs to be assessed. Natural variables that contribute to the overall extent of potential landslide activity in any particular area include soil properties, topographic position and slope, and historical incidence. Predicting a landslide is difficult, even under ideal conditions. As a result, the landslide hazard is often represented by landslide incidence and/or susceptibility, defined below:

Landslide incidence is the number of landslides that have occurred in a given geographic area. High incidence means greater than 15-percent of a given area has been involved in landsliding; medium incidence means that 1.5 to 15-percent of an area has been involved; and low incidence means that less than 1.5-percent of an area has been involved.

Landslide susceptibility is defined as the probable degree of response of geologic formations to natural or artificial cutting, to loading of slopes, or to unusually high precipitation. It can be assumed that unusually high precipitation or changes in existing conditions can initiate landslide movement in areas where rocks and soils have experienced numerous landslides in the past. Landslide susceptibility depends on slope angle and the geologic material underlying the slope. Landslide susceptibility only identifies areas potentially affected and does not imply a time frame when a landslide might occur. High,

medium, and low susceptibility are delimited by the same percentages used for classifying the incidence of landsliding. Landslides destroy property and infrastructure and can take the lives of people. Slope failures in the United States result in an average of 25 lives lost per year and an annual cost to society of about \$1.5 billion.

### **Previous Occurrences**

Easthampton has no record of previous landslides.

### **Probability of Future Events**

Because of the October 2014 microburst, the Hazard Mitigation Committee is concerned about the potential of earth sliding down the side of Mount Tom at Hendrick Street, East Street and Mountain Road. The City is seeking assistance from MEMA to identify funding sources to address this concern and has received some assistance from the Massachusetts Department of Environmental Protection.

### **Impact**

Potential impacts from landslide include environmental disturbance, property and infrastructure damage, and injuries and fatalities.

There are several homes which could be affected by a landslide in the area affected by the microburst. And Mountain Road could be blocked. Mountain Road is closed periodically during severe weather events, so people are not unaccustomed to using alternative routes. Because of this, the Hazard Mitigation Committee has determined the impact from this hazard to be "minor," with minimal damage to people and property.

### **Vulnerability**

Based on the above assessment, Easthampton has a hazard index rating of "4 –low risk" from Landslides.



## Impacts of Climate Change

Climate change is already causing natural hazards to have more of an impact on Easthampton, with hotter summers, wetter winters, more severe storms, and more frequent flooding. In the future, general climatic changes are projected to result in Easthampton experiencing higher temperatures and more precipitation. There will also be wider variability in weather extreme and more days of extreme heat above 90 degrees, more heat waves, more floods, more droughts, and more tornados, hurricanes and heavy storms.

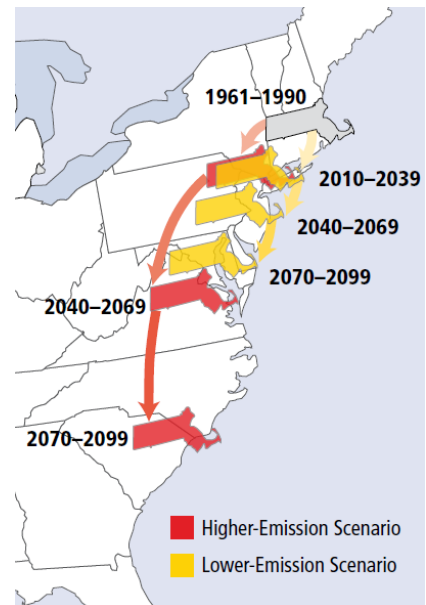
This change in climate will expand the area of Easthampton that is within the 100-year and 500-year floodplain, affect critical resources and vulnerable populations, alter local food production, increase the risk of wildfires, and result in increased damage to people and property.

This section identifies the impacts that climate change will have to the various identified hazards affecting Easthampton. The information included is derived from several accepted sources:

- The 2007 report of the Northeast Climate Impacts Assessment (NECIA)
- The Pioneer Valley Planning Commission's *Our Next Future: An Action Plan for Building a Smart, Resilient Pioneer Valley*, which includes climate change projections
- The Massachusetts Climate Change Adaptation Report
- The Massachusetts Multi-Hazard Mitigation Plan

The mitigation strategies included in Chapter 5 also take into account the impacts of climate change and provide adaptation strategies where appropriate.

While the exact extent is still uncertain, it is clear that climate change is occurring and will affect Easthampton in the upcoming decades.



At current rates of greenhouse gas accumulation and temperature increases, the climate of Massachusetts will become similar to those of present-day New Jersey or Virginia by 2040-2069, depending on future GHG emissions..  
Source: NECIA 2006



## Increased Flooding

By the end of the 21<sup>st</sup> century, annual precipitation is expected to increase by 14 percent – however, this increase will be a result of more winter precipitation – an increase of 30 percent– while summer precipitation will actually slightly decrease. Additionally, most of this winter precipitation is projected to be in the form of rain rather than snow. This will result in a continuation of the current trend of an overall decrease in total snowfall, as well as the number of days that have snow cover. The increased amount of strong precipitation events and overall increase in rainfall, combined with the aging stormwater infrastructure in the region, will likely result in more flooding in the region.

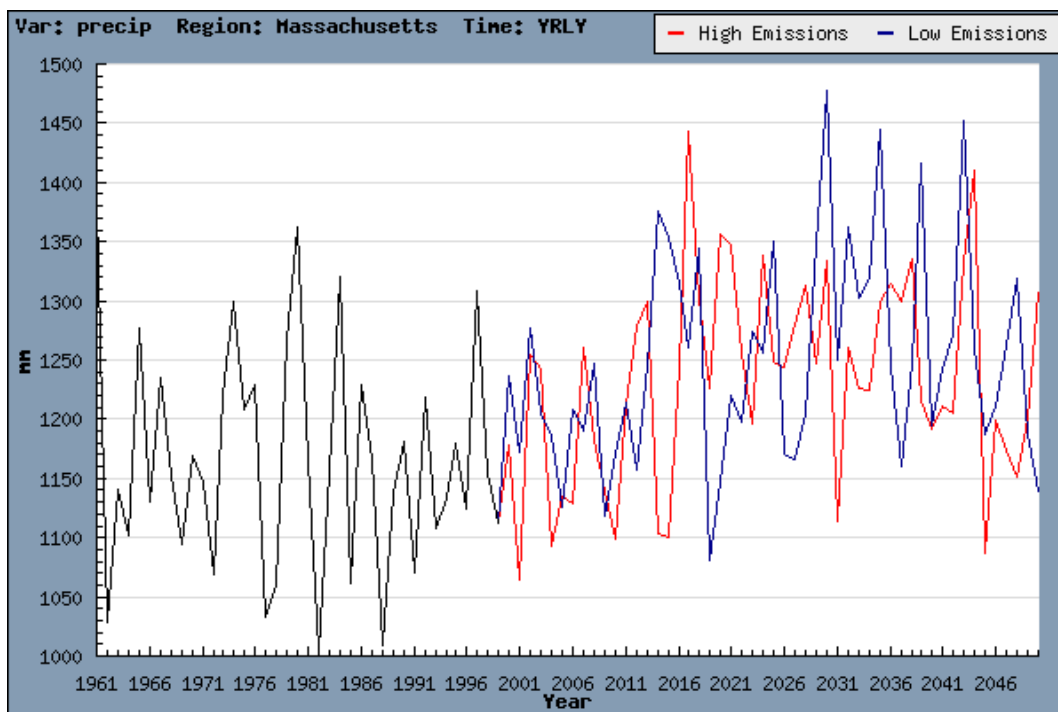
Expected Climatic Variations Due to Climate Change			
Category	Current (1961-1990 avg.)	Predicted Change 2040-2069	Predicted Change 2070-2099
Average Annual Temperature (°F)	46°	50° to 51°	51° to 56°
Average Winter Temperature (°F)	23°	25.5° to 27°	31° to 35°
Average Summer Temperature (°F)	68°	69.5° to 71.5°	74° to 82°
Days over 90 °F	5 to 20 days	-	30 to 60 days
Days over 100 °F	0 to 2 days	-	3 to 28 days
Annual Precipitation	41 inches	43 to 44 inches	44 to 47 inches
Winter Precipitation	8 inches	8.5 to 9 inches	9 to 10.4 inches
Summer Precipitation	11 inches	10.9 to 10.7 inches	10.9 to 11 inches

Sources: *Massachusetts Climate Adaptation Report 2011, NECIA*

Increased flooding will have the following projected impacts to people and property:

- Increased occurrences of localized flooding, in areas designated on the Hazard Identification map. The City of Easthampton believes this to be a minor risk.
- Increased stress on the City’s stormwater infrastructure.
- Increased instances of standing water will lead to increased mosquito populations and greater risk of disease vectors.

