

THE TOWN OF HADLEY, MA

**LOCAL NATURAL HAZARDS MITIGATION
PLAN**

FINAL DRAFT

March 13, 2007

[Insert Photo of Hadley Public Safety Complex]

Adopted by the Hadley Board of Selectmen on _____, 2008

**Prepared by:
The Hadley Hazard Mitigation Planning Committee**

and

The Pioneer Valley Planning Commission

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1 - INTRODUCTION

Hazard Mitigation

The Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA) define Hazard Mitigation as any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc. Mitigation efforts undertaken by communities will help to minimize damages to buildings and infrastructure, such as water supplies, sewers, and utility transmission lines, as well as natural, cultural and historic resources.

Planning efforts, like the one undertaken by the Town of Hadley and the Pioneer Valley Planning Commission, make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that may threaten a community.

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

Planning Process

The natural hazard mitigation planning process for the Town of Hadley included the following tasks:

- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure (i.e., critical facilities, public buildings, roads, homes, businesses, etc.) 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. Examples of such strategies include:
 - Preventing or limiting development in natural hazard areas like floodplains;
 - Implementing recommendations in existing planning documents including Stormwater Management Plans, Master Plans, Open Space and Recreation Plans, and Emergency/Evacuation Plans that address the impacts of natural hazards; and

- Requiring or encouraging the use of specific structural requirements for new buildings such as buried utilities, flood-proofed structures, and lightening grounding systems.
- Identifying deficiencies in the current strategies and establish goals for updating, revising or adopting new strategies.
- Adopting and implementing the final Local Natural Hazards Mitigation Plan.

During the planning process, the Town's Local Hazard Mitigation Planning Committee identified Action Plan Items and specific time frames identified by the Town during their review of existing programs, policies, and regulations. From this list, specific Action Items were prioritized by the Town's Local Natural Hazards Planning Committee based on the following criteria:

- Select Action Items which have the ability to significantly mitigate the negative impact of natural hazards on people and property;
- Select Action items which the Town has the ability to implement given the financial and staff resources available;
- Select Action Items which will have the greatest influence on achieving Local Goals & Objectives;
- Select a diverse set of Action Items which will address different Natural Hazards that present a high or moderate risk to the region; and
- Select Action items which will address those mitigation measures identified as deficient or in need of attention to ensure that the Town is in the best possible position to address natural hazards which impact property and residents.

For example, updating or adopting a local floodplain bylaw would be a relatively low cost action item, which could have a significant impact on mitigating hazards caused by flooding. If adopted by a community, this bylaw would discourage development in floodplain areas and prevent harm to people and damage to property. Another action item was to review and maintain shelters for victims of natural hazards within the Town and to conduct outreach to residents so that they are aware of the availability of those shelters.

First, however, the Town must identify what services are available at the different shelters (e.g. food preparation, potable water, back-up electrical power, heat, showers, etc.) and whether the location of different shelters will be impacted by different hazards (i.e. whether flooding will make the shelter inaccessible to some residents). This action item, review and maintain shelters, also addressed a number of different natural hazards and would help ensure that suitable shelters are available for different types of natural hazards. The action items selected were all considered to have a low to moderate cost to implement. In some cases grant funding would be sought for implementation given the limited resources available in the Town.

The local action items represent a multi-faceted approach to addressing natural hazards in the Town and will be undertaken as resources become available and will be integrated into ongoing planning activities. As part of the review and adoption process, the Committee approved the

action items that were in keeping with the goals and criteria established by the Town and assigned appropriate bodies within the Town to implement them within a five-year framework.

Public Committee Meetings

October 24, 2006, 6:30 - 8:00 p.m.: Public informational and organizational meeting, held at the Hadley Public Safety Complex.

November 14, 2006, 2:00 - 3:30 p.m.: Working Committee meeting held at the Hadley Public Safety Complex.

December 12, 2006, 2:00 - 3:30 p.m.: Working Committee meeting held at the Hadley Public Safety Complex.

January 9, 2007, 2:00 - 3:30 p.m.: Working Committee meeting held at the Hadley Public Safety Complex.

March 13, 2007, 2:00 - 3:30 p.m.: Working Committee meeting held at the Hadley Public Safety Complex.

April 17, 2007, 2:00 – 3:30 p.m.: Working Committee meeting held at the Hadley Public Safety Complex.

Public Meetings with the Hadley Board of Selectmen

November 1, 2006: The Hadley Board of Selectmen agreed to begin the process of developing a Local Hazard Mitigation Plan. Meeting held at the Hadley Senior Center.

May _____, 2007: The Board of Selectmen held a public hearing and adopted the Hadley Natural Hazards Mitigation Plan. Meeting held at the Hadley Senior Center.

A mailing was made to each Committee member, prior to each meeting that contained information from the previous meeting, an agenda sheet, and information to be covered.

Public Involvement in the Planning Process

On September 13, 2007 the Pioneer Valley Planning Commission sent a press release to all area media outlets to inform the general public that drafts of the region’s Hazard Mitigation plans were complete and available for public comment and review on the Commission’s website (www.pvpc.org). This press release (Appendix E) resulted in a series of news articles (Appendix E) that further enhanced awareness of the Hazard Mitigation Planning Process. This action was undertaken to fulfill the requirement that a Hazard Mitigation Plan be developed in a format that is open to the public for comments.

Involving neighboring Jurisdictions

In the initial stages of the planning process for this mitigation plan, the Pioneer Valley Planning Commission conducted a series of outreach efforts to make the public aware of the regional mitigation process. In October of 2005, the Planning Commission notified all Select Boards and

Chief Elected Officials that their community could participate in the region's mitigation planning process. Again, on April 4, 2006, the Planning Commission mailed a notice of planning activities to all Chief Elected Officials and Select Board in the Pioneer Valley. Both mailings explained the purpose of mitigation planning and invited communities to participate in either Round I or Round II of the region's mitigation planning process.

On November 20th, 2007 the Pioneer Valley Planning Commission Presented the planning process that led to the creation of the *Hadley Local Natural Hazards Mitigation Plan*. The Western Regional Homeland Security Council is the planning entity responsible for orchestrating the homeland security planning activities of Berkshire, Franklin, Hampden and Hampshire Counties. Collectively, this body is responsible for 101 communities.

Additionally, the Hampshire Regional Emergency Planning Committee was presented with the findings of this plan during its November 15, 2007 meeting. Prior to this briefing, the HREPC was provided with updates of the Hazard Mitigation Planning Process on April 20, 2007 and again on December 21, 2006.

Managing and Updating the Plan

The Hadley Local Emergency Planning Committee will manage this plan, update the plan's action steps, update the plan every five years and support funding applications for implementing the plan's action steps.

2 – LOCAL PROFILE¹

Community Setting

The Town of Hadley is nestled along the eastern bank of the Connecticut River bordered by Amherst on the east, Sunderland to the north, and South Hadley to the south. Route 9, a major state road, cuts through the community from I-91 to Amherst. While Route 9 bisects the Town from east to west, Route 47 traverses north/south along Hadley’s western border near the river.

The corridor along Route 9 contains most of the Town’s commercial development, yet also contains the historic Town center and serves as the principal gateway to the community. Several of the Town’s municipal structures, including the library, Town Hall, post office and the middle school/high school are located along Route 9. Closer to Amherst, Route 9 contains one of the larger concentrations of commercial and retail uses in the region. Hadley center is the heart of the community. Not only does the area contain a significant number of municipal structures, but it also has historic and charming residential neighborhoods, the Hadley Senior Center, the Farm Museum, the historic Town Common, important local businesses and religious institutions. To the north on Route 47 lies North Hadley center, a small, compact village center with a meeting hall, church, local businesses, and historic homes located along Lake Warner and Mill River.

In 1659, a dissenting Connecticut congregation founded Hadley as an agricultural community on the east bank of the Connecticut River. The first settlers laid out eight-acre home lots along both sides of the Town Common, with farmlands behind. By the 1670s, the Town rapidly developed northward. The North Hadley Mill Pond, a.k.a. Mill River, became the site of the Hopkins Corn Mill, and many farmers and mill workers settled there, near the mill.

The Town continued to grow as an agricultural Town during the 1700s. Broom and brush making became a thriving industry here, exporting all across New York and New England, and as far as Ohio. By 1840, tobacco would take its place as the major crop as well as seed onions and other vegetables. The Massachusetts Central Railroad crossed the northern half of the common in 1887, providing a faster way for Hadley farmers to ship their produce to market. The Connecticut Valley Street Railway, laid out along Russell Street about 1900, made local travel to Northampton and Amherst easier.

During the late 1800s, because of labor shortages and a drop in land values, Hadley experienced somewhat of a decline in farming. It was also about this time that a large number of Irish and Polish immigrants settled in Hadley.

¹ The majority of the information for this section was obtained from: Hadley Master Plan; www.hadleyma.org; and PVPC’s Hadley Community Profile.

Today, in spite of commercial development along Route 9, Hadley remains largely agricultural and residential. It has the largest number of acres in agriculture in the Pioneer Valley, which includes crops of corn, potatoes, tobacco and scores of other vegetables. Malls and commercial businesses now lie along Russell Street (Route 9) to the east of the Town's center.

Hadley is a part of the Connecticut River Watershed Basin. The Connecticut River, along the western border of Town, is one of the Town's major bodies of water, along with Lake Warner and the Mill River. The total land area of Hadley is approximately 15,872 acres (25 sq mi). The majority of its land is either undeveloped (30%) or agricultural (46%).

Hadley is a growing residential community with a strong agricultural base. Since 1990, its population has increased by 13.3% to approximately 5,166 residents. In this scenic community, the vast majority of new growth is single-family residential development.

Infrastructure

Hadley's history and geography have been major factors in the development of the Town's infrastructure. Both Hadley center and North Hadley center were settled along the water, while the agricultural background of the community promoted the development of the rolling landscape. Yet neither these village centers nor these farmlands required significant public infrastructure until the proliferation of the regional roadways in Hadley, and the introduction of large-scale commercial development along these routes. Now, Hadley is seeing a strain on its public services as residential development has steadily increased.

Roads and Highways

Regional transportation access to Hadley is provided primarily by Russell Street (Route 9), which runs east-west, through Town. To the west, Route 9 provides access to Interstate 91 at Exit 19. In addition to I-91, north-south regional access is provided by Route 116 in the western side of Town as well as River Drive (Route 47) along the Connecticut River. In more recent history, development has followed these transportation routes, with Hadley's largest commercial developments flanking Route 9 as it travels into Amherst.

A town's character is not only affected by its proximity to the regional highway system; it is also very much influenced by the pattern and condition of its local street network. Nearly 85 miles of roads run through Hadley. The street network in Hadley is dominated by various local roads connected directly or indirectly with Route 116, Route 47, North Hadley Road and Route 9.

Rail

The former Boston & Main Railroad right-of-way runs for 10 miles east-west through Town, linking Northampton, Hadley and Amherst. In 1985, it was purchased by the Department of Environmental Management and transformed into the Norwottuck Rail Trail, a part of the Connecticut River Greenway State Park.

Public Transportation

Hadley is served by the Pioneer Valley Transit Authority (PVRTA), both with regular bus service and paratransit service. Bus service is offered in Hadley, but mostly limited to the major

thoroughfares, specifically Route 47, Bay Road, Route 116, and multiple routes along Route 9. Paratransit, a door-to-door demand responsive van service, is provided in Hadley by PVRTA.

Public Drinking Water Supply

Groundwater resources in Hadley provide base flow for the streams and rivers in the Town and provide potable water for the Town's residences and businesses. The Town water supply is drawn from two groundwater wells and wellhead protection areas. The Town's primary source of water is located at the base of Mount Warner, which has two gravel-developed wells. A secondary source is the Callahan well field on Bay Road, which also has two wells; these are currently only used in high demand periods due to high manganese concentrations. The Town is currently building a water treatment plant at the site of the Callahan Wells, which when completed will become the primary water source for the public water distribution system. The project is expected to be completed in the Summer of 2007. Most Hadley residents are on the Town water supply, although some farmers use private wells for irrigation and related purposes.

Sewer Service

Hadley provides public wastewater treatment. The system has 800 connections serving Route 9, Route 47 and the side streets surrounding drinking water wells. Hadley accepts out of Town septage and uses the additional income to maintain and expand the collection pipeline system without cost to the system users. The treatment plant located at 230 South Middle Street was remodeled in 1988 and is in good condition. The average daily flow to the treatment plant is 300 mgd; this represents 55% of the plant's 540 mgd capacity. No lines have been added since 1988; however, the Town is currently replacing older sewer lines which have been causing problems. In addition, several Town residents rely on septic to treat their wastewater.

Schools

The **Town** has two public schools: Hadley Elementary serves Pre-Kindergarten through grade 6 and the Hopkins Academy junior- and senior high school serves grades 7 through 12. There is also the private Hartsbrook School, serving Pre-Kindergarten through grade 12.

Natural Resources

Hadley has natural resources that are of statewide importance; these include a pastoral landscape, rare and endangered species, the Mt. Holyoke range, and the best agriculture soils in the Commonwealth.