## Massachusetts Rainfall 1961-2050



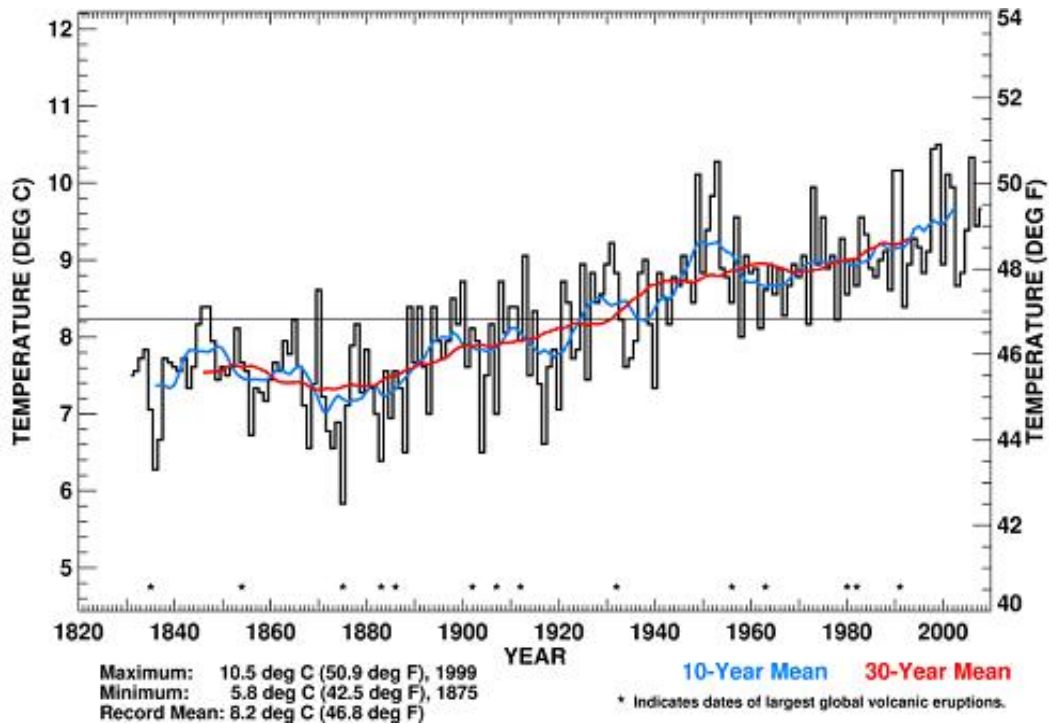
Rainfall has increased approximately 10% during the past 50 years, and is expected to continue to increase. *Source: NECIA*

### Increased Temperatures

Average temperatures in the Pioneer Valley have been increasing over time due to climate change, and this trend is likely to continue in the future. Higher temperatures due to climate change will likely have an effect on future drought risk in Easthampton. The climate of the Pioneer Valley is strongly influenced by the weather patterns of the larger Northeast United States, a region ranging from Pennsylvania to Maine. Average temperatures in the Northeast have been increasing since the late 1800s. The overall average annual temperature increase in this area has been approximately 0.9 degrees C (1.5°F) since approximately 1900.

According to records of the United States Historical Climatology Network, most of this temperature increase has occurred recently, with an average increase of about 0.2 degrees C (0.5°F) per decade since 1970. These higher average temperatures have primarily been the result of warmer winters (December through March), during which there has been an increase of 1.3°F per decade since 1970. In addition to average temperature increases, the number of extremely hot and record heat days has also increased: the number of days with temperatures of 90°F and higher throughout the Northeast has doubled during the past 45 years. The northern portion of the Northeast currently sees about 5 days per year with temperatures over 90°F and no days over 100°F, while the southern portion sees up to 20 days over 90°F and 2 days over 100°F.

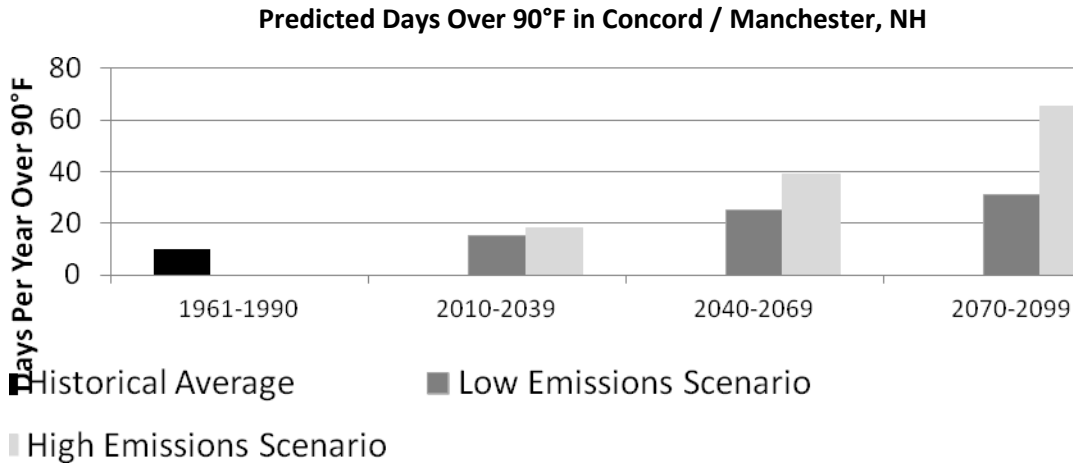
### Northeast U.S. Region Annual Average Temperatures 1831-2008



From 1831 to 2008, there was a trend in temperatures steadily increasing at the National Weather Service’s Blue Hill Observatory, the home of the oldest continuously recorded weather records in the U.S. *Source: Michael J. Iacono, Atmospheric and Environmental Research, Inc./ Blue Hill Observatory, MA. Plot includes temperature data for 1831–1884 from Milton and Canton that were adjusted to the Blue Hill summit location.*

Increased temperatures will have the following projected impacts to people and property:

- Increased temperatures will put stress on current food production and require farming operations to adjust by planting new varieties of crops.
- Changes are also likely to introduce new insect species, pests, and invasive plant species to the region, which will result in further threats to food production and also adversely affect natural systems and biodiversity. Additional prominence of ticks may potentially also lead to more occurrence of Lyme disease.
- Increased energy usage in order to cool buildings in the summer and long-term electrical needs will increase.
- Greater stress on special populations, such as senior citizens and economically disadvantaged people, without access to air conditioning during heat waves.



### Severe Weather

Temperature and precipitation changes in the region will lead to increased severe and extreme weather events, including:

- Slight decrease in summer precipitation that will result in an increase in the number of droughts. Short-term (1 to 3 month) droughts are likely to increase in their frequency in the Northeast to the level of once per year. According to the Connecticut Climate Adaptation Report, “Facing Our Future,” the occurrence of drought in that state is already increasing, with shallower lakes drying up.<sup>1</sup>
- Decreased rainfalls will potentially create more occurrences of wildfires.
- Less dependable rainfall will also impact the Pioneer Valley’s food systems, in the form of less dependable rainfall and require the region’s farming operations to evolve.
- Increased occurrences of major snowstorms, especially during times previously considered unseasonably warm. Should storms occur when there are still leaves on trees, there could be great damage due to broken limbs, as happened during the snowstorm of 2011.
- Increased occurrences of severe thunderstorms and hurricanes, which will result in more wind damage from major storms and greater flooding.

### Secondary Effects

- Disruption of communications services due to damage to cellular phone towers and other communications devices.

<sup>1</sup> State of Connecticut Department of Environmental Protection. Facing Our Future: Adapting to Connecticut’s Changing Climate. March 2009.

- Increased costs of home ownership due to higher flood insurance premiums, which will disproportionately affect low income residents.
- Higher difficulty in the ability of residents to obtain basic services that are heavily reliant on electricity after severe weather events, including gasoline and perishable food items.

## **Other Hazards**

---

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 Easthampton, coastal erosion, and tsunamis were determined to not be a threat.

Extreme temperatures, while identified in the state Hazard Mitigation Plan, was determined by the Easthampton Hazard Mitigation Committee to not currently be a primary hazard to people, property, or critical infrastructure in Easthampton. While extreme temperatures can result in increased risk of wildfire, this effect is addressed as part of the “Wildfire/Brushfire” hazard assessment. The Hazard of Icejams was raised to the Easthampton Hazard Mitigation committee by FEMA, and determined to not currently be a primary hazard to people, property, or critical infrastructure in Easthampton. The Hazard Mitigation Committee will continue to assess the impact of extreme temperature and icejams and update the Hazard Mitigation Plan accordingly.

## 4: CRITICAL FACILITIES

### Facility Classification

---

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 community residents and property
- Would create a secondary disaster if a hazard were to impact it

The Critical Facilities List for the City of Easthampton has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Easthampton's Hazard Mitigation Committee has broken up this list of facilities into three categories:

- Facilities needed for emergency response in the event of a hazard event.
- Facilities identified as non-essential and not required in an emergency response event, but which are considered essential for the everyday operation of the city.
- Facilities or institutions that include special populations which would need additional attention in the event of a hazard event.

The critical facilities and evacuation routes potentially affected by hazard areas are identified following this list. The Past and Potential Hazards/Critical Facilities Map (Appendix D) also identifies these facilities.

### Category 1 – Emergency Response Services

---

The City 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 Complex – 32 Payson Avenue
- 2. Fire Station**  
Easthampton Fire Department – 32 Payson Avenue
- 3. Police Station**  
Easthampton Police Department – 32 Payson Avenue
- 4. Highway Garage**  
30 Rear Northampton Street
- 5. Water Department**  
Water Treatment Plant – 109 Hendrick Street

Wastewater Treatment Plant – Gosselin Drive

**6. Emergency Fuel Stations**

30 Rear Northampton Street

**7. Emergency Electrical Power Facility**

None

**8. Emergency Shelters**

White Brook Middle School – 200 Park Street

Easthampton High School – 70 Williston Street

Williston-Northampton – 19 Payson Street

Maple Street School – 7 Chapel Street

Pepin School – 4 Park Street

Council on Aging -- 66 Union Street

Easthampton Community Center -- 12 Clark Street

Center Street School – 9 School Street

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

None

**10. Transfer Station**

30 Rear Northampton Street

**11. Utilities**

Electrical Substations – East Street, Phelps Street

Telephone Switching Station – Railroad Street

**12. Helicopter Landing Sites**

None

**13. Communications**

Radio Antennae – Old Water Tower, Ferry Street; Town Hall, Main Street; Mill 180, 180

Pleasant Street

Cable Tower – 90 Loudville Road

**14. Primary Evacuation Routes**

Route 141 (Holyoke Street), Route 10 (Northampton Street), East Street, Loudville Road

**15. Bridges Located on Evacuation Routes**

Manhan River Bridge, Route 10 (Northampton Street)

Cottage Street Bridge, Route 141

Manhan River Bridge, Loudville Road



16. **Retention Basins**
  - @ Public Safety Complex - 32 Payson Avenue
  - @Lauren Lane
  - @Plum Brook (private)
  - @Treehouse Complex, Button Road
  - @Ferry Street (to be constructed)

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

---

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

1. **Water Supply**
  - Nonotuck Park well, Brook Street well, Hendrick wellfield and Pines, Maloney well
2. **Water Infrastructure (Pump Stations)**
  - Hendrick Street plant, Brook Street well, Nonotuck Park well, Maloney well
3. **Water Storage Tanks**
  - Drury Lane (4 million gallons), Burt Street (2 million gallons), Reservation Road (1.67 million gallons, offline and being evaluated for repair or replacement)
4. **Sewer Infrastructure (Pump Stations)**
  - Hendrick Street, East Street (3), North Street, O’Neil Street, Florence Road, Torrey Street, Ashley Circle, Pomeroy Meadow Road, Truehart Drive, Daley Field Road, Williston Avenue, Brook Street
5. **Problem Culverts**
  - Ferry Street--City wants to re-line this culvert.

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

---

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

1. **Special Needs Population**
  - Riverside Industries – One Cottage Street
2. **Elderly Housing/Assisted Living (NOTE--all Condominium complexes in City are 55+)**
  - Lathrop Community – 100 Russell Brook Road
  - John F. Sullivan Housing – 108 Everett Street
  - Frederick Dickinson CT Housing – 15 Liberty Street
  - Sunrise Manor – Paradise Dr.
  - Cliffview Manor – Lussier Circle
  - 20 Ballard Street
  - 31-43 Lyman Street
  - Treehouse Development – Easthampton Meadow

Condos-359 Main Street  
Condos-310 East Street

**3. Recreation Areas**

Nonotuck Park – Lownds Ave.  
Daley Field, Daley Field Road  
Galbraith Field, Williston-Northampton School  
Millside Park – 2 Ferry Street

**4. Schools**

Williston Northampton School – 19 Payson Avenue  
Calvary Baptist School – 412 Main Street  
Tri-County High School – 199 East Street  
Easthampton High School – 70 Williston Avenue  
White Brook Middle School – 200 Park Street  
Pepin School – 4 Park Street  
Center Street School – 7 School Street  
Maple Street School – 7 Chapel Street  
Little Bear Learn 'N Care -- 189 Northampton Street  
Hilltown Charter School -- 1 Industrial Parkway  
Sunflower Nursery School – 186C Northampton Street  
Young World Day Care – 51 Main Street  
All About Children Day Care – 15A Industrial Parkway

**5. Churches**

Calvary Baptist Church – 413 Main Street  
Easthampton Congregational Church – 112 Main Street  
God Is Love Believers Church – 280 East Street  
Our Lady of the Valley – 33 Adams Street  
Saint Philip’s Episcopal Church – 128 Main Street  
Trinity Lutheran Church – 2 Clark Street

**6. Historic Buildings/Sites**

Brookside Cemetery – Williston Avenue  
St. Bridget’s Cemetery – Everett Street  
St. Stanislaus Cemetery – Mayher Street  
East Street Cemetery – off Parsons Street  
Emily Williston Memorial Public Library and Museum – 9 Park Street  
Town Hall - 43 Main Street  
Town Lodging House – 75 Oliver Street  
Nonotuck Park – Daley Field – Lownds Avenue  
Historical Society – 5 Holyoke Street  
Community Center – 12 Clark Street  
Main Street Common / Pulaski Park – Main Street  
Historic Mills - One Cottage Street; 116-180 Pleasant Street; Button Bldg-123-133 Union Street

**7. Apartment Complexes**

College Highway Apts. – 390 Main Street

John F. Sullivan Housing – 108 Everett Street  
Frederick Dickinson CT Housing – 15 Liberty Street  
Sunrise Manor – Paradise Drive  
Cliffview Manor – Lussier Circle  
Lathrop Community – 100 Russell Brook Road  
Viking Landing – 246 Main Street  
Wright Homestead – 305 Main Street  
180 Northampton Street  
20 Ballard Street  
22 Nashawannuck Street

**8. Employment Centers**

Riverside Industries – 1 Cottage Street  
Mill 180 – 180 Pleasant Street  
Big E's Foodland – 11 Union Street  
October Company – 51 Ferry Street  
Chemetal – 39 O'Neil Street  
Applied Adhesives – 41 O'Neil Street  
Williston Northampton School – 8 Payson Avenue  
Cottage Street Studios– One Cottage Street  
Easthampton Savings Bank – 36 Main Street  
Philipp Manufacturing Company – 19 Ward Avenue

**9. Camps**

Arcadia Wildlife Sanctuary (Mass Audubon) – 127 Combs Road  
Williston-Northampton School – 8 Payson Avenue  
Nonotuck Park – Lownds Avenue

**10. Mobile Home Parks**

None

## 5: MITIGATION CAPABILITIES & STRATEGIES

One of the steps of this Hazard Mitigation Plan update process is to evaluate all of the City's existing policies and practices related to natural hazards and identify potential gaps in protection. Easthampton's local Hazard Mitigation Committee worked with PVPC to comprehensively assess existing capabilities using the FEMA Capability Assessment worksheet as a guide.

Easthampton has most of the no cost or low cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in floodplains, stormwater management, tree maintenance, etc. Easthampton also has appropriate staff dedicated to hazard mitigation-related work for a community its size, including the Mayor, an Emergency Management Director, a professionally run Department of Public Works, a Building Inspector, a Planner, and a Tree Warden, and Easthampton has recommended plans in place, including a Master Plan, an Open Space and Recreation Plan, a Comprehensive Emergency Management Plan, and a Capitol Improvements Plan. Not only does Easthampton have these capabilities in place, but they are also deployed for hazard mitigation as appropriate. The City also has very committed and dedicated volunteers who serve on Boards and Committees and in Volunteer positions. The City collaborates closely with surrounding communities and is party to Mutual Aid agreements through the MEMA. Easthampton is also an active member community of the Pioneer Valley Planning Commission (PVPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at the PVPC.

Easthampton's most obvious hazard mitigation need is for federal funds to implement prioritized actions. While Easthampton is a well-managed fiscally sound City, it is not a wealthy community and with state constraints on municipalities raising their own funds, Easthampton has very limited financial resources to invest in costly hazard mitigation measures. Easthampton is, however, committed to locally matching all HMGP grants received.

After reviewing existing policies and the hazard identification and assessment, the City Hazard Mitigation Committee developed a set of hazard mitigation strategies it will work to implement.

The City of Easthampton 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, winds, hurricanes, tornadoes, wildfires/brushfires, earthquakes, dam failures, drought, and landslides.

## **Overview of Mitigation Strategies by Hazard**

---

An overview of the general concepts underlying mitigation strategies for each of the hazards identified in this plan is as follows:

### **Flooding**

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 city's water bodies and waterways. The City of Easthampton currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the City's zoning bylaw and subdivision regulations, such as ensuring adequate driveway drainage, restricting development in the floodplain, requiring drainage easements where applicable for subdivisions, and following the Wetlands Protection Act.