Topography

Hadley's landscape is characterized by acres of contiguous farmland along the Connecticut River Valley. The predominantly flat landscape is only interrupted by two upland and wooded areas, the Holyoke Range and Mount Warner. Far to the south, along virtually Hadley's entire southern border lies Skinner State Park, a heavily wooded landscape in the Mt. Holyoke range that towers over the remainder of the Town. To the north lies Mount Warner, the only other major area of woodland within Hadley. These two woodlands are connected through a tenuous ribbon of trees that cling to the various streams and corridors running north to south. The remainder of the community contains some of the most valuable and productive agricultural land in Massachusetts. This cropland makes up almost 42 percent of Hadley's total land area and is

spread through virtually the entire community. Significant clusters of agricultural land lie along the western half of Route 9, around the Moody Bridge area, in the Great Meadows area, along portions of Route 47 and to the north along Knightly Road, among others.

Water Resources

Wetlands and bodies of water comprise approximately 936 acres of Hadley's 15,872 acres of total landmass. Water resources are essential to residents. Waterways in Hadley have had a large influence on development and recreation. The first settlers in Hadley made their homes along the Connecticut River, later, North Hadley developed as townspeople harnessed the power of Mill River to run the mill industry.

Watershed and Water Bodies

Hadley lies in the Connecticut River (a Federal National Heritage River) watershed and has nearly fifteen miles of river frontage. The Mill and Fort Rivers are two major tributaries of the Connecticut within the Town. The Fort River lies to the Southwest and is fed by numerous streams with headwaters in the Holyoke Range. Fort River provides important wildlife habitat, floodwater storage (nearly the entire length lies within the Floodplain Overlay district), and helps protect water quality (it is within the recharge area for the backup well field). Russellville Brook, a lesser tributary of the Mill River has been identified by the Department of Environmental Management as the largest and most significant natural community found in Hadley along the Connecticut River.

Lake Warner and the Hadley Reservoir are Hadley's major bodies of water. Water rights to the sixty-eight (68) acre Lake Warner belong to the Valley Land Fund, a private land trust operating in Hampden, Hampshire, and Franklin counties.

Wetlands

Hadley has a range of wetland resources, including floodplain forests, forested swamp and wet meadows. Much of the wetlands lie in heavily forested areas along the Connecticut River and its tributaries. Wet meadows are more common along the Fort River near Hockanum Flat and Hadley Cove. Many wetlands and wooded swamps in Hadley were drained for agricultural use as Hadley once had many wetland areas, specifically around Lake Warner, Fort River and Mill River, along the Connecticut River riparian corridor and behind Stop and Shop. The remaining wetlands are a critical element in the habitat and stormwater management systems of the Town.

Flood Hazard Areas

The Town of Hadley has several FEMA Special Flood Hazard Areas identified. The Connecticut River, which creates the entire western boarder of the Town, sees a year swell every spring. In addition, the natural path of the river has created a large peninsula-like swath of land, the site of Hadley's earliest settlements. This peninsula is very low-lying and has the potential to be completely flooded. Other flood prone areas are along the Fort River, which consists of several large wetlands and ponds, and along Mill River, before it runs into Lake Warner.

FEMA data indicates that Hadley is a member community of the National Flood Insurance Program and has a Flood Insurance Rate Map (FIRM) date of 6/1/1978.

Forests

Portions of Hadley are heavily forested with a mixture of hemlock, pine, oak, maple, and birch trees. There are significant climax forests consisting of generally even aged stands, which are punctuated by streams and ponds. The diversity of forests, wetlands and plant communities provide many excellent wildlife habitats. Including Skinner State Park, Hadley boasts almost 30% of its land as forested.

Development in Hadley

Development Patterns

Several factors have played, and will continue to play, an important role in the development of Hadley. These include: the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, soil conditions, land set aside for conservation, the Connecticut River, its tributaries and floodplains; and the availability of utilities such as public water and sanitary sewers. These factors have an impact, both individually and cumulatively, on where and how development occurs.

Zoning and other land use regulations constitute a town's "blueprint" for its future. Land use patterns over time will continue to look more and more like the town's zoning map until the Town is finally "built out"—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the Town focus not on the current use and physical build-out today, but on the potential future uses and build-out that are allowed under the Town's zoning map and zoning bylaws. Zoning is the primary land use tool that the Town may use to manage development and direct growth to suitable and desired areas while also protecting critical resources and ensuring that development is in keeping with the Town's character.

Hadley has five base zoning districts and five overlay districts. The base districts define the allowed uses and dimensional requirements in all parts of the Town, while the overlay districts provide for additional restrictions in certain areas. These districts are described below.

Residential: This district allows primarily single family residences with a minimum lot size of 22,500 sq. ft. This is small district located between Rocky Hill and Mount Warner Roads.

Agricultural-Residential: This district is spread through the majority of the Town and permits single family homes with a minimum lot size of 30,000 sq. ft.

Business: This district, spread along the majority of Route 9 and a large portion of Route 47 south of Route 9, permits offices, banks, and retail businesses. The only size limitation imposed is on the structure's height (2.5 - 3 stories).

Limited Business: This district is along the majority of Route 47 north of Route 9 and permits businesses of a lesser scale than the Business District. Business size on any one lot shall not exceed 2,500 sq. ft and many uses are permitted only by Special Permit granted by the Planning Board.

Industrial: This district, located north and south of the eastern half of Route 9 and encompassing the entire Hadley portion of the UMASS campus along Route 116, permits any use permitted in the Business District plus manufacturing and industrial uses.

Hadley's Overlay Districts further regulate land use within the community. These include:

Aquifer Protection District: This overlay district sets forth standards, rules and permitting procedure for uses that are located within the Town's drinking water source recharge areas.

Wireless Communication Services District: This overlay district establishes the location (Town owned land, and all land within the Business and Industrial Districts) which may contain personal wireless facilities (cell towers). It contains a thorough application procedure and review criteria.

Village Center Overlay: This district, located along the western sections of Route 9 outlines colonial architectural standards for the area.

Flood District Overlay: This district establishes standards to protect against flood related damages within the areas designated Zone A and A1-30 on the Hadley Flood Insurance Rate Maps.

The Zoning Bylaw establishes a Commercial Site Plan Approval procedure for all business, industrial, and commercial buildings within the Business, Limited Business and Industrial Districts. Site Plan Review allows the Planning Board the ability to review the development proposal to ensure that the basic safety and welfare of the people of Hadley are protected.

Current Development Trends

Although blessed with extremely productive agricultural land and valuable natural resources, these areas are succumbing rapidly to residential growth and commercial development. Nearly 1,000 acres of open space were lost between 1971 and 1999; approximately 80% of that land was replaced with residential and commercial development. The consumption of land can be linked to four factors: (1) population growth; (2) larger lot sizes; (3) dispersed development patterns; and (4) retail and commercial development.

Hadley has absorbed much of the growth in the Pioneer Valley Region; the Town grew by 13% since 1990 while the region's population increased by only 1%. Hadley is expected to grow another 12% by 2010. The historic, compact layout of the Town centers have been abandoned for conventional single family large lot subdivisions. Residential development that was historically clustered around the two Town centers has spread into the outlying areas of Town and commercial development has followed the residential market. Large scale suburban retail uses dominate the Route 9 corridor outside the Town Center and three new large retail developments are in the process of being developed along Route 9.

As of 1999, roughly 85% of the Town was open land, with 77% being undeveloped crop or forest. Nearly 6,500 acres, or 41% of Hadley's total land, is protected by land preservation programs such as Conservation Restrictions and Agricultural Preservation Restrictions,

demonstrating the Town's history with land preservation. A high priority strategy for the Town is a continued effort to acquire conservation land in Hadley through the use of *Open Space Bonds, Conservation Restrictions* and other means.

Currently, development in Hadley is not sufficiently encouraged by existing zoning to seek areas where the infrastructure and environmental conditions support such development. Rather, Hadley's existing zoning permits development, primarily subdivisions, across the entire Town with no incentives for guiding that development to more suitable areas.

Development in Hazard Areas

Hazards identified in this plan are regional risks and, as such, all new development falls into the hazard area. The exception to this is flooding. According to the Community Information System (CIS) of FEMA, there were 331 1-4 family structures and 74 "other" structures located within the Special Flood Hazard Area (SFHA) in Hadley as of July 14, 2005, the most current records in the CIS for the Town of Hadley.

National Flood Insurance Program (NFIP)

Hadley is a participating member of the National Flood Insurance Program. Flood Insurance Rate Maps, all bearing the effective date of May 1, 1978, are used for flood insurance purposes and are on file with the Hadley Planning Board. As of 2006, there were 82 policies in effect in Hadley for a total of \$16,697,700 worth of insurance. There are currently no "Repetitive Loss Properties" insured under the NFIP within the Town of Hadley.

3 – HAZARD IDENTIFICATION & ANALYSIS

Natural Hazard Identification

Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to identify the natural hazards which are most likely to have an impact on the Town of Hadley.

Floods

The average annual precipitation for Hadley and surrounding areas in western Massachusetts is 47 inches. There are three major types of storms that bring precipitation to Hadley. Continental storms that originate from the west continually move across the region. These storms are typically low-pressure systems that may be slow-moving frontal systems or more intense, fast-moving storms. Precipitation from coastal storms, also known as nor'easters, that travel into New England from the south constitute the second major storm type. In the late summer or early fall, the most severe type of these coastal storms, hurricanes, may reach Massachusetts and result in significant amounts of rainfall. The third type of storm is the result of local convective action.

Thunderstorms that form on warm, humid summer days can cause locally significant rainfall. Floods can be classified as either *flash floods*, which are the product of heavy, localized precipitation in a short time period over a given location or *general floods*, which are caused by precipitation over a longer time period in a particular river basin. There are several local factors that determine the severity of a flooding event, including: stream and river basin topography, precipitation and weather patterns, recent soil moisture conditions, amount of impervious surface area, and the degree of vegetative clearing. Furthermore, flooding can be influenced by larger, global climate events. Global warming and climate change have the potential to shift current rainfall and storm patterns. Increased precipitation is a realistic result of global warming, and could potentially increase the frequency and intensity of flooding in the region. Currently, floods occur and are one of the most frequent and costly natural hazards in the United States.

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).

In contrast, *general flooding* events may last for several days. 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).

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 Chicopee 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.

Severe Snowstorms/Ice Storms

Severe winter storms can pose a significant risk to property and human life because the rain, freezing rain, ice, snow, cold temperatures and wind associated with these storms can disrupt utility service, phone service and make roadways extremely hazardous. Severe winter storms can be deceptive killers. The types of deaths that can occur as a result of a severe winter storm include: traffic accidents on icy or snow-covered roads, heart attacks while shoveling snow, and hypothermia from prolonged exposure to cold temperatures.

Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt. Power and telephone lines, trees, and telecommunications structures can be damaged by ice, wind, snow, and falling trees and tree limbs. Icy road conditions or roads blocked by fallen trees may make it difficult to respond promptly to medical emergencies or fires. Prolonged, extremely cold temperatures can also cause inadequately insulated potable water lines and fire sprinkler pipes to rupture and disrupt the delivery of drinking water and cause extensive property damage.

New England generally experiences at least one or two severe winter storms each year with varying degrees of severity. Research on climate change indicates that there is great potential for stronger, more frequent storms as the global temperature increases. Severe winter storms typically occur during January and February; however, they can occur from late September through late April.

Hurricanes/Severe Thunderstorms

Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour, and 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. Global warming will increase the threat of hurricanes as oceans and atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future. In Massachusetts, major hurricanes occurred in 1904, 1938, 1954, 1955, 1960 and 1976.

Tornadoes/Microbursts

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. High wind speeds, hail, and debris generated by tornadoes can result in loss of life, downed trees and power lines, and damage to structures and other personal property (cars, etc.).

Of additional concern are microbursts, which often do tornado-like damage and can be mistaken for tornadoes. In contrast to the upward rush of air in a tornado, air blasts rapidly downward from thunderstorms to create microbursts.²

Microbursts and tornadoes are not uncommon in the region, and they are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of climate change from global warming. In the last fifty years, one known tornado has touched down in Hadley, and there have been several high-wind storms and hail events. In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath from Southwick to New Salem, and Hadley sits directly within this "tornado alley."

Wildland Fires/Brushfires

According to FEMA, there are three different classes of wildland fires: *surface fires*, *ground fires* and *crown fires*.³ The most common type of wildland fire is a surface fire that burns slowly along the floor of a forest, killing or damaging trees. A ground fire burns on or below the forest floor and is 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. While wildland fires have not been a significant problem in Hadley, there is always a possibility that changing land use patterns and weather conditions will increase a community's vulnerability.

For example, drought conditions can make forests and other open, vegetated areas more vulnerable to ignition. Once the fire starts, it will burn hotter and be harder to extinguish. Soils and root systems starved for moisture are also vulnerable to fire. Residential growth in rural, forested areas increases the total area that is vulnerable to fire and places homes and neighborhoods closer to areas where wildfires are more likely to occur. Global climate changes may also influence precipitation patterns, making the region more susceptible to drought and therefore, wildfires.

There were 73 wild land and brush fires reported in Hadley between 2001 and 2006.

Earthquakes

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.⁴ A small earthquake was recorded in the southwestern corner of Hadley in 1943.

² <http://www.fema.gov>.

³ FEMA, "Fact Sheet: Wildland Fires," September 1993.

⁴ Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm.