### **Severe Snowstorms / Ice Storms**

The City's current mitigation strategy is to restrict the location and height of telecommunications facilities. To the extent that some of the damages from a winter storm can be caused by flooding, flood protection mitigation measures also assist with severe snowstorms and ice storms. The State Building Code provides minimum snow load requirements for roofs, that also assist in mitigation of severe snow storms and ice storms.

### **Hurricanes**

The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Flood protection measures can thus also be considered hurricane mitigation measures. The high winds that often accompany hurricanes can also damage buildings and infrastructure, similar to tornadoes and other strong wind events. Meeting the requirements of the State Building code also reduce damages from hurricanes.

### **Severe Thunderstorms / Winds / Tornadoes**

Most damage from tornadoes and severe thunderstorms come from high winds that can fell trees and electrical wires, as well as generate hurtling debris. Adherence to the Massachusetts Building Code is a primary current mitigation strategy. Current land development regulations, such as restrictions on the height of telecommunications towers, also help prevent wind damages.

### **Wildfires / Brushfires**

Residents must notify the Fire Department when they plan to have a controlled burn on their property. In addition, the City conducts local outreach to schools about fire safety.

## **Earthquakes**

Most buildings and structures in the state were constructed without specific earthquake resistant design features. However, the State Building Code helps maintain the structural integrity of structures and helps to mitigate earthquakes.

## **Dam Failure**

The mitigation measures currently in place focus on regular inspections and permitting process required by the Massachusetts DCR.

## **Drought**

The City's Aquifer Protection District Overlay designates areas for recharge of aquifers to ensure plentiful access to drinking water. The City also has a Water Use Restriction Ordinance that allows it to declare a State of Water Conservation, in order to limit water use by residents and businesses.

## **Landslides**

The City has been working to clean up and replant trees in the area where the microburst occurred to mitigate the likelihood and possible consequences of a landslide.

## Existing Mitigation Capabilities

The City of Easthampton currently has many mitigation capabilities in place. These capabilities are listed on the following pages and have been evaluated in the “Effectiveness” column. This inventory of existing Mitigation Capabilities addresses most of the topics covered in the Capability Assessment worksheet 4.1 in the FEMA Local Mitigation Planning Handbook. Plans reviewed for Mitigation Capabilities are addressed in Chapter 6.

Existing or Proposed Protection	Description	Hazards Mitigated	Effectiveness	Potential Changes
Backup Electric Power	Full power generator available at 32 Payson (Public Safety Complex); portable generator can be used at all shelters (White Brook Middle School, Tri-County, and High School)	All hazards	Effective.	None.
State Building Code	The City of Easthampton has adopted the Massachusetts State Building Code, which sets standards for the construction of all new structures.	All hazards	Effective.	None.
Flood Control Structures	There are seven dams within the City of Easthampton.	Floods	Very effective for preventing flooding downstream.	Ensure dam owners realize their responsibility to inspect the dams.
Zoning Bylaws: Area, Height, and Bulk Regulations	Prohibits the construction of buildings within the floodplain or 10 feet of a waterway, unless the first floor is elevated above the floodline.	Floods	Very effective for preventing flood damages to structures.	None.

Existing or Proposed Protection	Description	Hazards Mitigated	Effectiveness	Potential Changes
Zoning Bylaws: Aquifer Protection District Overlay	Areas delineated as primary recharge areas for groundwater aquifers, and watershed areas for reservoirs are protected by strict use regulations.	Floods Droughts	Very effective for preventing groundwater contamination and for controlling stormwater runoff, promoting groundwater recharge.	Add Zone II to northern portion of city.
Zoning Bylaws: Floodplain and Manhan River Protection District Overlay	Areas delineated as part of the 100-year floodplain, and/or within 100 feet of the Manhan River, are protected by strict use regulations.	Floods	Very effective for preventing incompatible development within the floodplain.	None.
Zoning Bylaws: Site Plan Approval and Special Permit	Sets forth specific requirements for protecting wetlands and other related natural features, and water quality and supply.	Floods	Very effective for managing very specific impacts.	None.
Zoning Bylaws: Additional Regulations	City has environmental protection standards and filling standards that govern stormwater management, erosion control, and other applicable development impacts.	Floods	Somewhat effective for managing specific impacts, managing stormwater runoff.	Develop Stormwater Bylaw with LID standards.
Subdivision Regulations: Construction Standards	New developments must meet drainage requirements that will allow for conveyance of stormwater.	Floods	Somewhat effective for managing stormwater runoff.	Consider adding infiltration requirements, impervious surface limits, etc.
Wetlands Protection Act River and Stream Protection	City enforces the standards established by Wetlands Protection Act, which protects water bodies and wetlands through the Conservation Commission.	Floods	Somewhat effective at protecting water bodies and wetlands.	Develop local protection ordinance.



Existing or Proposed Protection	Description	Hazards Mitigated	Effectiveness	Potential Changes
National Flood Insurance Program	The City participates in the National Flood Insurance Program and restricts development in the 100-year floodplain.	Floods	Effective.	None.
Easthampton Master Plan	Inventories natural features and promotes natural resource preservation in the city, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks. The plan highlights the importance of balancing future development with the preservation of natural and scenic resources, and preservation of open space and farmland to provide flood storage capacity.	Floods Droughts	Effective in identifying sensitive resource areas, including floodplains. Encourages forestland and farmland protection, which will help conserve the city's flood storage capacity.	None.
Subdivision Grade Regulations	Development must meet street grade regulations (eight percent maximum) and intersection grade regulations.	Severe snowstorm / ice storm	Effective.	None.
Subdivision Regulations: Underground Utilities	Utilities must be placed underground in all new developments.	Severe snowstorm / ice storm Hurricane Tornado Severe Wind Severe Thunderstorm	Effective for preventing power loss.	None.

Existing or Proposed Protection	Description	Hazards Mitigated	Effectiveness	Potential Changes
Wireless Communication Services District	Restricts the height and other features of wireless communication towers, such as distance that tower can be from edge of property line.	Severe snowstorm / ice storm Hurricane Tornado Severe Wind Severe Thunderstorm	Somewhat effective for preventing damage to nearby property.	None.
Burn Permits	Residents are permitted to obtain burn permits over the phone. State police personnel provide information on safe burn practices. Easthampton residents that wish to participate in open burning must go to the Easthampton Public Safety Complex to fill out a burning permit. There is no fee for this permit. Residents need only to fill out one burning permit for the season. Once permits are on file, residents need to call the day they wish to burn. Open burning may or may not be allowed depending on weather conditions.	Wildfire / brushfire	Effective.	None.
Subdivision Review for Fire Safety	The Fire Chief is involved in the review of subdivision plans. The Definitive Plan of a subdivision is reviewed by the Fire Chief to ensure that the subdivision has sufficient fire protection standards.	Wildfire / brushfire	Effective.	None.

Existing or Proposed Protection	Description	Hazards Mitigated	Effectiveness	Potential Changes
Fire Safety Public Education / Outreach	The Fire Department has an ongoing educational program in the schools. The Easthampton Fire Department has two primary outreach and education measures for fire prevention. First, the Fire Department holds an Open House. Second, three S.A.F.E. (Student Awareness of Fire Education) instructors teach fire safety in all public and private elementary schools throughout the year. Several members participate in educational presentations and demonstrations to the public throughout the year, including portable fire extinguisher instruction and CPR.	Wildfire / brushfire	Effective.	None.
New Dam Construction Permits	State law requires a permit for the construction of any dam, issued by the Massachusetts Department of Conservation and Recreation	Dam Failure	Effective. Ensures dams are adequately designed.	None.
Dam Inspections	Massachusetts DCR has an inspection schedule that is based on the hazard rating of the dam.	Dam Failure	Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply.	Identify sources of funding for dam safety inspections.
Easthampton Water Use Restriction Ordinance	Allows the City to declare a State of Water Conservation and enforce restrictions, conditions, and requirements limiting the use of water by residents and businesses	Drought	Very effective for enforcing water conservation measures during a drought.	None.

## Deleted Mitigation Strategies

The City of Easthampton has decided not to pursue several mitigation strategies identified in the previous version of its Hazard Mitigation Plan. These deleted strategies, as well as the reason for their deletion, are indicated in the table below.

Deleted Mitigation Strategies					
Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Reason for Deletion
Dam Inspections Funding - Review	Operational Strategy	Incorporate Dam Safety into Development Review Process	Flooding	DPW/Planning	Determined that integration into development review process is not most effective way to address concern given that the dams exist and are not likely to be affected by a new development review process as MA law would grandfather existing dams.
Debris Management Plan	Planning document	Regional Debris Management Plan	Consider participation in the creation of a Regional Debris Management Plan	DPW and WRHSAC	The WRHSAC had allocated funds for a regional debris management plan in 2008, but the funds were re-assigned.

Deleted Mitigation Strategies					
Action Name	Action Type	Description	Hazards Mitigated	Responsible Agency	Reason for Deletion
State Building Code	State regulation	Evaluate older structures to be used as shelters to determine if they are earthquake resistant	Earthquakes	EMD, Board of Health	City Hazard Mitigation committee has determined that this action is not cost effective
Dam Removal	Operational strategy	Remove unnecessary dams	Flooding Dam Failure	Mayor, DPW	City has determined that there are no unnecessary dams in the community
Telecommunications Facilities zoning	Zoning bylaw	In the Zoning regulations for Telecommunications Facilities, add safety and prevention of wind related damage as a stated purpose	Hurricanes Tornadoes Microburst Earthquakes	City Planner	Determined to be not cost effective because it would not improve the bylaw, just add to its purpose, and the municipal staff are operating with limited funds and significant obligations.

## **Prioritized Implementation Plan**

---

Throughout this planning process, the City of Easthampton Hazard Mitigation Committee has worked to analyze actions and/or projects that the City considered to reduce the impacts of hazards identified in the risk assessment, and identified the actions and/or projects that the jurisdiction intends to implement. Several of the action items previously identified in the previous version of this 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. The strategies identified in this plan are believed by the local Hazard Mitigation Committee to be the ones needed in Easthampton to address the vulnerabilities identified in this plan.

### **Prioritization Methodology**

The 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

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:

- **Municipal staff time** for grant application and administration
- **Consultant design and construction cost** (based on estimates for projects obtained from City and general knowledge of previous work in the city)
- **Municipal staff time** for construction, maintenance, and operation activities

### Project Timeline

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

Mitigation Action	Status	Action Type	Description	Hazards Mitigated	Responsible Entity	Timeframe	Funding source	Cost	Priority
Collaborate with Commonwealth to clean up debris and re-plant trees on Mount Tom at Hendrick Street, East Street and Mountain Road	Under-way	Operational strategy	Clean up debris from Oct 2014 microburst and replant shrubs, plants and trees	Landslide	DPW	Anticipate completion in mid 2016	Most of the damage is on state owned land so anticipate funding by DCR Department of Public Works for local portion	Local portion est low	high
Detention Basins Maintenance	Under-way	Operational strategy	Develop and implement a plan for maintenance of detention basins	Flooding Hurricanes Dam Failure	DPW, Planning Board	Anticipate completion of plan development in Fall 2016	City Staff, DLTA	Low, est \$5,000	high
Dam Inspections Funding - Review	Under-way	Operational strategy	Identify sources of funding for dam safety inspections	Flooding	Planning Dept./PVPC	Anticipate completion in Fall 2016	Department of Public Works	very low, est. under \$1,000	medium






## Mitigation Strategies to be Implemented


Mitigation Action	Status	Action Type	Description	Hazards Mitigated	Responsible Entity	Timeframe	Funding source	Cost	Priority
Dam Inspections Schedule	Include d in 2009 plan-but not accomplished	Operational Strategy	<p>Ensure dam owners realize their responsibility to inspect dams</p> <p>Create schedule of required dam inspections, send letters of notification to private dam owners at both one year and six months prior to required inspection dates, determine if inspections have been completed, require copies of inspection reports be provided to the city, and initiate appropriate legal actions if inspections are not completed as required.</p>	Flooding Dam Failure	DPW, Mayor's Office, Planning Dept.	Anticipate start-Jan 2017 and complete by Dec 2017	City Staff Time out of existing municipal budget	Low, Est. \$2,000, 20-30 hrs staff time annually	Medium
Aquifer Protection District Overlay	Include d in 2009 plan-but not accomplished	Zoning bylaws	Amend the Aquifer Protection District Overlay and add Zone II to northern portion of city	Flooding Drought	Barnes Aquifer Protection Advisory Committee, Planning Board	Anticipate start in Jan 2019 and complete in Jan 2020	DLTA Grant	Low, Est. \$10,000	Low
Stormwater bylaw	Include d in 2009 plan-but not accomplished	Regulation	Develop Stormwater and Erosion Control Bylaw with LID standards	Flooding, Hurricane	Planning Board, DPW, Board of Health	Anticipate start in Jan 2017 and complete by May 2018	DLTA Grant, existing Municipal budget, volunteer Board members	Low, Est. \$10,000	Low

## Mitigation Strategies to be Implemented

Mitigation Action	Status	Action Type	Description	Hazards Mitigated	Responsible Entity	Timeframe	Funding source	Cost	Priority
Radio Stations Emergency Broadcast	New	Operational strategy	Collect, periodically update and disseminate information on which local radio stations provide emergency information	All Hazards	EMD	Anticipate start in June 2016 and complete 1st effort in Sep 2016, repeat 2x/yr	City Staff	Very low, \$300 staff time	low
Fire Safety Pamphlet	Include d in 2009 plan-but not accomplished	Operational strategy	Develop and distribute an educational pamphlet on fire safety and prevention	Wildfire Brushfire	Fire Department	Anticipate start in Sep 2017 and complete in Dec 2017	City Staff / Volunteers	Low, Est. \$2,000	low
Back-up Generators	Include d in 2009 plan-but not accomplished	Operational strategy	Install back-up generators to ensure that all identified shelters have sufficient back-up energy in the event of primary power failure, target COA because all other targeted buildings have recently been equipped with back-up generators	All hazards	EMD	After securing financing, 9 months to complete	Commercial Equipment Direct Assistance Program (CEDAP)	\$10-50K	Low

**Mitigation Strategies Accomplished since last plan was adopted in 2009**  = Complete

Mitigation Action	Status	Action Type	Description	Hazards Mitigated	Responsible Entity	Timeframe	Funding Source		
Notification System - Reverse 911		Operational strategy	Examine current notification system including feasibility of Reverse 911 City implemented Code Red	Floods Severe Snowstorms / Ice storms Severe Thunderstorm Hurricanes Tornadoes Wildfire / Brushfire Earthquakes Dam Failure	Mayor, City Council	done	City Staff		
Existing Shelters		Operational strategy	Identify existing shelters that are outside of floodplain and inundation areas. Disseminate this information to appropriate city departments	Flooding Dam Failure	EMD, Board of Health	done	City Staff		
Shelter Inventory		Operational strategy	Inventory supplies at existing shelters and develop a needs list and storage requirements. Establish arrangements with local or neighboring vendors for supplying shelters with food and first aid supplies in the event of a natural disaster	Severe Snowstorms / Ice storms Tornadoes Hurricanes	EMD	done	Homeland Security grants MA EOPS		

Shelter Supplies Plan		Operational strategy	Develop and implement a plan for providing access to water, information, shelter, and food stores for special needs populations in city in event of severe winter storm	Floods Severe Snowstorms / Ice storms Severe Thunderstorm Hurricanes Tornadoes Wildfire / Brushfire Earthquakes Dam Failure	EMD, Board of Health	done	Homeland Security grants, Massachusetts Executive Office of Public Safety		
Construction Standards		Planning document	Add infiltration requirements, including impervious surface limits, to the Construction Standards in the subdivision regulations--done for Aquifer Protection zone and determined to be not possible downtown.	Flooding Dam Failure Hurricane	Planning Board	done	Planning Board		
Easthampton Master Plan		Planning document	Work to implement goals in Master Plan on protection of water supply and quality	Flooding Drought	DPW, Barnes Aquifer Protection Advisory Committee, Mayor	done	City Staff / Volunteers		
Undeveloped Properties in Flood Zone		Operational strategy	Prioritize and acquire undeveloped properties within the flood zones throughout the city	Flooding Hurricanes	Planning Department, Conservation Commission, City Council	done	City Staff / Volunteers		

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

## Plan Adoption

---

Upon completion of the draft Hazard Mitigation Plan, a public meeting was held by the City staff and the Pioneer Valley Planning Commission on February 24, 2015 to present and request comments from residents. 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 adopted by the Mayor.

## Plan Implementation

---

The implementation of this plan began upon its formal adoption by the City Council and approval by MEMA and FEMA. Those City departments and boards responsible for ensuring the development of policies, ordinance revisions, and programs as described in Chapter 5 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 / Documentation of Easthampton's existing Authorities, Policies and Programs to Mitigate Hazards**

Easthampton has a number of planning and regulatory capabilities that prevent and reduce the impacts of hazards. Many of these are assessed in the tables in Chapter 5. 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:

- ***Easthampton Master Plan*** - used to identify Community's priorities and sync hazard mitigation strategies with planned actions
- ***Easthampton Capital Improvements Plan***
- ***Easthampton Comprehensive Emergency Management Plan*** - used to identify critical infrastructure, current emergency operations, and special needs populations
- ***Easthampton Open Space and Recreation Plan*** - used to identify existing hazard mitigation strategies, already proposed mitigation strategies, natural resources, and critical infrastructure
- ***Easthampton Zoning Ordinance and Subdivision Regulations*** - used to identify existing mitigation strategies

- **Massachusetts' State Hazard Mitigation Plan** - used to ensure consistency with state identification of mitigation strategies, critical infrastructure, and hazards
- **Our Next Future: An Action Plan for Building a Smart, Sustainable, and Resilient Pioneer Valley** - used for data, information, context and strategies, **including the 8 elements plans:**
  1. **Climate Action and Clean Energy**
  2. **Food Security**
  3. **Sustainable Transportation**
  4. **Environment**
  5. **Green Infrastructure**
  6. **Housing**
  7. **Brownfields**
  8. **Land Use**

The three core members of the City's Hazard Mitigation Committee (Mayor, City Planner and DPW Director) will stay abreast of the status of these plans and whenever any of these plans are in the process of being updated, the Hazard Mitigation Committee will provide copies of the Hazard Mitigation Plan to relevant City staff and brief them on the content of the Hazard Mitigation Plan, so that the Hazard Mitigation plan can be integrated into these plans. The Hazard Mitigation Committee will also review current City programs and policies to ensure that they are consistent with the mitigation strategies described in this plan, and amend them over time as possible and practicable to benefit from the hazard mitigation knowledge and expertise developed in the process of updating this plan. The Hazard Mitigation Plan will also be incorporated into updates of the City's Comprehensive Emergency Management Plan.