Ground shaking from earthquakes can rupture gas mains and disrupt other utility service, damage buildings, bridges and roads, and trigger other hazardous events such as avalanches, flash floods (dam failure) and fires. Un-reinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated, unstable soil, and mobile homes not tied to their foundations are at risk during an earthquake.⁵

Table 3-1: New England Earthquakes with a Magnitude of 4.2 or More, 1924 – 2002

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

Source: Northeast States Emergency Consortium Web site:
www.nesec.org/hazards/earthquakes.cfm

Table 3-2: Historic Earthquakes, New England States

State	Years of Record	Number of Earthquakes
Connecticut	1568 - 1989	137
Maine	1766 - 1989	391
Massachusetts	1627 - 1989	316
New Hampshire	1728 - 1989	270
Rhode Island	1766 - 1989	32
Vermont	1843 - 1989	69
New York	1737 - 1985	24
<i>Note: Total Number of Earthquakes within the New England states between 1568 and 1989 = 1,239.</i>		

Source: Northeast States Emergency Consortium Web site:
www.nesec.org/hazards/earthquakes.cfm

⁵ Federal Emergency Management Agency Web site: www.fema.gov/hazards/earthquakes/quake.shtm.

Massachusetts introduced earthquake design requirements into their building code in 1975. 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 1975 may not have been designed to withstand the forces of an earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code.

Dam Failure

Although dams and their associated impoundments provide many benefits to a community, such as water supply, recreation, hydroelectric power generation, and flood control, they also pose a potential risk to lives and property. Dam failure is not a common occurrence but dams do represent a potentially disastrous hazard. When a dam fails, the potential energy of the stored water behind the dam is released. Most earthen dam failures occur when floodwaters above overtop and erode the material components of the dam. 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.

Many dams in Massachusetts were built in the 19th century without the benefit of modern engineering design and construction oversight. Dams can fail because of structural problems due to age and/or lack of proper maintenance. Dam failure can also be the result of structural damage caused by an earthquake or flooding brought on by severe storm events.

The Massachusetts Department of Conservation and Recreation (MA DCR) was the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). Until 2002, DCR was also responsible for conducting dam inspections but then state law was changed to place the responsibility and cost for inspections on the owners of the dams. This means that individual dam owners are now responsible for conducting inspections.

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.

The inspection schedule for dams is as follows:

- Low Hazard dams – 10 years
- Significant Hazard dams – 5 years
- High Hazard dams – 2 years

The time intervals represent the maximum time allowed between inspections. Dams and reservoirs licensed and subject to inspection by the Federal Energy Regulatory Commission (FERC) are excluded from the provisions of the state regulations provided that all FERC-approved periodic inspection reports are provided to the DCR. All other dams are subject to the regulations unless exempted in writing by DCR.

The Massachusetts Emergency Management Agency (MEMA) identifies seven (7) dams in Hadley. The follow table identifies the dams within the Town as well as whether they are classified as low, significant, or high hazard.

Table 3-3: Hadley Dams, Classified by Hazard Risk

Dam	Hazard Risk
Lake Warner Dam	Significant
Shingle Mill Brook Dam	Low
B & M Upper Pond Dam	Low
B & M Middle Pond Dam	Low
B & M Lower Pond Dam	Low
Harts Brook Lower Dam	Low
Harts Brook Upper Reservoir Dam	Low

Source: Massachusetts Emergency Management Agency (MEMA)

It is also important to consider and plan for the potential critical failure of dams upstream in the Town of Amherst. Amherst contains one *High Hazard* dam upstream, Factory Hollow Dam.

Drought

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.⁷

In Massachusetts, six major droughts have occurred statewide since 1930⁶. 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 1987-89 drought cost \$39 billion in estimated damages to agricultural crops, wildlife, livestock, land values, water quality and the economy in the Central and Eastern States.

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

⁶ US Geological Survey Water-Supply Paper 2375. “National Water Summary 1989 – Floods and Droughts: Massachusetts.” Prepared by S. William Wandle, Jr., US Geological Survey.

examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

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.⁷ 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.

Man-Made Hazards – Hazardous Materials

Hazardous materials are chemical substances, which if released or misused can pose a threat to the environment or health. These chemicals come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes and businesses routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

The Toxics Release Inventory (TRI), a publicly available EPA database that contains information on specific toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities.⁸ According to TRI, there are no industries currently releasing hazardous materials within Hadley's Town limits.

However, varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores. These hazardous materials are transported regularly over our highways and by rail and if released can spread quickly to any community. Incidents can occur at any time without warning. Human error is the probable cause of most transportation incidents and associated consequences involving the release of hazardous materials.

The University of Massachusetts which abuts Hadley and is located partly within the Hadley Town Limits is considered to be a Tier II site in its entirety. A new central heating plant and electric natural gas line is currently under construction at the University and will be test fired in 2007.

Natural Hazard Analysis Methodology

In order to review the likelihood of a specific hazard occurring, identify the location of occurrence, and assess the impacts of the hazard event, a *Hazard Identification and Analysis Matrix* was prepared to organize the information that was gathered for this project. The matrix is organized into the following sections: Type of Hazard, Frequency of Occurrence, Severity of Impacts and Hazard Index. The Hazard Index was completed to rank the hazards according to

⁷ National Drought Mitigation Center – <http://drought.unl.edu>

⁸ 2004 Toxic Releases Inventory (TRI) Data Files for Massachusetts. www.epa.gov/tri/

the frequency of occurrence and the amount of potential damage likely to occur. The Hazard Index forms the basis for concentrating the future mitigation efforts outlined in this plan. A description of each of the matrix categories is provided below. The completed Matrix is shown on Table 3-7, *Hazard Identification and Analysis Worksheet for Hadley*.

Type of Hazard

The natural hazards identified for Hadley include floods, severe snowstorms/ice storms, hurricanes, tornadoes, wildfires/brushfires, dam failure, earthquakes, drought, and hazardous materials. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage. A more detailed description of each type of hazard is included in the earlier section of this chapter.

Frequency of Occurrence

The frequency or likelihood of occurrence for each natural hazard was classified according to the following scale:

Table 3-4: Frequency of Occurrence and Annual Probability of a Natural Hazard

Frequency of Occurrence	Annual Probability
<i>Very High</i>	70-100% probability in the next year
<i>High</i>	40-70% probability in the next year
<i>Moderate</i>	10-40% probability in the next year
<i>Low</i>	1-10% probability in the next year
<i>Very Low</i>	Less than 1% probability in the next year

Source: Information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, Sept. 2002.

Location of Occurrence

The classifications are based on the area of the Town of Hadley that would potentially be affected by the hazard. The following scale was used:

Table 3-5: Location and Percentage of Town Impacted of Given Natural Hazard

Location of Occurrence	Percentage of Town Impacted
<i>Large</i>	More than 50% of the town affected
<i>Medium</i>	10 to 50% of the town affected
<i>Small</i>	Less than 10% of the town affected

Source: Information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, Sept. 2002.

Severity of Impacts

The severity of direct impacts an affected area could potentially suffer were classified according to the following scale:

Table 3-6: Severity and Magnitude of Multiple Impacts of Given Natural Hazard

Severity of Impacts	Magnitude of Multiple Impacts
<i>Catastrophic</i>	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.
<i>Critical</i>	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
<i>Limited</i>	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
<i>Minor</i>	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Source: Information adapted from Hyde County, North Carolina Multi-Hazard Mitigation Plan, Sept. 2002.

Hazard Index

The hazard index ratings were determined after assessing the frequency, location and impact classifications for each hazard. The hazard index ratings are based on a scale of 1 (highest risk) through 5 (lowest risk). The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable however; many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability. The Hazard Ratings are labeled as follows:

- 1 – High Risk
- 2 – Medium-High Risk
- 3 – Medium Risk
- 4 – Low-Medium Risk
- 5 – Low Risk

Table 3-7: Hazard Identification and Analysis Worksheet for Hadley

Type of Hazard	Frequency of Occurrence	Location of Occurrence	Severity of Impacts	Hazard Risk Index Rating
Flooding (100-yr base flood)	Moderate	Medium	Limited/Critical	2
Flooding	High	Medium	Limited/Critical	2
Severe Snowstorms/ Ice Storms	High	Large	Limited/Critical	2
Hurricanes/ Severe Thunderstorms	Moderate	Medium	Limited/Critical	3
Tornadoes/Microbursts	Moderate	Small	Critical	3
Wildfire/Brushfire	Low	Small	Minor	4
Earthquakes	Low	Large	Critical	3
Dam Failures	Very Low	Medium	Critical	5
Drought	Low	Large	Minor	5
Man-made Hazards/ Hazardous Materials	Low	Small	Critical	4

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

Vulnerability Assessment

The following is a list of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Hadley. The Past and Potential Hazards Map at the end of this Plan reflects the contents of this list.

In order to determine estimated losses due to natural and man made hazards in Hadley, each hazard area was analyzed with results shown below. Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The value of all structures in the Town of Hadley, including exempt structures such as schools and churches, is \$880,902,107⁹ as of 2006. The median value of a home in Hadley is \$270,435¹⁰ as of 2005. The data below was calculated using 1) aerial photography, 2) FEMA's Community Information System (CIS), and 3) FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses, August 2001*.

Past and Potential Hazards

Flooding (100-year base flood): Medium-High Risk

In this section, a vulnerability assessment was prepared to evaluate the potential impact that flooding could have on the portions of Hadley located within the 100-year floodplain. Flooding was chosen for this evaluation because it is a natural hazard likely to impact the community and the location of the impact can be determined by mapping of areas inundated during severe flooding events. Flooding can be caused by severe storms, such as hurricanes, nor'easters, and microbursts, as well as ice dams and snow melt.

There are approximately 2,412 acres of land within the FEMA mapped 100-year floodplain and 690 acres of land within the 500-year floodplain within the Town of Hadley. According to the Community Information System (CIS) of FEMA, there were 331 1-4 family structures and 74 "other" structures located within the Special Flood Hazard Area (SFHA) in Hadley as of July 14, 2005, the most current records in the CIS for the Town of Hadley. Utilizing the Town's median home value of \$270,435, a preliminary damage assessment was generated. For the estimated number of people living in the floodplain, an average household size of 2.45¹¹ people was used.

A total of 405 structures are located within the SFHA in Hadley, totaling approximately \$109,526,175 of damage, and 992 people impacted. The damage estimate is a rough estimate and likely reflects a worst-case scenario. Computing more detailed damage assessments based on assessor's records is a labor-intensive task and beyond the scope of this project.

⁹ Figure courtesy of the Town Assessor of Hadley

¹⁰ Figure courtesy of the Town Assessor of Hadley

¹¹ Figure courtesy of 2000 U.S. Census.

Summary of October 9, 2005 Connecticut River Flood¹²

General flooding occurred along the Connecticut River with the most severe flooding occurring along Aqua Vitae Road, Honey Pot Road, and lower Hockanum Road (Route 47) by Mitch's Marina. These areas were evacuated do to high water levels. Both marinas in Hadley suffered severe damage and loss of boats and docks. Power was shut off to flooded areas on Aqua Vitae Road, Honey Pot Road and Mitch's Marina. Numerous homes in the community called the Fire Department for assistance with flooded basements.

Aqua Vitae Road¹³

The primary land use in this area is agriculture as well as low density residential. Approximately thirty (30) structures could be affected by a flood incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$8,113,050. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- A washout of one section of the road and extensive flooding occurred during the October 9, 2005 Connecticut River Flood. A dirt berm was constructed at the intersection of Aqua Vitae Road and Bay Road to prevent flood waters from crossing Bay Road.
- Annual potential for flooding in floodplain from both spring runoff and heavy summer/fall rains.
- Potential for damage/repair to road surface.

Bay Road¹³

Approximately fifty (50) structures could be affected by a flood incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$13,521,750. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- Portions of Bay Road are within the 100-year floodplain associated with the Connecticut River, Fort River and Harts Brook.
- Annual potential for flooding in floodplain from both spring runoff and heavy summer/fall rains.
- Potential for damage/repair to road surface.

Honey Pot Road¹³

The primary land use in this area is agriculture as well as low density residential. Approximately ten (10) structures could be affected by a flood incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$2,704,350. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- A washout of 3 ½ feet in depth occurred during the October 9, 2005 Connecticut River Flood.
- Annual potential for flooding in floodplain from both spring runoff and heavy summer/fall rains.

¹² Information obtained from the *Incident Report For October 9, 2005 Connecticut River Flood*

¹³ Number of structures determined through the use of aerial photography

- Potential for damage/repair to road surface.

Flooding: Medium-High Risk

There is potential for annual flood incidents in Hadley due to the community's location next to the Connecticut River as well as its topography. Most of the flood hazard areas listed here were identified due to known past occurrence in the respective area. There are many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff from surrounding slopes.

Mountain Road¹⁰

Most of Mountain Road is just outside the FEMA mapped 100-year base flood but floods on a regular basis due to both spring runoff and heavy summer/fall rains. Approximately two structures, including a pump station, could be affected by a flood incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$236,800. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- A portion of Mountain Road is within a FEMA mapped 100-year flood zone.
- A washout and landslide, approximately 200' in length, depth about 20', as well as numerous washouts on other portions of road over 1,500' in length occurred during the October 9, 2005 Connecticut River Flood.
- Annual potential for flooding in floodplain from both spring runoff and heavy summer/fall rains.
- Potential for damage/repair to road surface.