Members of the local Hazard Mitigation committee do not have written evidence that the previous Hazard Mitigation plan was formally integrated into City plans that may have been developed and/or updated since the previous plan was approved. However, it is the understanding of the members of the local Hazard Mitigation committee that this was the case. Going forward, the process of cross integration will be more closely monitored.

## **Plan Monitoring and Evaluation**

---

The three core members of the City's Hazard Mitigation Committee (Mayor, City Planner and DPW Director) will hold meetings of all responsible parties to review plan progress as needed, based on occurrence of hazard events, but at a minimum annually. The public will be notified of these meetings in advance through a posting of the agenda at the Municipal Office Building. Responsible parties identified for specific mitigation actions will be asked to submit status reports in advance of the meeting. Meetings will entail the following actions:

- Review previous hazard events to discuss and evaluate the effectiveness of current mitigation measures

- Assess how the mitigation strategies of the plan can be integrated with other City plans and operational procedures, including the Zoning Bylaw and Emergency Management Plan
- Review and evaluate progress toward implementation of the current mitigation plan based on reports from responsible parties
- Amend current plan to improve mitigation practices

The following questions will serve as the criteria that is used to evaluate the plan:

#### *Plan Mission and Goal*

- Is the Plan's stated goal and mission still accurate and up to date, reflecting any changes to local hazard mitigation activities?
- Are there any changes or improvements that can be made to the goal and mission?

#### *Hazard Identification and Risk Assessment*

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.
- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.
- Is there any new data available from local, state, or Federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the plan.

#### *Existing Mitigation Strategies*

- Are the current strategies effectively mitigating the effect of any recent hazard events?
- Has there been any damage to property since the plan was last reviewed?
- How could the existing mitigation strategies be improved upon to reduce the impact from recent occurrences of hazards? If there are improvements, these should be incorporated into the plan.

#### *Proposed Mitigation Strategies*

- What progress has been accomplished for each of the previously identified proposed mitigation strategies?
- How have any recently completed mitigation strategies affected the Town's vulnerability and impact from hazards that have occurred since the strategy was completed?
- Should the criteria for prioritizing the proposed mitigation strategies be altered in any way?

- Should the priority given to individual mitigation strategies be changed, based on any recent changes to financial and staffing resources, or recent hazard events?

*Review of the Plan and Integration with Other Planning Documents*

- Is the current process for reviewing the Hazard Mitigation Plan effective? Could it be improved?
- Are there any Town plans in the process of being updated that should have the content of this Hazard Mitigation Plan incorporated into them?
- How can the current Hazard Mitigation Plan be better integrated with other Town planning tools and operational procedures, including the zoning bylaw, the Comprehensive Emergency Management Plan, and the Capital Improvement Plan?

Following these discussions, it is anticipated that the Hazard Mitigation Committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different municipal departments and/or revise the goals and objectives contained in the plan. The Committee will review and update the Hazard Mitigation Plan every five years.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all meetings in accordance with Massachusetts open meeting laws and the public invited to attend, as well as comment via e-mail or phone. The public will be notified of any changes to the Plan via the meeting notices board at City Hall, and copies of the revised Plan will be made available to the public at City Hall.



## 7: APPENDICES

### Appendix A: 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
Selected MA Regional Planning Commissions:	
Berkshire Regional Planning Commission (BRPC).....	413/442-1521
Franklin Regional Council of Governments (FRCOG).....	413/774-3167
Metropolitan Area Planning Council (MAPC).....	617/451-2770
Pioneer Valley Planning Commission (PVPC).....	413/781-6045
MA Board of Building Regulations & Standards (BBRS).....	617/227-1754
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 1.....	413/582-0599
MA Division of Marine Fisheries.....	617/626-1520
MA Division of Capital & Asset Management (DCAM).....	617/727-4050
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
National Oceanic and Atmospheric Administration: National Weather Service.....	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) .....	MA Emergency Management Agency
406 Public Assistance and Hazard Mitigation .....	MA 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) .....	MA Emergency Management Agency
Emergency Generators Program by NESEC‡ .....	MA Emergency Management Agency
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation
Service Flood Mitigation Assistance Program (FMAP).....	MA Emergency Management Agency
Flood Plain Management Services (FPMS).....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP).....	MA Emergency Management Agency
Mutual Aid for Public Works.....	Western Massachusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) † .....	MA Emergency Management Agency
Power of Prevention Grant by NESEC‡ .....	MA 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

‡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.

† 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. MEMA can provide additional information regarding participation in the NFIP-CRS Program.

### 3) Internet Resources

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	<a href="http://www.fema.gov/fema/csb.html">http://www.fema.gov/fema/csb.html</a>	Searchable site for

Sponsor	Internet Address	Summary of Contents
Insurance Program, Community Status Book		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
The Tornado Project Online	<a href="http://www.tornadoroject.com/">http://www.tornadoroject.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.iix.com/ndcmap.html">http://www.iaa.iix.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.

## **Appendix B: Documentation of Planning Process**

---

Staff from the Pioneer Valley Planning Commission (PVPC) work in collaboration with their member community representatives (member communities include the 43 cities and towns in Hampden and Hampshire counties of western Massachusetts) to develop and update Hazard Mitigation plans. PVPC started work on Hazard Mitigation Planning in 2005.

The process PVPC and member municipalities follow to develop these plans entails preliminary background research and data collection and analysis performed by PVPC staff to review and incorporate existing plans and other information documenting hazards, vulnerabilities, risks and mitigation strategies. Once PVPC staff have a draft updated plan, they work with each municipality to form and convene a local Hazard Mitigation Committee. Below are the agendas for the Easthampton Hazard Mitigation Committee as well as a list of participants present at each meeting.

**Easthampton Hazard Mitigation Committee  
Meeting Agenda  
Municipal Office Building  
January 20, 2015 2:00 pm**

1. Introductions
2. Overview of Hazard Mitigation Planning Process
  - a. Background on Hazard Mitigation Planning
  - b. Planning process and requirements
    - i. 3-5 committee meetings
    - ii. 2 public committee meetings
    - iii. Mayoral adoption
    - iv. Public outreach
  - c. Overview of current Easthampton Hazard Mitigation Plan
    - i. Items to be updated
      1. Value of all property in city
      2. History of natural hazards in last 5 years
      3. Previously identified mitigation strategies
      4. New mitigation strategies
      5. Hazard identification map
3. Identification/Review of Critical Facilities
4. Discussion of Hazard Identification and Risk Assessment
5. Review Existing Mitigation Strategies Undertaken by City
6. Next Steps
  - a. Proposed meeting schedule
  - b. Next committee meeting agenda, time, date, and location
  - c. First public meeting agenda, time, date, and location

Present: Mayor Cadieux, City Planner Jessica Allan, DPW Director Joseph Pipczynski

**Easthampton Hazard Mitigation Committee  
Meeting Agenda**

**Municipal Office Building  
February 10, 2015 2:00 pm**

1. Assure Readiness for first public meeting
2. Edits to plan based on discussion from January meeting
3. Review of Chapter 3: Hazard Identification and Analysis
4. Review of Chapter 4: Critical Infrastructure and map
5. Review of Chapter 5: Mitigation Strategies

Present: Mayor Cadieux, City Planner Jessica Allan

**Easthampton Hazard Mitigation Committee  
Meeting Agenda**

**Municipal Office Building  
February 24, 2015 2:00 pm**

1. Finalize Prioritized list of Mitigation Strategies
  - a. Affirm strategies accomplished since 2009
  - b. Delete Strategies no longer relevant/cost effective
2. Proposed Mitigation Strategies
  - a. Costs
  - b. Prioritization
  - c. Responsible entities
  - d. Funding sources
3. Plan Review, Evaluation, Implementation, and Adoption

Present: Mayor Cadieux, City Planner Jessica Allan, DPW Director Joseph Pipczynski

In addition to the above documentation of the Easthampton Hazard Mitigation Committee's work, we have also documented the public outreach that was part of this planning process below.

Two media releases of the planning process, inviting residents, businesses, surrounding communities and all interested parties to attend two public meetings describing the planning process and presenting the DRAFT plan were mailed to the following list of media outlets. The audience for these announcements covers all the surrounding communities and reaches businesses, and other key stakeholders.

The Republican newspaper picked up both media releases and they were printed in the paper and also published on the paper's website, Masslive at:

[http://www.masslive.com/news/index.ssf/2015/01/public\\_input\\_sought\\_as\\_eastham.html](http://www.masslive.com/news/index.ssf/2015/01/public_input_sought_as_eastham.html)

[http://www.masslive.com/news/index.ssf/2015/02/easthampton\\_to\\_hold\\_final\\_publ.html](http://www.masslive.com/news/index.ssf/2015/02/easthampton_to_hold_final_publ.html)

### WRHSAC Contacts

Chair	Sheriff Bowler /Lt. Col. Thomas Grady	Berkshire County Sheriff's Office
Vice Chair	Thomas Lynch	Baystate Health
Corrections	Sheriff Bowler /Maj. Thomas Grady	Berkshire County Sheriff's Office
Law Enforcement	Chief Stephen Kozloski	Monson Police Department
Law Enforcement	Chief Michael Wynn	Pittsfield Police Department
Law Enforcement	Chief John Paciorek	Deerfield Police Department
Fire	Chief Mark Babineau	Ludlow Fire Department
Fire	Chief John Pond	Holyoke Fire Department
Fire	Chief Francis Nothe	Wilbraham Fire Department
Emergency Mgt.	Robert Hassett	Springfield Office of Emergency Preparedness
Regional Transit	Jamin Carroll	Pioneer Valley Transit Authority
Hospital	Thomas Lynch	Baystate Health
Public Safety Communications	Melissa Nazzaro	Springfield Public Safety
Public Works	Christopher Brouhard	Town of Beckett Highway Superintendent
Public Health	Ed Lesko	Town of Hatfield Board of Health
Emergency Medical Services	Linda Moriarty	WMEMS
Municipal Government	Carolyn Shores Ness	Board of Selectmen Town of Deerfield

# Public input sought as Easthampton updates Hazard Mitigation Plan



Easthampton's 50 Payson Ave. Municipal Building (Mary Serreze Photo)



By **Mary Serreze** | Special to The Republican  
on January 30, 2015 at 8:55 AM

[Print](#) [Email](#)

**EASTHAMPTON** — Easthampton officials are currently assessing the city's risks from natural hazards, identifying steps that can be taken to prevent damage to property and loss of life and prioritizing funding for mitigation actions.

The public is invited to provide comment on the update to the Easthampton Hazard Mitigation Plan at a meeting slated for Monday, Feb. 2 at 3 p.m. at the 50 Payson Ave. Municipal Building.

The plan is being updated with help from the Pioneer Valley Planning Commission, and is funded by the Federal Emergency Management Agency and the Massachusetts Emergency Management Agency.

## EASTHAMPTON HEADLINES

**Easthampton contingent in 2015 Holyoke St. Patrick's Parade**

**Easthampton: Union Mart customer says he was repeatedly charged illegal fee for using EBT card**

**Level 3 sex offender Michael Wright Jr., of Easthampton, pleads in court for more time to find a job**

**Easthampton police: Search for child porn yields hash oil, pills, stolen street sign**

**Easthampton Meadow housing**

**BREAK WITH TRADITION**

AST LIGI  
RES CUS  
REN AGI

COLE HAAN  
ZEROGRA

SHOP NOW

## POPULAR PHOTO GAL



**Tree thinning p  
long-term fore  
management**



**Fiddler on the r  
Sinai Temple in  
Springfield**



# Easthampton to hold final public engagement event for Hazard Mitigation Plan



MEMA coordinator Bob Barry, Fire Chief Dave Mottor and Police Chief Bruce McMahon speak to the press on Oct. 8, 2014, the day Easthampton was hit by a destructive microburst. (Mary Serreze Photo)



By [Mary Serreze](#) | Special to The Republican  
on February 20, 2015 at 6:24 PM

[Print](#) [Email](#)

**EASTHAMPTON** -- Easthampton is updating its Hazard Mitigation Plan, and residents are invited to a meeting Tuesday afternoon to provide input.

The draft plan, updated with help from the Pioneer Valley Planning Commission, will be presented Feb. 24 at 3 p.m. at the 50 Payson Ave. Municipal Building.

The meeting will include an overview of the planning process, a summary of existing

**MOVING?**

*Bert Hill*  
MOVER

CLICK OR CALL 413-485-0050

## POPULAR PHOTO GALLERIES

[SEE ALL »](#)



**Tree thinning part of long-term forest management**



**Fiddler on the Roof at Sinai Temple in Springfield**



**Cathedral boys hockey faces St. John's Prep in Super 8 semifinals**

[POPULAR PHOTO GALLERIES »](#)

<b>Media Organization</b>	<b>Address</b>	<b>Town</b>	<b>State</b>	<b>Zip Code</b>
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	Northampton	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	Northampton	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	Northampton	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	Northampton	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

In addition to the media releases publicizing the City's planning process and inviting input, PVPC assured that surrounding communities were aware of Easthampton's work updating their plan by informing the members of the Commission that oversees PVPC's work through articles in the quarterly newspaper published by the PVPC and also by presenting at meetings of the Executive Committee. Three articles have been published on the Easthampton (and other member municipalities) Hazard Mitigation work, starting in 2012. They are copied below. The PVPC "Regional Reporter" is emailed to all 43 cities and towns in the Pioneer Valley and also to Businesses, Chambers of Commerce, Educational Institutions and Developers.

**Pioneer Valley Planning Commission Regional Reporter  
December 2012**

*PVPC working with member communities to mitigate the long term consequences of natural hazards*

PVPC is working with 10 member municipalities to update and/or develop new Hazard Mitigation plans. Granville, Longmeadow, Montgomery, Russell, and Wales are all developing their first Hazard Mitigation plans; while Agawam, Easthampton, Hampden, Southwick, and Ware are working on updates.

PVPC was also engaged by the University of Massachusetts Amherst campus to write their campus Hazard Mitigation plan, and PVPC has just submitted a grant application to MEMA to update plans for Hadley, Hatfield, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southampton, Westhampton, and Wilbraham.

Having a FEMA approved Hazard Mitigation plan makes each municipality eligible to apply for Hazard Mitigation grant funds to address identified top community priorities to mitigate the long-term consequences of natural disasters.

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

## **Pioneer Valley Planning Commission Regional Reporter January 2015**

Let PVPC Guide Your Community Through the Hazard Mitigation Planning Process!

Over the past 10 years, PVPC has helped 40 communities in the Pioneer Valley develop hazard mitigation plans, making them eligible for grant opportunities from the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA).

Through the hazard mitigation planning process, communities assess their vulnerability to natural hazards, such as flooding, snowstorms, hurricanes, wildfire, and tornadoes. They also prioritize a set of mitigation strategies that will help eliminate the long-term risk to human life and property from these hazards. Common mitigation strategies that are eligible for grant funding from FEMA and MEMA include minor localized flood reduction projects, structural retrofitting of existing buildings, culvert improvements, installation of emergency backup generators, and infrastructure retrofits.

PVPC provides guidance in all aspects of the development of hazard mitigation plans, including identification and mapping of natural hazards, collaboration with municipal officials to prioritize mitigation strategies, and public outreach. PVPC can also assist communities in applying for grants to fund mitigation projects, through its Local Technical Assistance (*LTA*) program. Contact Josiah Neiderbach at [jneiderbach@pvpc.org](mailto:jneiderbach@pvpc.org) to find out more.

## **Pioneer Valley Planning Commission Regional Reporter April 2013**

The Pioneer Valley Planning Commission is currently working with 23 member municipalities to create new hazard mitigation plans and update expiring plans. These plans, approved by the Federal Emergency Management Agency (FEMA), make these municipalities eligible to apply for hazard mitigation grant funds to address identified top community priorities to mitigate the long-term consequences of natural disasters.

PVPC is currently in the process of creating or updating plans for 10 communities. This includes developing new hazard mitigation plans for Granville, Longmeadow, Montgomery, Russell, and Wales, as well as updating the current plans for Agawam, Easthampton, Hampden, Southwick, and Ware.

PVPC also recently applied for funds from FEMA to create or update plans for an additional 13 communities. This includes creating new plans for Blandford and Tolland, as well as updating existing plans for Chesterfield, Hadley, Hatfield, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southampton, Westhampton, and Wilbraham.

Copies of approved hazard mitigation plans are available on PVPC's website at <http://www.pvpc.org/activities/landuse-mitplans-2011.shtml>. For more information please contact PVPC's Josiah Neiderbach at (413) 781-6045 or [jneiderbach@pvpc.org](mailto:jneiderbach@pvpc.org).

# Slides from Public Outreach Presentations

## Easthampton Hazard Mitigation Plan Update

February 10, 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
Planning and zoning	Evacuation plans and emergency drills
Open space preservation	Radio communications equipment
Education and outreach	Emergency response drills
Drainage improvements	

## 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 Easthampton?
- How is Easthampton affected by these hazards?
- How effective are current mitigation strategies?
- What new strategies could be implemented?