Moody Bridge Road¹⁰

Approximately two structures could be affected by a flood incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$236,800. Cost for repairing or replacing any dams or bridges, power lines, telephone lines, and contents of structures are not included.

- Moody Bridge Road is not within a FEMA mapped 100-year flood zone with the exception of that portion that crosses Harts Brook.
- Numerous washouts occurred during the October 9, 2005 Connecticut River Flood.
- Annual potential for flooding in floodplain from both spring runoff and heavy summer/fall rains.
- Potential for damage/repair to road surface.

Severe Snowstorms/Ice Storms: Medium-High Risk

Three types of winter events are heavy snow, ice storms and extreme cold which cause concern. Occasionally heavy snow years will collapse buildings. Ice storms have disrupted power and communication services. Timberland has been severely damaged. Extreme cold affects the elderly. Hadley's recent history has not recorded any loss of life due to the extreme winter weather. These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

- Area has been subject to extremely heavy snow falls, records of early 1900s and into the

1950s and 1960s indicate this.

- High risk Town wide due to snow, ice and extreme cold.
- 1969 heavy snow - several 3 feet events.
- 1988 temperature below 0 degrees for a month (Nov.-Dec.).
- Elderly are affected by extreme weather.

Snow Drift Areas

The following areas in the Town of Hadley have been identified as areas where snow drifts form during winter storm events:

- Portions of the north side of Knightly Road.
- Northwest corner of the intersection of Knightly Road/Roosevelt Road.
- Northwest corner of the intersection of Mount Warner Road/Roosevelt Road.
- Southwest corner of the intersection of Mount Warner Road/North Maple Street.
- Portions of the north side of Huntington Road.
- Portions of the north side of Rocky Hill Road.
- West side of South Maple Street.
- Portions of the east side of Lawrence Plain Road (Route 47).

Hurricanes/Severe Thunderstorms: Medium Risk

Hadley's location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes. The Town has experienced small blocks of downed timber and uprooting of trees onto structures. Hurricanes can and do create flooding. Estimated wind damage 5% of the structures with 10% damage \$4,404,511. Estimated flood damage 10% of the structures with 20% damage \$17,618,042. Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included.

- Connecticut River corridor at risk.
- 1938 hurricane was a major event - wind damage and flooding statewide.
- Power and phone lines - disruptions of services.
- Flooding/washing of evacuation routes.

Tornadoes/Microbursts: Medium Risk

Risk of tornadoes is considered to be high in Hampshire County. Tornadoes rarely occur in this part of the country; therefore, assessing damages is difficult. Most buildings in the Town of Hadley 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. According to the 2000 U.S. Census, approximately 61% of the housing in Hadley was built before 1970. Estimated damages to 10% of structures with 20% damages \$17,618,042. Estimated cost does not include building contents, land values or damages to utilities.

- In the last fifty years, one known tornado has touched down in Hadley.

- River corridors and hill tops susceptible.
- 9 incidents of tornado activity (F3 or less) occurred in Hampshire County from 1954 to 2006.
- A microburst occurred along Chmura Road in 2004 which caused damage to trees along the road.

Wildfires/Brush Fires: Low Risk

The following areas have been identified as potential wildfire areas in Hadley:

Area East of Mount Warner Road

Moderate risk exists for potential wildfire incidents in this central portion of Town. There are approximately 10 structures¹⁴ in this area that could be affected by a wildfire incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$2,704,350. Cost for repairing or replacing any power lines, telephone lines, and contents of structures are not included.

- Forested areas with high fuel content have more potential to burn.
- Risk increases for wooded areas with higher elevation.
- Limited access for reaching some areas if a wildfire occurs in this area.

Skinner State Park

This was identified as the area having the greatest potential for wildfires and brush fires. There are approximately 30 structures¹⁶ in this area that could be affected by a wildfire/brush fire incident. 100% damage to 100% of the structures, estimated cost of repairing or replacing to be \$8,113,050. Cost for repairing or replacing any power lines, telephone lines, and contents of structures are not included.

- Brushfires occur in this area almost annually from campfires.
- Forested areas with high fuel content have more potential to burn.
- Risk increases for wooded areas with higher elevation.
- Limited access for reaching a wildfire in this area.

2001 Brush and Wild Land Fires: Estimated total fires = 9

- Lawrence Plain Rd.
- Cemetery Rd (river side)
- Farm Lane (2 fires – brush fires)
- Laurel Lane
- South Maple (agricultural out of control – ½ acre)
- River Drive (river side)
- Mt Warner Rd.
- Chmura Road and Skinner State Park area of Seven Sisters
 - 350 acres burned over 2 week incident 45+ Towns called for mutual aid also burned on South Hadley side.

¹⁴ Determined through the use of aerial photography from MassGIS

2002 Brush and Wild Land Fires: Estimated total fires = 7

- Comins Rd. (brush fire out of control)
- East St (brush fire out of control)
- Moody Bridge (brush fire out of control)
- Mt Warner (brush fire out of control)
- Meadow Street at River
- Mill Valley (brush fire out of control)
- Hawley Rd (brush fire out of control)

2003 Brush and Wild Land Fires: Estimated total fires = 9

- Mitches Way (brush fire out of control)
- River Drive - river side (brush fire out of control) X 3 fires
- Bay Road at Reservoir (brush fire out of control)
- Bay Road (brush fire out of control) X 2 fires
- Lawrence Plain (brush fire out of control)
- Laurana Lane (brush fire out of control)

2004 Brush and Wild Land Fires: Estimated total fires = 9

- Stockbridge Rd (brush fire out of control)
- 311 River Dr. (brush fire out of control)
- 294 River Dr. (brush fire out of control)
- Mt. Warner Rd. (Construction waste spread into woods – 5 acres)
- Meadow St. at River
- East Hadley Rd (brush fire out of control)
- 301 River Dr (brush fire out of control)
- Gooseberry Lane (Kids set fire to paper spread into woods)
- Wampanoag Dr (brush fire out of control)

2005 Brush and Wild Land Fires: Estimated total fires = 27

- 29 Lawrence Plain (brush fire out of control)
- Bay Rd. (brush fire out of control)
- Cemetery (brush fire out of control)
- S. Maple (brush fire out of control)
- Breckenridge (brush fire out of control)
- Huntington Rd (brush fire out of control)
- Ferry Rd. (brush fire out of control)
- River Drive – Agricultural out of control
- 354 River Drive (brush fire out of control)
- East St (brush fire out of control)
- River Dr. (brush fire out of control)
- Roosevelt (brush fire out of control)
- 31 Huntington Rd. (brush fire out of control)
- Mt. Warner (brush fire out of control)
- 12 East Street (brush fire out of control)

- Russell St. at river
- Breckenridge (brush fire out of control)
- Rocky Hill (brush fire out of control)
- Route 116 brush fire in median
- Meadow St. at river
- 56 River Drive (brush fire out of control)
- 257 Russell St. (brush fire out of control)
- Aquae Vita Rd. (brush fire out of control)
- 70 Russell St. – students burning trash
- 33 Honey Pot (brush fire out of control)
- River Drive at Montgomery Rose Trash Fire
- Birch Meadow – Construction materials

2006 Brush and Wild Land Fires: Estimated total fires = 12

- Mt Warner Rd. (brush fire out of control)
- North Branch Road at Dump – Agricultural out of control
- South Maple and Moody Bridge (brush fire out of control)
- 210 Russell St. (brush fire out of control)
- Sylvia Heights (brush fire out of control)
- Bay Rd. (brush fire out of control)
- Aqua Vitae Rd – Sandy Beach
- 434 River Dr. (brush fire out of control)
- Comins Rd. (brush fire out of control)
- Huntington Rd. (brush fire out of control)
- Roosevelt (brush fire out of control)
- River Drive at Montgomery Rose (brush fire out of control)

Most of the brush fires that have occurred in Hadley are the result of spring time burning by farmers and other Town residents that have gone out of control.

Earthquakes: Medium Risk

Moderate potential for serious damage in village portions of Town and along Connecticut River shoreline. Structures are mostly of wood frame construction estimated loss 20% of Town assessed structural valuation \$176,180,421. Costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures are not included.

- A small earthquake was recorded in the southwestern corner of Hadley in 1943 – no record of damage.
- Low risk to Town.

Dam Failure: Low Risk

The Massachusetts Emergency Management Agency (MEMA) identifies seven (7) dams in Hadley. Table 3-3 identifies the dams within the Town as well as whether they are classified as low, significant, or high hazard. Of the seven dams in Hadley six are classified as *Low Hazard*: Dams located where failure or improper operation may cause minimal property damage to others. Loss of life is not expected. Lake Warner Dam is classified as *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.

Drought: Low Risk

In Massachusetts, six major droughts have occurred statewide since 1930¹⁵. 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.

Man-Made Hazards - Hazardous Materials: Low-Medium Risk

Hadley relies on the support of the Fire Department for responding to incidents involving hazardous materials. Public transportation of chemicals and bio-hazardous materials by vehicle transport on Routes 9, 47, and 116 are a concern. There are three (3) sites in the Town of Hadley identified by the U.S. EPA as Tier II Hazardous Material sites. These sites are:

Rocky's Hardware, 299 Russell Street (Route 9)

Wal-Mart Store #2683, 337 Russell Street (Route 9)

Hampshire College Physical Plant, 289 Bay Road

(Past and Potential Hazards Map Located In Back of Plan)

¹⁵ US Geological Survey Water-Supply Paper 2375. "National Water Summary 1989 – Floods and Droughts: Massachusetts." Prepared by S. William Wandle, Jr., US Geological Survey.

4 – CRITICAL FACILITIES

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

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

Critical Facilities within Hazard Areas

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

The Critical Facilities List for the Town of Hadley has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer as well as the Hadley CEM Plan. Hadley's Hazard Mitigation Planning Committee has broken up this list of facilities into three categories. The first category contains facilities needed for Emergency Response in the event of a disaster. The second category contains Non-Emergency Response Facilities that have been identified by the Committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Hadley. The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster. The Critical Facilities Map at the end of this Plan identifies these facilities.

Category 1 – Emergency Response Services

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

1. Emergency Operations Center

Hadley Public Safety Complex – 15 East Street

Alternate EOC – Western Massachusetts Electric Company, 55 Russell Street (Route 9)

2. Fire Station

Hadley Public Safety Complex – 15 East Street

North Hadley Fire Station – 237 River Drive (Route 47)

3. Police Station

Hadley Public Safety Complex – 15 East Street

4. Highway Garage

Department of Public Works, Highway Department – 230 South Middle Street

5. Water Department

Department of Public Works, Water Department – 230 South Middle Street

6. Waste Water Treatment Plants

Department of Public Works, Waster Water Treatment Plant – 230 South Middle Street

University of Massachusetts Waster Water Treatment Plant - Off of Disposal Plant
Road

7. Mass Care Shelters and Reception Centers

Hadley Elementary School – 21 River Drive (Route 47), Capacity = 400

Sunbridges Care/Rehab. For Nancy at Elaine Manor – 20 N. Maple Street, Capacity =
300

Kidsports Family Fun and Fitness – 317 Russell Street (Route 9), Capacity = 1,400

American Legion – 271 Russell Street (Route 9), Capacity = 150

North Hadley Fire Station – 237 River Drive (Route 47), Capacity = 200

8. Water Storage Facilities

Water Tanks - Mount Warner Road

Water Tank – Mount Holyoke (Route 47 @ Laurel Drive)

9. Primary Evacuation Routes

Russell Street (Route 9)

River Drive (Route 47)

Route 116

10. Bridges Located on Evacuation Routes

Calvin Coolidge Bridge over Route 9

Bridge over a brook under Route 9 near the Home Depot site

Bridge over the Fort River on Route 47

Bridge over the Mill River on Route 47 in North Hadley Village

Bridge over Russellville Brook on Route 47 in North Hadley

Bridge over the Mill River on Route 116

Bridge over wetland area on Route 116 east of Stadium Drive

Category 2 – Non Emergency Response Facilities

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

1. Hospitals

Cooley Dickenson Hospital – 30 Locust Street, Northampton

2. Public Water Supply

The Town's primary source of water is located at the base of Mount Warner off of Town Well Road, which has two gravel-developed wells.

A secondary source is the Callahan well field on Bay Road, which also has two wells; these are only used in high demand periods due to high manganese concentrations.

3. Pumping Stations

Pumping Station - 129 Bay Road

Pumping Station - Bay Road/Middle Street

Pumping Station - Bay Road/West Street

Pumping Station - Mill Valley Road

Pumping Station - Hawley Road

Pumping Station – Area of 106 Mount Warner Road

Pumping Station – Route 47 (Hibbard Lane)

Pumping Station - Route 47 (Klimoski)

Pumping Station – Route 47 (Stockbridge Road)

Pumping Station – Venture Way

Pumping Station – Westgate Drive

Pumping Station - Winfield Drive

4. Emergency Electrical Power Facility

University of Massachusetts Physical Plant located at the end of Disposal Plant Road in Hadley

5. Transfer Station

Located at the end of North Branch Road

6. Utilities

Western Massachusetts Electric Company, 55 Russell Street (Route 9)

7. Communications (Cell Towers)

Cell Tower at Stop & Shop site on Route 9 near Amherst Town Line

Skinner State Park Mountain House Communications Tower

8. Alternate Transportation Pickup Points

Hooker School – 46 Middle Street

Hopkins Academy – 131 Russell Street (Route 9)

North Hadley Hall – 239 River Road (Route 47)

9. Transportation Resources

Niedbala Bros (Private Buses) – Route 9, Number of Vehicles = 5

Town of Hadley Schools (Public Buses), Number of Vehicles = 2
Executive Limo (Limousine Services), Number of Vehicles = 6
Checkers Taxi-Cab Service (Taxi Services), 217 Mount Tom Road, Northampton
Kevin's Towing (Towing Services), 1 Railroad Street
Goutlet (Trucking – Non-Construction), 41 South Maple Street
Karl's Excavating (Trucking – Non-Construction), 327 River Drive (Route 47)
BTM Construction (Trucking – Non-Construction), 30 Lawrence Plain Road

10. Mortuary Facilities

Amherst Funeral Home, 151 Amity Street
Douglas Funeral Home, 87 N. Pleasant Street, Amherst

11. Emergency Food Storage/Goods Warehousing

Hopkins Academy – 131 Russell Street (Route 9)
Hadley Senior Center – 46 West Street
Hadley Elementary School – 21 River Drive (Route 47)

12. Problem Culverts (Localized Flooding)

Numerous locations throughout Town, see *Critical Facilities Map* at the back of this plan.

Category 3 – Facilities/Populations to Protect

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

1. Health and Medical Facilities

Shady Lawn Rest Home – 132 Middle Street
Sunbridges Care/Rehab. For Nancy at Elaine Manor – 20 N. Maple Street

2. Group Home or Adult Day Care

Numerous locations throughout Town – see Critical Facilities Map located in back of Plan

3. Special Institutions

Commonwealth Community Services – 29 East Street
Commonwealth Community Services – 212 River Drive (Route 47)
Kidsports Family Fun and Fitness – 317 Russell Street (Route 9)
Pioneer Valley Charter – 135 Russell Street (Route 9)
Service Network of Northampton – 52 Roosevelt Street
Thayer Care – 49 Middle Street

4. Nursing or Rest Home

Sunbridges Care/Rehab. For Nancy at Elaine Manor – 20 N. Maple Street

Shady Lawn Rest Home – 90 Middle Street

5. Daycare or Nursery

Numerous locations throughout Town – see Critical Facilities Map located in back of Plan

6. Schools

Hadley Elementary School – 21 River Street

Hopkins Academy (Public Middle School and High School) – 131 Russell Street

Hartsbrook School #1 (Private School) – 193 Bay Road

Hartsbrook School #2 (Private School) – 94 Bay Road

Pioneer Valley Performing Arts Charter Public School – 15 Mulligan Drive

7. Historic Buildings/Sites

Hadley Center Historic District (added 1977 to the National Register of Historic Places – District #77000185): Middle and Russell Streets.

Hockanum Rural Historic District (added 1993 to the National Register of Historic Places – District #93001474): Area surrounding Hockanum Road from Hockanum Cemetery to the NE corner of Skinner State Park.

North Hadley Historic District (added 1993 to the National Register of Historic Places – Building #93001475): Roughly, area along River Drive from Stockwell Road to Stockbridge Street, including French, Meadow and Mt. Warner Streets.

8. Large Employment Centers

Commercial corridor along Route 9, particularly near the Amherst Town Line

Table 4-1: Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding (100-year Flood)	100-year Floodplain along Connecticut River Shoreline	<ul style="list-style-type: none"> - Route 47 Bridge over Russellville Brook in North Hadley - N. Maple Street Bridge over Mill River @ N. Hadley Road - Route 116 Bridge over Mill River north of N. Hadley Road - Bay Road Bridge over Fort River north of Bay Road - Bay Road Bridge over Harts Brook in East Hadley - Mitch’s Drive Bridge over Fort River in South Hadley - Pumping station: Bay Road/West Street - Pumping station: 129 Bay Road - Public Well @ Bay Road/Lawrence Plain Road 	<ul style="list-style-type: none"> Route 47 North None Route 116 None None None None None None
Flooding	Aqua Vitae Road	None	None
	Bay Road	See Above	None
	Honey Pot Road	None	None

	Mountain Road	None	None
	Moody Bridge Road	None	None
Wildfires/Brushfires	Area East of Mount Warner Road	Water Tanks - Mount Warner Road	None
	Skinner State Park	Skinner State Park Mountain House Communications Tower	None
Hazardous Materials (EPA Tier II Sites)	Rocky's Hardware, 299 Russell Street (Route 9)	None	None
	Wal-Mart Store #2683, 337 Russell Street (Route 9)	None	None
	Hampshire College Physical Plant, 289 Bay Road	None	None

(Critical Facilities Map Located In Back of Plan)

5 – CURRENT MITIGATION STRATEGIES

Flooding

The Floodplain Map for the Town of Hadley shows the 100-year and 500-year flood zones identified by FEMA’s Flood Insurance Rate Maps. The 100-year flood zone is the area that will be covered by water as a result of a flood that has a one percent chance of occurring in any given year. Likewise, the 500-year flood has a 0.2 percent chance of occurring in any given year. In Hadley, there are three general floodplain areas – along the Connecticut River; especially where the river bends west by Hadley center; along the Mill River in the northern part of Town; and in the large low-lying areas around Fort River.

The National Weather Service and the New England River Forecast Center issue flood watch, flood warning, and flash flood watch and warnings through MEMA, EAS, and the news media. A flood warning should be issued if the flood stage is forecast to be reached or exceeded within 12 to 24 hours. A flood warning would be issued if the flood stage forecast suggests that the flood stage for a given location will be reached or exceeded within 12 hours.

A flash flood watch would be issued if rainfall may reach or exceed the 1 or 3 hour rainfall values or amount needed to produce flooding on small streams in a forecast zone. A flash flood warning is issued based on radar or observation that the 1 or 3 hour rainfall values will be exceeded.

One of the goals of this Natural Hazards Mitigation Plan is to evaluate all of the Town’s existing policies and practices related to natural hazards and identify potential gaps in protection.

Management Plans

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

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

The Comprehensive Emergency Management (CEM) Plan for Hadley also lists the following generic preparedness and response measures for floods:

1. Place EOC personnel on standby during stage of flood ‘watch’ and monitor NWS/New England River Forecast Center reports.
2. Ensure that public warning systems are working properly and broadcast any information that is needed at this time.
3. Review mutual aid agreements.
4. Monitor levels of local bodies of water.
5. Arrange for all evacuation and sheltering procedures to be ready for activation when needed.
6. Carry out, or assist in carrying out needed flood-proofing measures such as sand bag placement, etc.
7. Regulate operation of flood control works such as floodgates.
8. Notify all Emergency Management related groups that will assist with flood response activities to be ready in case of flood ‘warning’.
9. Broadcast warning/notification of flood emergency.
10. Coordinate traffic control and proceed with evacuation of affected populations as appropriate.
11. Open and staff shelters and reception centers.
12. Undertake, or continue to carry out, flood proofing measures.
13. Dispatch search and rescue teams.
14. Dispatch emergency medical teams.

Evacuation Options

Much of the land subject to flooding in Town is agricultural or forested. However, there are some areas of medium-density residential, commercial, and industrial development, proximate to Hadley center. According to the Hadley CEM Plan, the primary risk is the Connecticut River along Aqua Vitae Road and Bay Road. The primary evacuation routes for floods and hurricanes are Russell Street (Route 9), River Drive (Route 47), and Route 116.

In addition, Hadley has 6 bridges situated either in or near the 100-year floodplain, which could make evacuation efforts as a result of flood more difficult. Some of the roads that residents would most likely take to reach safety travel through flood-affected areas.

Flood Control Structures

There are seven (7) dams within the Town of Hadley, none of which has a high hazard risk. A dike has also been constructed by the Army Corp of Engineers along the Connecticut River.

Land Use Regulations that Mitigate Impacts from Flooding¹⁶

The Town of Hadley has several land use regulations that serve to regulate development in floodplains, to manage stormwater runoff, and to protect groundwater and wetland resources, the latter of which often provide important flood storage capacity. These regulations are summarized below and their effectiveness evaluated in Table 5-1.

Zoning Bylaws

The Hadley Zoning Bylaw addresses flood hazards and source water protection through several legislative avenues – the use of a flood district overlay, an aquifer protection district overlay, and other general regulations.

Section V: General Regulations

5.3 Flood Plain Restrictions

In a Flood Plain District, uses otherwise permitted may be authorized after finding by the Board of Appeals that said use will not endanger the health or safety of the occupants thereof.

5.6 Wetlands Restrictions on Building Lots

Every building lot created after the effective date of this amendment shall contain the following amount of upland: 1/3 (one-third) acre if the lot is not to be sewered and 1/4 (one-quarter) acre if the lot will be sewered. For the purpose of this Bylaw, upland is defined as land which is neither defined as wetlands under the Massachusetts Wetland Protection Act, nor located within one hundred (100) feet of such wetlands.

Section XII: Aquifer Protection District

12.1 Purpose of District

To promote the health, safety and welfare of the community by protecting and preserving the surface and groundwater resources of the Town from any use of land or buildings which may reduce the quality and quantity of its water resources.

12.4 Establishment of District

The Aquifer Protection District is herein established to include all specified lands within the Town of Hadley. The intent of the Aquifer Protection District is to include lands lying within the primary recharge areas of ground water aquifers. The map entitled 'Aquifer Protection District, Town of Hadley' on file with the Town Clerk delineates the boundaries of the district.

12.5 Prohibited Uses in the Hadley Aquifer Protection District:

[Several uses listed.]

12.6 Restricted Uses in the Hadley Aquifer Protection District:

¹⁶ All bulleted items and direct quotes in the Hadley Local Natural Hazards Mitigation Plan are taken from the Town of Hadley's Land Use Ordinance – Zoning Bylaws and Subdivision Rules and Regulations. Other references to these documents contained herein are paraphrases of the same.

[Several use restrictions listed.]

12.7 Drainage

All runoff from impervious surfaces shall be recharged on the site by being diverted toward areas covered with vegetation for surface infiltration to the extent possible. Dry wells shall be used only where other methods are infeasible, and shall be preceded by oil, grease and sediment traps to facilitate removal of contamination.

12.8 Uses by Special Permit

12.8.1 Business and industrial activities permitted in the underlying district (either by matter of right or by special permit) shall file application for a special permit.

12.8.1.1 Said application and plan shall be prepared in accordance with the data requirements of the proposed development, including a site plan, which shall show:

- drainage recharge features and provisions to prevent loss of recharge;
- provisions to control soil erosion and sedimentation;
- provisions to prevent soil compaction;
- provisions to prevent seepage from sewer pipes;
- provisions to prevent contamination of groundwater by petroleum products or hazardous chemicals.
- complete list of chemicals, pesticides, fuels and other potentially hazardous materials to be used or stored on the premises in quantities greater than those associated with normal household use.

Section XIII: Flood District Overlay

13.1 Establishment of Districts and Flood Hazard Areas

The Flood District Overlay is herein established as an Overlay District and includes all special flood hazard areas designated as Zone A, A1-30 on the Hadley Flood Insurance Rate Maps, and the Flood Boundary and Floodway Maps....

13.2 Development Regulations

13.2.2 In the floodway, the following provisions shall apply:

13.2.2.1 Prohibit encroachments, including fill, new construction, substantial improvements, and other development unless demonstrating... [no] increase in flood levels during the occurrence of the 100-year flood.

13.2.2.2 In the floodway, prohibit the placement of mobile homes except by special permit as defined below.

13.2.3 Mobile Residential Uses

13.2.3.1 Purpose

- (1) To provide that lands in the Town of Hadley subject to seasonal or periodic flooding as described hereinafter shall not be used for residence or other purposes in such manner as to endanger the health and safety of the occupant thereof.
- (2) To assure the continuation of the natural flow patterns of the water courses within the Town of Hadley in order to provide adequate and safe flood water storage capacity to protect persons and property against the hazards of flood inundation.

13.2.3.3 Notwithstanding any language in this bylaw to the contrary, mobile residential units are permitted in the flood plain and flood way only for not more than 179 consecutive days between May 1 and October 31 of each year, by Special Permit from the Special Permit granting authority. All mobile residential units are prohibited at other times.

13.2.3.4 The application to the Special Permit granting authority must satisfy the following conditions as shown by a site plan prepared by a registered professional surveyor....

13.3 Board of Appeals

The Board of Appeals may consider a special permit to the regulations set forth in the Flood Plain Overlay District of the Zoning Bylaw. A special permit may be granted for the new construction or expansion of a business that due to its nature must be located adjacent to a river. Construction under this special permit must comply with all provisions of these Flood Plain Overlay District Bylaw.

Subdivision Regulations

In addition to the Zoning Bylaws, Hadley has adopted Subdivision Regulations. There are two sections of these subdivision regulations which address flood hazards and water resource protection. The submission requirements include specific regulations for subdivisions in the Flood Plain District. In addition, the subdivision design standards govern drainage and natural features protection.

Section IV: Procedure for Submission and Review of Plans

C) Definitive Plan

6. Compliance with the Wetlands Protection Act

In accordance with Chapter 131, Section 40 of the General Laws, no person shall remove, fill dredge, or alter any water course, pond, flood plain or wetland without filing written intention to perform said work with the local Conservation Commission, and with the State Departments of Natural Resources and Public Works.