### Overview of Planning Process

- Three Hazard Mitigation Committee meetings
- Hazard Mitigation Committee members:
  - Jessica Allan, Planner
  - Joseph Fipczynski, DPW Director
  - Mayor Cadieux

### 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
- City Council/Mayor will then review and adopt

### Question and Comments

#### Contact information:

Catherine Ratte  
Pioneer Valley Planning Commission  
E-mail: [cratte@pvpc.org](mailto:cratte@pvpc.org)

Phone: 413-781-6045

## Easthampton Hazard Mitigation Plan

Public Outreach Event  
February 25, 2015






## Agenda

- Overview of hazard mitigation
- Content of Easthampton Hazard Mitigation Plan
  - Hazard identification and risk assessment
  - Critical infrastructure
  - Existing strategies for mitigating hazards
  - Proposed strategies for mitigating hazards
- Question and comment period

## What is Hazard Mitigation?

According to FEMA:

"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."

## Benefits of Hazard Mitigation

- Makes community eligible to apply for Hazard Mitigation funds from FEMA
- Mitigation is less expensive than disaster clean up
- Having a plan provides an approach for using limited resources more effectively

## Overview of a Hazard Mitigation Plan

**Purpose of plan:**  
Lessen the long-term consequences of natural disasters

**Key plan components:**

1. Hazard identification and assessment
2. Identification of critical infrastructure
3. Existing and proposed mitigation strategies
4. Proposed schedule for implementation of strategies

## Easthampton Hazard Mitigation Working Group

Easthampton municipal staff are currently reviewing and updating the City's current Hazard Mitigation Plan. Public comments will also be incorporated into this update.

**Hazard Mitigation Working Group members:**

- Mayor Karen Cadieux
- Jessica Allan, City Planner
- Joe Pipczynski, Director, Department of Public Works

The Pioneer Valley Planning Commission assisted the City with the development of the plan, through funding from FEMA via MEMA.

### Hazard Assessment

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Perceived Risk Index Rating
Woods	Local	Frequent	Low	Low to Moderate Risk
Storm Surge/Sea Level Rise	Local	Medium	Low	Low to Moderate Risk
Wetlands	Local	Low	High	High Risk
Storm Flooding	Local	Medium	High	High Risk
Wild	Local	Medium	High	High Risk
Severe Weather	Local	Low	Low	Low to High Risk
Wildfire	Local	Frequent	High	High to Moderate Risk
Sea Level Rise	Local	Low	High	High to Moderate Risk
Sea Level Rise	Local	Low	High	High to Moderate Risk
Sea Level Rise	Local	Low	High	High to Moderate Risk
Sea Level Rise	Local	Low	High	High to Moderate Risk
Sea Level Rise	Local	Low	High	High to Moderate Risk

### Existing and New Mitigation Strategies

- Easthampton's existing Hazard Mitigation Plan includes a list of existing mitigation strategies, as well as strategies to be pursued in the future
- The Hazard Mitigation Committee evaluated each strategy in terms of its effectiveness and added additional strategies
- The list of strategies to be pursued in the future was prioritized

#### Existing Mitigation Strategies

Mitigation Strategy	Description	Source/Origin	Effectiveness	Cost/Value
Emergency Preparedness	Develop and maintain an Emergency Management Plan (EMP) for the town, including a public information program.	Local	High	Low
Storm Surge	Develop and maintain a Storm Surge Mitigation Plan (SSMP) for the town, including a public information program.	Local	High	Low
Wildfire	Develop and maintain a Wildfire Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low
Sea Level Rise	Develop and maintain a Sea Level Rise Mitigation Plan (SLRMP) for the town, including a public information program.	Local	High	Low
Wetlands	Develop and maintain a Wetlands Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low

#### New Existing Mitigation Strategies

Mitigation Strategy	Description	Source/Origin	Effectiveness	Cost/Value
Emergency Preparedness	Develop and maintain an Emergency Management Plan (EMP) for the town, including a public information program.	Local	High	Low
Storm Surge	Develop and maintain a Storm Surge Mitigation Plan (SSMP) for the town, including a public information program.	Local	High	Low
Wildfire	Develop and maintain a Wildfire Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low
Sea Level Rise	Develop and maintain a Sea Level Rise Mitigation Plan (SLRMP) for the town, including a public information program.	Local	High	Low
Wetlands	Develop and maintain a Wetlands Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low

#### New Existing Mitigation Strategies

Mitigation Strategy	Description	Source/Origin	Effectiveness	Cost/Value
Emergency Preparedness	Develop and maintain an Emergency Management Plan (EMP) for the town, including a public information program.	Local	High	Low
Storm Surge	Develop and maintain a Storm Surge Mitigation Plan (SSMP) for the town, including a public information program.	Local	High	Low
Wildfire	Develop and maintain a Wildfire Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low
Sea Level Rise	Develop and maintain a Sea Level Rise Mitigation Plan (SLRMP) for the town, including a public information program.	Local	High	Low
Wetlands	Develop and maintain a Wetlands Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low

#### New Existing Mitigation Strategies

Mitigation Strategy	Description	Source/Origin	Effectiveness	Cost/Value
Emergency Preparedness	Develop and maintain an Emergency Management Plan (EMP) for the town, including a public information program.	Local	High	Low
Storm Surge	Develop and maintain a Storm Surge Mitigation Plan (SSMP) for the town, including a public information program.	Local	High	Low
Wildfire	Develop and maintain a Wildfire Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low
Sea Level Rise	Develop and maintain a Sea Level Rise Mitigation Plan (SLRMP) for the town, including a public information program.	Local	High	Low
Wetlands	Develop and maintain a Wetlands Mitigation Plan (WMP) for the town, including a public information program.	Local	High	Low



Deleted Mitigation Strategies					
Strategy Number	Strategy Title	Strategy Description	Responsible Agency	Start Date	End Date
13	Dem. Hazardous Facilities - Pesticides	Increase Dem Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012
	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012
	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012
	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012
	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012

Mitigation Number	Title	Category	Description	Responsible Agency	Start Date	End Date	Funding Source	Cost	Risk
14	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012	Dem. Safety Ins. Checkpoints/Pesticide Traps	\$100,000	High

Mitigation Number	Title	Category	Description	Responsible Agency	Start Date	End Date	Funding Source	Cost	Risk
15	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012	Dem. Safety Ins. Checkpoints/Pesticide Traps	\$100,000	High

Mitigation Number	Title	Category	Description	Responsible Agency	Start Date	End Date	Funding Source	Cost	Risk
16	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012	Dem. Safety Ins. Checkpoints/Pesticide Traps	\$100,000	High

Mitigation Number	Title	Category	Description	Responsible Agency	Start Date	End Date	Funding Source	Cost	Risk
17	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012	Dem. Safety Ins. Checkpoints/Pesticide Traps	\$100,000	High

Mitigation Number	Title	Category	Description	Responsible Agency	Start Date	End Date	Funding Source	Cost	Risk
18	Dem. Hazardous Facilities - Pesticides	Dem. Safety Ins. Checkpoints/Pesticide Traps	Dem. Safety Ins. Checkpoints/Pesticide Traps	Fire/ID	2011	2012	Dem. Safety Ins. Checkpoints/Pesticide Traps	\$100,000	High

### Next Steps in Planning Process

- Plan available for public review at [www.pvpc.org/plans/city-easthampton-hazard-mitigation-plan](http://www.pvpc.org/plans/city-easthampton-hazard-mitigation-plan)
- Plan to be submitted for review by MEMA and FEMA, with public comments incorporated

### Question and Comments

Contact information:

Catherine Ratté  
Pioneer Valley Planning Commission  
E-mail: [cratte@pvpc.org](mailto:cratte@pvpc.org)  
Phone: 413-781-6045

## Appendix C: List of Acronyms

---

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: Critical Facilities Map**

---

**CERTIFICATE OF ADOPTION**

**CITY OF EASTHAMPTON, MASSACHUSETTS**

**MAYOR KAREN L. CADIEUX**

**A RESOLUTION ADOPTING THE**

**CITY EASTHAMPTON HAZARD MITIGATION PLAN Update 2015**

WHEREAS, the City of Easthampton established a Committee to prepare the Easthampton Hazard Mitigation plan; and

WHEREAS, several public planning meetings were held in January and February 2015 regarding the review of the Easthampton Hazard Mitigation Plan; and

WHEREAS, the Easthampton Hazard Mitigation Plan contains several potential future projects to mitigate hazard damage in the City of Easthampton; and

WHEREAS, the Federal Emergency Management Agency has conditionally approved the City's updated Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Mayor of Easthampton adopts the City of Easthampton Hazard Mitigation Plan Update 2016.

ADOPTED AND SIGNED this July 20, 2016

  
\_\_\_\_\_  
Mayor Karen L. Cadieux  
City of Easthampton

ATTEST