D) Subdivision Standards in the Flood Plain District

All subdivision proposals and other proposed new development shall be reviewed to determine whether such proposals will be reasonably safe from flooding. If any part of a subdivision proposal or other new development is located within the Flood Plain District, established under the Zoning Bylaw, it shall be reviewed to assure compliance with the following:

1. The proposed is designed consistent with the need to minimize flood damage;
2. All public utilities and facilities, such as sewer, gas, electrical, and water systems shall be located and constructed to minimize or eliminate flood damage;
3. Adequate drainage systems shall be provided to reduce exposure to flood hazards; and
4. Base flood elevation (the level of the 100-year flood) data shall be provided for proposals greater than 5 lots or 5 acres, whichever is the lesser, for that portion within the Flood Plain District.

Section V: Design Standards

C) Natural Features

All significant natural features such as: large trees, watercourse and wetlands, as well as scenic and historic areas shall be preserved. These features add to both the attractiveness, and economic value of the subdivision and the Town.

D) Drainage

11. Where a portion of a subdivision lies within an aquifer recharge area, storm drainage shall be directed, when appropriate, to retention basins in order to artificially recharge the ground water.

River and Stream Protection

The Town of Hadley follows the standards established by the Wetlands Protection Act and the rivers Protections Act, which protects water bodies and wetlands through the Town Conservation Commission.

Hadley Master Plan and Open Space and Recreation Plan

The Town's open space and recreation efforts are guided by the 1998 Open Space and Recreation Plan. The newly updated Master Plan provides an outline for subsequent strategies and incorporates the unrealized goals of the 1998 plan.¹⁷ In these two plans there are several provisions that are useful for flood hazard mitigation purposes. Although the intent of the plans is not to address hazard mitigation or flood control in a direct or comprehensive way, they inventory the natural features and environments in the Town, many of which, such as wetlands, aquifer recharge areas, farms, rivers, streams, and brooks, contain floodplain, dam failure inundation or localized flooding areas.

The plans highlight the importance of balancing future development with the preservation of the community's natural and scenic resources. The preservation of open space and farmland will

¹⁷ Hadley Master Plan, October 2005.

provide flood storage capacity, which reduces the amount of impervious surfaces in an area, as well as other benefits not directly related to natural hazard mitigation.

Furthermore, the plans identify several potential initiatives, including adopting an urban services boundary, encouraging the APR program, pursuing long-term funding for open space protection and acquisition, and several other actions. One major recommendation relevant to flooding is to strengthen the current Aquifer Protection District Regulations by adapting a variation of EOEAs model. All of these could help provide a higher level of protection to areas near major water bodies.

National Flood Insurance Program

The Town of Hadley participates in the National Flood Insurance Program. As of 2006, there were 82 policies in effect in Hadley for a total of \$16,697,700 worth of insurance. The Town is not a member of the Community Rating System, which entitles policyholders to a discount on flood insurance premiums. The CRS ranking is based on the steps that a town has taken to control flood losses.

The Community Rating System reduces flood insurance premiums to reflect what a community does above and beyond the National Flood Insurance Program's (NFIP) minimum standards for floodplain regulation. The objective of the CRS is to reward communities for what they are doing, as well as to provide an incentive for new flood protection activities. To participate in the CRS, a community must fill out an application and submit documentation that shows what it is doing and that its activities deserve at least 500 points. More information including instructions and applications is available at <http://training.fema.gov/EMIWeb/CRS/m3s1main.htm>

Table 5-1: Existing Flood Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Flood Control Structures	Seven dams.	Flood inundation zones below dams	Very effective for preventing flooding downstream.	Ensure dam owners realize their responsibility to inspect the dams.
Zoning Bylaws				
Wetlands Regulations	Proposed development where wetlands are located must meet minimum upland acreage requirements.	Areas around wetlands.	Somewhat effective for preventing development of wetlands and for controlling stormwater runoff.	None.
Aquifer Protection District Overlay	Areas delineated as part of the aquifer recharge zones are protected by strict use regulations.	Aquifer recharge areas.	Very effective for preventing groundwater contamination and for controlling stormwater runoff.	None.
Flood Plain District Overlay	Areas delineated as part of the 100-year flood plain are protected by strict use regulations.	100-year flood plain	Very effective for preventing incompatible development within the floodplain.	None.
Subdivision Regulations				
Submission Requirements	Subdivisions must meet requirements of Wetlands Protection Act as well as the Floodplain Overlay District.	All subdivisions	Somewhat effective at protecting water bodies and wetlands. Effective as ensuring that	None.

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
	Subdivisions within the Flood Plain District are governed by additional regulations.	Subdivisions within 100-year flood plain	subdivisions protect against potential flooding. Very effective for preventing incompatible development within the floodplain.	None.
Design Standards	Requirements for sufficient drainage and protection of natural features.	Proposed subdivisions	Somewhat effective for controlling impacts from storm water runoff and protecting streams, wetlands.	Consider adding infiltration requirements, impervious surface limits, etc.
River and Stream Protection	Required enforcement of standards established by Wetlands Protection Act.	Entire Town.	Somewhat effective at protecting water bodies and wetlands.	None.
Hadley Master Plan and Open Space and Recreation Plan	Inventories natural features and promotes natural resource preservation in the Town, including areas in the floodplain; such as wetlands, aquifer recharge areas, farms and open space, rivers, streams and brooks.	Entire Town.	Effective in identifying sensitive resource areas, including floodplains. Encourages forestland and farmland protection, which will help conserve the Town's flood storage capacity.	Consider implementing more of the proposed actions.
Participation in the National Flood	As of 2006, there were 82 homeowners with flood insurance policies.	Areas identified by	Somewhat effective, provided that the Town	The Town should evaluate whether to become a part of

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Insurance Program		the FEMA flood maps	remains enrolled in the National Flood Insurance Program.	FEMA's Community Rating System.

Severe Snowstorms/Ice Storms

Winter storms can be especially challenging for emergency management personnel even though the storm has usually been forecast. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected.¹⁸

Management Plans

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

1. Develop and disseminate emergency public information concerning winter storms, especially material which instructs individuals and families how to stock their homes, prepare their vehicles, and take care of themselves during a severe winter storm.
2. As it is almost guaranteed that winter storms will occur annually in Massachusetts, local government bodies should give special consideration to budgeting fiscal resources with snow management in mind.
3. Maintain plans for managing all winter storm emergency response activities.

To the extent that some of the damages from a winter storm can be caused by flooding, all of the flood protection mitigation measures described in Table 5-1 can also be considered as mitigation measures for severe snowstorms/ice storms.

The CEM Plan for Hadley lists the following generic preparedness and response measures for severe winter storms:

1. Ensure that warning/notification, and communications systems are in readiness.
2. Ensure that appropriate equipment and supplies, (especially snow removal equipment), are in place and in good working order.
3. Review mutual aid agreements.
4. Designate suitable shelters throughout the community and make their locations known to the public.
5. Implement public information procedures during storm 'warning' stage.
6. Prepare for possible evacuation and sheltering of some populations impacted by the storm (especially the elderly and special needs).
7. Broadcast storm warning/notification information and instructions.
8. Conduct evacuation, reception and sheltering activities.
9. If appropriate, activate media center. Refer to Resource Manual for media center information.
10. Dispatch search and rescue teams.

¹⁸ Comprehensive Emergency Management Plan for the Town of Hadley, December 2006.

11. Dispatch emergency medical teams.
12. Take measures to guard against further danger from power failure, downed trees and utility lines, ice, traffic problems, etc.
13. Close roads, and/or limit access to certain areas if appropriate.
14. Provide assistance to homebound populations needing heat, food, and other necessities.
15. Provide rescue and sheltering for stranded/lost individuals.

Land Use Regulations that Mitigate Impacts of Severe Storms

There are no restrictions on development that are directly related to severe winter storms. However, Hadley's Subdivision Regulations set grade limits on streets, which, although not specified as weather hazard mitigation, can serve to minimize accident potential and power loss from severe winter storms:

Section V – Design Standards – Streets

3. Grade

The maximum grades for streets shall be as follows: major street 6% and secondary street 10%. No grade shall be less than 1%.

In addition, in the Hurricanes subsection *Land Use Regulations that Mitigate Impacts of Hurricanes*, there are specific standard regarding height and utilities which may also be relevant in severe winter storms.

State Building Code

For new or recently built structures, the primary protection against snow-related damage is construction according to the State Building Code, which addresses designing buildings to withstand snowloads. The Town of Hadley currently has an Inspections Department which manages all building inspection services.

Table 5-2: Existing Severe Snowstorms/Ice Storms Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Subdivision Regulations: Design Standards for Roads	Standards include street grade regulations (six to ten percent maximum).	Entire Town.	Effective.	Consider reducing the maximum grade to eight percent.
State Building Code	The Town of Hadley is under the Massachusetts State Building Code.	Entire Town.	Effective.	None.

Hurricanes/Severe Thunderstorms

Of all the natural disasters that could potentially impact Hadley, hurricanes provide the most lead warning time because of the relative ease in predicting the storm's track and potential landfall. MEMA assumes "standby status" when a hurricane's location is 35 degrees North Latitude (Cape Hatteras) and "alert status" when the storm reaches 40 degrees north Latitude (Long Island).¹⁹ The flooding associated with hurricanes can be a major source of damage to buildings, infrastructure and a potential threat to human lives. Therefore, all of the flood protection mitigation measures described in Table 4-1 can also be considered hurricane mitigation measures. High winds that oftentimes accompany hurricanes can also damage buildings and infrastructure.

The Town of Hadley's wireless communications bylaw, height restrictions on development, and State Building Code regulations, as listed below, are equally applicable to wind events such as hurricanes and tornadoes.

Management Plans

The CEM Plan for Hadley includes the following generic mitigation measures for hurricane planning and response:

1. Develop and disseminate emergency public information and instructions concerning hurricane preparedness and safety.
2. Community leaders should ensure that Hadley is enrolled in the National Flood Insurance Program.
3. Develop and enforce local building codes to enhance structural resistance to high winds and flooding. Build new construction in areas that are not vulnerable to direct hurricane effects.
4. Maintain plans for managing all hurricane emergency response activities.

The CEM Plan for Hadley includes the following generic preparedness and response measures for hurricanes:

1. Ensure that warning/notification systems and equipment is ready for use at the 'hurricane warning' stage.
2. Review mutual aid agreements.
3. Designate suitable wind and flood resistant shelters in the community and make their locations known to the public.
4. Prepare for coordination of evacuation from potentially impacted areas including alternate transportation systems and locations of special needs facilities.
5. Activate warning/notification systems to inform public of protective measures to be taken including evacuation where appropriate.
6. Conduct evacuation of affected populations.

¹⁹ Comprehensive Emergency Management Plan for the Town of Hadley, December 2006.

7. Open and staff shelters and reception centers.
8. Dispatch search and rescue teams.
9. Dispatch emergency medical teams.
10. Activate mutual aid activities.
11. Take measures to guard against further danger from downed trees and utility lines, debris, etc.

Evacuation Options

The primary evacuation routes for floods and hurricanes are Russell Street (Route 9), River Drive (Route 47), and Route 116.

Land Use Regulations that Mitigate Hurricane Impacts

Zoning Bylaw

There are no wind-related restrictions on development in Hadley's Land Development regulations. However, the Zoning Bylaw does state "height" as one feature of development able to be regulated "to promote the general welfare of the Town of Hadley, to protect the health of its inhabitants, to encourage the most appropriate use of land within the Town, to increase the amenities of the Town, and to provide an adequate supply of light and air and reduce the hazard from fire." Although height is addressed in the general dimensional requirements, it exempts several structures which could be hazardous in high winds. Height is also addressed in a subsection dedicated to wireless communications.

Section IV: Intensity Regulations

4.1 and 4.2 [See Table I and Table II – General Dimensional Requirements. Lists zoning districts, and maximum height of buildings for each. No building is permitted to be taller than 2 ½ stories, except if it is in an industrial zone in the flood plain, in which case it is permitted to be up to 4 stories in height.]

4.3 In addition to the regulations contained in Sections 4.1 and 4.2 above, the following regulations shall apply:

4.3.3 The limitations on height of buildings shall not apply in any district to chimneys, cooling towers, elevator bulkheads, skylights, ventilators, electronic equipment, elevator shafts, other necessary appurtenances usually carried above the roof, and if not used for human occupancy, towers, spires, or other ornamental features of buildings.

Section XIV: Wireless Communications Services District

14.1 Purpose

The purpose of this section is to establish a district in which wireless communications services may be provided with minimal harm to the public health, safety and general welfare. Specifically, the Wireless Communications Services District has been created to:

14.1.1 Protect the general public from hazards associated with wireless communications towers...

14.3 Location

The Wireless Communications Services District shall be located on all land owned by the Town of Hadley which is held in the care, custody, management and control of the Board of Selectmen, and on all land located in the Business District and Industrial Districts. In all other districts of the Town, a Wireless Communications Facility may be permitted, on buildings or structures in existence on May 1, 1997.

14.5 Use Restrictions – Wireless Communications Towers

14.5.1 To the extent feasible, all service providers shall co-locate on a single tower. Towers shall be designed to structurally accommodate the maximum number of foreseeable users (within a ten year period) technically practicable.

14.5.3 In no event shall any such tower be located closer than two (2) miles to any other such tower.

14.5.4 Tower height shall not exceed 55 feet above the existing terrain.

14.5.5 A tower shall not be erected nearer to any property line, existing building or way (public or private) than a distance equal to twice the vertical height of the tower (inclusive of any appurtenant devices), measured at the mean finished grade of the tower base.

14.5.6 No more than one such tower is permitted per lot.

14.5.8 To the extent feasible, all network interconnections from the communications site shall be via land lines.

14.5.13 Any proposed extension in the height, addition of cells, antennas or panels, construction of a new facility, or replacement of a facility shall be the subject of a new application for an amendment to the Special Permit.

14.6 Use Restrictions – Wireless Communications Facility

14.6.2 No facility shall project more than five feet above the existing roof line of the building, or more than five feet out from the plane of the existing wall or facade to which it is affixed, provided such projections do not otherwise violate existing yard dimension or set-back requirements.

14.6.3 Any proposed addition of cells, antennas or panels or replacement of a facility shall be the subject of a new application for an amendment to the Special Permit.

Subdivision Regulations

Within the subdivision standards section, there are other relevant requirements, specifically regarding underground utilities.

Section VI: Required Improvements for An Approved Subdivision

K. Utilities

All electrical, telephone, fire alarm and other wires and cables shall be installed underground, unless in the opinion of the Board and the appropriate utility company, such installation is impractical or not in the best interest of the Town. If located within a flood prone area (determined by the Board), transformers, switching equipment, or other vital components shall be flood-proofed and approved by the Board or a Board appointed engineer at the subdivider's expense.

State Building Code

For new or recently built structures, the primary protection against wind-related damage is construction that adheres to the State Building Code, which, when followed, results in buildings that withstand high winds. The Town of Hadley's Building Inspections Department currently oversees all building inspections.

Tornadoes/Microbursts

Worcester County and areas just to its west, including portions of Hampshire County, have been dubbed the "tornado alley" of the state because the majority of significant tornadoes in Massachusetts's weather history have occurred in that region.²⁰ Like earthquakes, the location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes comes from high winds that can fell trees and electrical wires, generate hurtling debris and, possibly, hail. According to the *Institute for Business and Home Safety*, the wind speeds in most tornadoes are at or below design speeds that are used in current building codes.²¹

Management Plans

The CEM Plan for Hadley includes the following generic mitigation measures for tornado planning and response:

1. Develop and disseminate emergency public information and instructions concerning tornado safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.
2. Strict adherence should be paid to building code regulations for all new construction.
3. Maintain plans for managing tornado response activities. Refer to the non-institutionalized, special needs and transportation resources listed in the Resource Manual.

²⁰ Comprehensive Emergency Management Plan for the Town of Hadley, December 2006.

²¹ www.ibhs.org.

The CEM Plan for Hadley includes the following generic preparedness and response measures for tornadoes:

1. Designate appropriate shelter space in the community that could potentially withstand tornado impact.
2. Periodically test and exercise tornado response plans.
3. Put Emergency Management on standby at tornado 'watch' stage.
4. At tornado 'warning' stage, broadcast public warning/notification safety instructions and status reports.
5. Conduct evacuation, reception, and sheltering services to victims.
6. Dispatch search and rescue teams.
7. Dispatch emergency medical teams.
8. Activate mutual aid agreements.
9. Take measures to guard against further injury from such dangers as ruptured gas lines, downed trees and utility lines, debris, etc.
10. Acquire needed emergency food, water, fuel, and medical supplies.
11. Take measures relating to the identification and disposition of remains of the deceased.

Evacuation Plans

There are 5 Mass Care Shelters and Reception Centers in the Town of Hadley identified in the Hadley CEM Plan.

Table 5-3: Existing Hurricane and Tornado Hazard Mitigation Measures (Wind-Related)

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Zoning Bylaws				
Height Restrictions	The Town restricts height of development based on use and zoning district.	Entire Town.	Somewhat effective for preventing wind damage.	Consider restricting heights on building structures such as chimneys, etc.
Subdivision Rules and Regulations				
Utilities	Electric, cable, communications, and gas utility lines are to be placed underground.	New subdivisions	Somewhat effective for ensuring that utility service is uninterrupted by severe storms in new areas of residential development	Work with utility companies to underground new utility lines in general and existing utility lines in locations where repetitive outages occur.
State Building Code	The Town of Hadley is under the Massachusetts State Building Code.	Entire Town.	Effective.	None.
Debris Management Plan	A debris management plan could be developed. ²²	Entire Town.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.
Shelters	There are 5 shelters identified in the Hadley CEM Plan.	Entire Town.	Somewhat effective.	None.

²⁶ Natural disasters can precipitate a variety of debris, including trees, construction and demolition materials and personal property. After a natural disaster, potential threats to the health, safety and welfare of impacted citizens can be minimized through the implementation of a debris management plan. Such a plan can be critical to recovery efforts after a disaster, including facilitating the receipt of FEMA funds for debris clearance, removal and disposal. Additional information is available at <http://www.fema.gov/rrr/pa/dmgbroch.shtm>.

Wildfires/Brushfires

Hampshire County has approximately 252,000 acres of forested land, which accounts for 71 percent of total land area. Forest fires are therefore a potentially significant issue. In Hadley approximately 30 percent of the Town's total land area is in forest, or about 4,762 acres, and is therefore at risk of fire. Between 2001 and 2006, there were 73 fires reported in Hadley according to the Hadley Fire Department.

Management Plans

The CEM Plan for Hadley includes the following generic mitigation measures for Wildfires/Brushfires planning and response:

1. Promote fire safety measures such as fire-safe landscaping and construction practices to the public and business communities.

The CEM Plan for Hadley includes the following generic preparedness and response measures for Wildfires/Brushfires:

1. Restrict outside burning etc. based on moisture levels, fuels supply conditions such as drought.
2. Identify high vulnerability or problem areas.
3. Utilize mutual aid, including the State Fire Mobilization Plan, as needed.

Regulatory Measures

Burn Permits

Burn permits for the Town of Hadley are issued by the Hadley Fire Department. During this process, the applicant is read the State Law, which includes guidelines for when and where the burn may be conducted as well as fire safety tips provided by the control center. Specific burn permit guidelines are established by the state, such as the burning season and the time when a burn may begin on a given day. Currently, residents may only burn between 10 a.m. and 4 p.m.

Subdivision Review

Preliminary and Definitive Subdivision Plans are reviewed by the Hadley Fire Department to ensure that their trucks will have adequate access and that water supplies are adequate for firefighting purposes.

Public Education/Outreach

The Hadley Fire Department works with the Amherst Fire Department's SAFE Program with fourth graders in school and provides educational programs at the Harvest Fair, which occurs during Fire Prevention Week, which is the first week of October.

Restrictions on Development

There are currently no restrictions on development that are based on the need to mitigate the hazards of wildfires/brushfires in the Town of Hadley.

Table 5-4: Existing Wildfire/Brushfire Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Burn Permits	Residents can obtain burn permits from the Hadley Fire Department which provides information on safe burn practices.	Entire Town.	Effective.	None.
Subdivision Review Fire Safety	The Fire Department is involved in the review of subdivision plans.	Entire Town.	Effective.	None.
Public Education/ Outreach	The Fire Department has an ongoing educational program in the schools.	Entire Town.	Effective.	None.

Earthquakes

Although there are five mapped seismological faults in Massachusetts, there is no discernable pattern of previous earthquakes along these faults nor is there a reliable way to predict future earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard to plan for. Most buildings and structures in the state were constructed without specific earthquake resistant design features.

In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the Town's recovery from an earthquake.

Management Plans

The Hadley CEM Plan lists the following generic mitigation measures for earthquakes:

1. Community leaders in cooperation with Emergency Management Personnel should obtain local geological information and identify and assess structures and land areas that are especially vulnerable to earthquake impact and define methods to minimize the risk.
2. Strict adherence should be paid to land use and earthquake resistant building codes for all new construction.
3. Periodic evaluation, repair, and/or improvement should be made to older public structures.
4. Emergency earthquake public information and instructions should be developed and disseminated.
5. Earthquake drills should be held in schools, businesses, special care facilities, and other public gathering places.

The Hadley CEM Plan lists the following generic preparedness and response measures for earthquakes:

1. Earthquake response plans should be maintained and ready for immediate use.
2. All equipment, supplies and facilities that would be needed for management of an earthquake occurrence should be maintained for readiness.
3. Emergency Management personnel should receive periodic training in earthquake response.
4. If the designated Emergency Operations Center (EOC) is in a building that would probably not withstand earthquake impact, another building should be chosen for an earthquake EOC.
5. Mass Care shelters for earthquake victims should be pre-designated in structures that would be most likely to withstand earthquake impact.
6. EOC will be activated and response will immediately be engaged to address any and all earthquake effects listed.

7. Emergency warning/notification information and instructions will be broadcast to the public.
8. Search and rescue teams will be dispatched.
9. Emergency medical teams will be dispatched.
10. Firefighters will address fires/explosions, and HAZMAT incidents.
11. Law enforcement personnel will coordinate evacuation and traffic control.
12. Reception centers and shelters will be opened and staffed.
13. Animal control measures will be taken.
14. Law enforcement personnel will protect critical facilities and conduct surveillance against criminal activities.
15. Immediate life-threatening hazards will be addressed such as broken gas lines, downed utility wires, and fire control resources.
16. Emergency food, water, and fuel will be acquired.
17. Activate mutual aid.
18. Measures will be taken relating to identification and disposition of remains of deceased by the Chief Medical Examiner.

State Building Code

State and local building inspectors are guided by regulations put forth in the Massachusetts State Building Code. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975 and included specific earthquake resistant design standards. These seismic requirements for new construction have been revised and updated over the years and are part of the current, 6th Edition of the Massachusetts State Building Code. Given that most structures in Massachusetts were built before 1975, of many buildings and structures do not have specific earthquake resistant design features. According to the 2000 U.S. Census, 45% of the housing in Hadley was built before 1960 (and 76.5% was built before 1979). In addition, built areas underlain by artificial fill, sandy or clay soils are particularly vulnerable to damage during an earthquake.

Restrictions on Development

There are no seismic-related restrictions on development in the Town of Hadley.

Table 5-5: Existing Earthquake Hazard Mitigation Measures

Type of Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
State Building Code	The Town of Hadley is under the 6 th Edition of the State Building Code.	Entire Town but applies to new construction only.	Effective for new buildings only.	Evaluate older structures to be used as shelters to determine if they are earthquake resistant.
Debris Management Plan	A debris management plan could be developed.	Entire Town.	Effective.	Consider participation in the creation of a Regional Debris Management Plan.
Shelters	There are 5 shelters identified in the Hadley CEM Plan.	Entire Town.	Effective.	None.

Dam Failures

The only mitigation measures in place for dams are the state regulations that control their construction and inspection.

Management Plans and Regulatory Measures

The Hadley CEM Plan states that there are three categories of dam failure or overspill and that action should be taken according to hazard rating:

Type 1: Slowly Developing Condition

1. Activate EOC
2. Activate all communication networks
 - Establish communications with Command Position on a 24-hour basis.
3. Release public information
4. Notify:
 - MEMA Region Headquarters
 - American Red Cross
 - Downstream communities
5. Review Plans for evacuation and sheltering
 - a. Evacuation
 - routes
 - notification
 - b. Shelter
 - availability and capacity
 - food, supplies, and equipment
 - shelter owners and managers
 - other communities (if out of town sheltering is required)
6. Require “Stand By” status of designated emergency response forces.

Type 2: Rapidly Developing Condition

1. Establish a 24-hour communications from dam site to EOC.
2. Assemble, brief and assign specific responsibilities to emergency response forces.
3. Release public information.
4. Obtain and prepare required vehicles/equipment for movement.
5. Prepare to issue warning.

Type 3: Practically Instantaneous Failure

1. Issue warning
2. Commence immediate evacuation.

3. Commit required resources to support evacuation.
4. Activate shelters or coordinate activation of shelters located outside the community.
5. Notify:
 - MEMA Region Headquarters
 - Red Cross
6. Initiate other measures as required to protect lives and property.

The Hadley CEM Plan contains the following generic mitigation measures for dam failure:

1. Develop and conduct public education programs concerning dam hazards.
2. Maintain up-to-date plans to deal with threat and actual occurrence of dam over-spill or failure.
3. Emergency Management and other local government agencies should familiarize themselves with technical data and other information pertinent to the dams, which impact Hadley. This should include determining the probable extent and seriousness of the effect to downstream areas.
4. Dams should be inspected periodically and monitored regularly.
5. Repairs should be attended to promptly.
6. As much as is possible burdens on faulty dams should be lessened through stream re-channeling.
7. Identify dam owners.
8. Determine minimum notification time for down stream areas.

The Hadley CEM Plan contains the following generic preparedness and response measures for dam failure:

1. Pre-place adequate warning/notification systems in areas potentially vulnerable to dam failure impact.
2. Pre-place procedures for monitoring dam site conditions at first sign of any irregularity that could precipitate dam failure.
3. Identify special needs populations, evacuations routes, and shelters for dam failure response.
4. Have sandbags, sand, and other items to reinforce dam structure or flood proof flood prone areas.
5. Disseminate warning/notification of imminent or occurring dam failure.
6. Coordinate evacuation and sheltering of affected populations.
7. Dispatch search and rescue teams.
8. Coordinate evacuation and sheltering of affected populations.
9. Activate mutual aid if needed.

10. Acquire additional needed supplies not already in place, such as earth moving machinery.
11. Establish incident command post as close to affected area as safely possible.
12. Provide security for evacuated public and private property.

Permits Required for New Dam Construction

Massachusetts State Law (M.G.L. Chapter 253 Section 45) regulates the construction of new dams. A permit must be obtained from the Department of Conservation and Recreation (DCR) before construction can begin. One of the permit requirements is that all local approvals or permits must be obtained.

Dam Inspections

The DCR requires that dams rated as Low Hazards are inspected every ten (10) years, dams that are rated as Medium/Significant Hazards are inspected every five (5) years, and dams that are rated as High Hazards are inspected every two (2) years. This is the responsibility of the dam owner.

Zoning

There is no mention made regarding the construction of new dams in the Town of Hadley zoning or subdivision regulations, although alterations of watercourses must be reported.

Restrictions on Development

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

Table 5-6: Existing Dam Failure Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
New Dam Construction Permits	State law requires a permit for the construction of any dam.	Entire Town.	Effective. Ensures dams are adequately designed.	None.
Dam Inspections	DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard).	Entire Town.	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. Incorporate dam safety into development review process.
Evacuation Plans	Comprehensive evacuation plans are required for High Hazard Dams and ensure the safety of the citizens in the event of dam failure.	Inundation areas in Town.	None.	None.

Drought

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. And unlike other places, drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place. Hadley has several water protection regulations in place, as evidenced in the section on flooding. Additional regulations and mitigation options, specific to drought mitigation, are included here.

Management Plans

The Hadley CEM Plan contains the following generic mitigation measures for drought:

1. Seeks to balance demand on water supply through land use, zoning and other tools.
2. Encourages water conservation and water control measures to ease demand on water supply.
3. Improves efficiency and capacity of the water supply system, including leak detection and repair.

The Hadley CEM Plan contains the following generic preparedness and response measures for drought:

1. Identify potential emergency water sources, such as purchase from adjoining communities if available.
2. Keep abreast of drought forecasts issued by the State Drought Task Force.
3. Encourages businesses and other bulk users to develop water conservation and shortage plans.
4. Implement water use controls as needed.
5. Coordinate requests for potable water in emergency situations.

Land Development Regulations that Mitigate Impacts of Drought

Hadley's Land Development Ordinance has several sections governing flood and stormwater management, proper drainage, and aquifer protection. The Bylaws protecting these features of the landscape can also be seen as preventing drought, as they promote the natural processes of infiltration and groundwater recharge. In addition, Hadley adopted a temporary moratorium on large-scale development to ensure water supply capacity could keep up with demands. This moratorium expired last year, but the language is included here:

Section XII: Aquifer Protection District

[See Flood section, above.]

Hadley Master Plan

Water is a main focus of the Hadley Master Plan, and it makes several recommendations to protect and manage Hadley's water resources. One key suggestion (as mentioned in the Flood

Hazard section earlier) is to strengthen the current Aquifer Protection District, modeling it after EOEAs water supply protection district bylaw. On November 15, 2006, the Town adopted a new Aquifer Protection District as recommended in the Master Plan by consolidating multiple districts into one district. Additionally, the plan highlights some potential hazardous situations regarding insufficient water supply in Hadley.

The 790,000 gpd average permitted usage was exceeded in 2001 in the North Hadley wells. The average permitted usage was recently increased to 920,000 gpd. The town received a 2 percent State Revolving Fund (SRF) loan to improve the condition of the Callahan wells. A new water treatment plant at the site of the Callahan Wells will be constructed which will become the primary water source for the public water distribution system. The project is expected to be completed by the Summer of 2007. The Town currently enforces a water restriction policy in the summer months where residents alternate watering on odd and even days. Furthermore, the Town adjusted water rates to promote water conservation and instituted a moratorium on new water line extensions to conserve demand which ended October 2005. The Town also received a \$45,000 grant from MA DEP for leak detection.

Table 5-7: Existing Drought Hazard Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Zoning Bylaws				
Aquifer Protection District	Areas delineated as part of the aquifer recharge zones are protected by strict use regulations.	Aquifer recharge areas.	Effective for preventing groundwater contamination and for controlling stormwater runoff.	None.
Hadley Master Plan	Identifies potential issues for Hadley’s water supply needs in the future.	Entire Town.	Effective for bringing to light problems and discrepancies with current regulations and identifying needs for the future.	None.

Man-Made Hazards/Hazardous Materials

Hazardous materials are in existence throughout Town, and are constantly being moved on Hadley's roads and highways. However, there is no way to anticipate where and when a hazardous materials spill or explosion could take place. Therefore, it makes it somewhat difficult to determine mitigation strategies, but Hadley has some regulations currently in place to mitigate the impacts of a hazardous materials disaster.

Management Plans

A Model Hazardous Materials Response Plan is provided in the Hadley CEM Plan framework for community and/or LEPC use under the Specific Hazards Annexes section. Complete plans may be attached to the CEM or referenced as a separate document. The CEM Plan may also support regional emergency planning committees.

Land Development Regulations that Mitigate Impacts of Hazardous Materials

There are two sections within Hadley's Land Development Ordinance which address hazardous materials management. The first restricts the storage of hazardous materials at outdoor facilities. In addition, development within the Aquifer Protection District is governed by specific use restrictions in the Zoning Bylaws, including an application to use/store any hazardous materials.

Section VIII: Commercial Site Plan Approval

8.8.7 Water Quality

All outdoor storage facilities for fuel, hazardous materials or wastes, and potentially harmful raw materials shall be located within an impervious, diked containment area adequate to hold the total volume of liquid kept within the storage area.

Section XII: The Aquifer Protection District

12.8 Uses by Special Permit

12.8.1 Business and industrial activities permitted in the underlying district (either by matter of right or by special permit) shall file application for a special permit.

12.8.1.1 Said application and plan shall be prepared in accordance with the data requirements of the proposed development, including a site plan, which shall show:

- drainage recharge features and provisions to prevent loss of recharge;
- provisions to control soil erosion and sedimentation;
- provisions to prevent soil compaction;
- provisions to prevent seepage from sewer pipes;
- provisions to prevent contamination of groundwater by petroleum products or hazardous chemicals;

- complete list of chemicals, pesticides, fuels and other potentially hazardous materials to be used or stored on the premises in quantities greater than those associated with normal household use.

Table 5-8: Existing Man-Made Hazard/Hazardous Materials Mitigation Measures

Existing or Proposed Protection	Description	Area Covered	Effectiveness	Potential Changes
Zoning Bylaws				
Site Plan Approval	Regulates how commercial development must store hazardous materials.	Commercial development sites.	Very effective for preventing hazardous material spills and leaks.	None.
Aquifer Protection District	Restricts uses in aquifer recharge areas, regulates how to correctly store hazardous materials.	Aquifer recharge areas.	Effective for preventing hazardous materials spills and leaks.	Consider prohibiting any hazardous materials within the Aquifer recharge area.

6- INCORPORATION

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:

- ☞ *Hadley Comprehensive Emergency Management Plan* (particularly the Critical Infrastructure Section) – the Critical Infrastructure section was used to identify those infrastructure components in Hadley that have been identified as crucial to the function of the Hadley; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
- ☞ *Hadley Open Space and Recreation Plan* – this Plan was used to identify the natural context within which the Hadley mitigation planning would take place. This proved useful insofar as it identified water bodies, rivers, streams, infrastructure components (i.e. water and sewer, or the lack thereof), as well as population trends. This was incorporated to ensure that the Town’s mitigation efforts would be sensitive to the surrounding environment. During the OSRP update, the Hadley can use the work of the PDM Plan to incorporate identified hazard areas into open space and recreation planning. This could either take the form of acquiring parcels of land that are currently un-developed, but situated within an identified hazard area, as permanent open space, thereby minimizing the likelihood that critical infrastructure components will be constructed in an area prone to damage from natural hazards.
- ☞ *Hadley Community Development Plan*—this Plan was used to identify any action items that might prove successful, based on previous planning efforts. When the CD plan is updated, the Town can make sure it examines the structural improvements that can take place to mitigate natural hazards.
- ☞ *Hadley Zoning Bylaw and Subdivision Regulations* - The Town’s Zoning Bylaw was used to gather identify those actions that the Town is already taking that are reducing the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts. The Town’s subdivision regulations were used to examine the ways in which the Town is using its design guidelines to limit the impact of natural hazards.
- ☞ *Draft State of Massachusetts’ Multi-Hazard Mitigation Plan* - This plan was used to insure that the Town’s HMP was consistent with the State’s Plan.

When appropriate, the Town of Hadley and its officials will incorporate action items from the mitigation plan into the documents listed above.

7– FUTURE MITIGATION STRATEGIES

Goal Statements and Action Items

As part of the natural hazards mitigation planning process that was undertaken by the Hadley Hazard Mitigation Planning Committee, existing gaps in protection and possible deficiencies were identified and discussed. The Committee then developed general Goal Statements and Action Items that, when implemented, will help to reduce risks and future damages from natural hazards. The Goal Statements, Action Items, Town department(s) responsible for implementation, and the proposed timeframe for implementation for each category of natural hazard are described below.

Several of the Action Items have multiple benefits because, if implemented, these Action Items will mitigate or prevent damages from more than one type of natural hazard. For example, updating the Subdivision Regulations to require new utility lines be placed underground will prevent property damage and loss of service in the event of high winds (tornado or hurricane) or severe snow and ice storms.

Before funding can be approved for any capital projects, the residents of Hadley must vote to approve the recommended spending item at the Town's annual Town Meeting. This gives Hadley's residents final approval of any and all mitigation steps.

General Mitigation Action Items

Goal Statement: To provide adequate shelter, water, food and basic first aid to displaced residents in the event of a natural disaster and to provide adequate notification and information regarding evacuation procedures, etc., to residents in the event of a natural disaster.

Action Item: Establish an Emergency Management Planning Committee.

Responsible Department/Board: Emergency Management Director,
Board of Selectmen

Proposed Completion Date: 2007

Action Item: Establish a Community Emergency Response Team (CERT).

Responsible Department/Board: Emergency Management Director,
Hadley TRIAD Seniors and Law Enforcement Together (SALT) Council

Proposed Completion Date: 2008

Action Item: Identify existing shelters that are earthquake resistant as well as outside of dam inundation areas. Disseminate this information to appropriate Town departments.

Responsible Department/Board: Building Inspector, Emergency Management Director

Proposed Completion Date: 2008

Action Item: 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.

Responsible Department/Board: Emergency Management Planning Committee, School Facilities Manager

Proposed Completion Date: 2008

Action Item: Examine current notification system including feasibility of Reverse 911.²³ Develop a preliminary project proposal and cost estimate.

Responsible Department/Board: Board of Selectmen, Police & Fire Departments, Hampshire Regional Emergency Planning Committee

Proposed Completion Date: 2008

Action Item: Collect, periodically update, and disseminate information on which local radio stations provide emergency information, what to include in a 'home survival kit,' how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.

Responsible Department/Board: Emergency Management Director, Police and Fire Departments, Hadley Senior Center

Proposed Completion Date: On-going

Flooding

Overall, the Town of Hadley's existing land use regulations control the quantity and quality of stormwater runoff, but do little to regulate development in the floodplain or reduce localized flooding events. Long-range planning documents such as the Town's Open Space and Recreation Plan also addresses flood prevention and mitigation either directly or indirectly in the goals and objectives listed in these documents.

²³ In essence, Reverse 911 is a Windows compatible software program, which uses GIS and database technology to create call lists of phone numbers within a specified geographical area and provide prerecorded messages to the residents at those numbers. Call lists can be created ahead of time or as emergency or other situations arise. The system is voluntary and it is a simple matter to remove those residents who do not wish to participate. Cost of the system varies depending on a number of factors. The Town of Green Tree, Pennsylvania was able to subsidize their purchase of a Reverse 911 system through a \$10,000 Community Development Block Grant.

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to flooding.

Action Item: Add Flood prevention and mitigation to the purpose section of the Subdivision Rules and Regulations.

Responsible Department/Board: Planning Board

Proposed Completion Date: 2007

Action Item: Add requirements to identify impacts that a proposed development could have on the potential for flooding, and include mitigation measures, if deemed necessary by the Planning Board to the Environmental Impact Statement provisions under Section 4.3.4 of the Hadley Subdivision Regulations.

Responsible Department/Board: Planning Board

Proposed Completion Date: 2007

Action Item: Implement standards in the Subdivision Rules and Regulations to require temporary and permanent erosion control measures for streams and surface water bodies.

Responsible Department/Board: Planning Board, Conservation Commission

Proposed Completion Date: 2007

Action Item: Add more specific requirements to address flood related issues in the Special Permit and Site Plan Approval provisions in the Hadley Zoning Bylaw including topographic change, removal of cover vegetation, risk of erosion or siltation and increased stormwater runoff.

Responsible Department/Board: Planning Board, Conservation Commission

Proposed Completion Date: 2008

Action Item: In regards to the Hadley Open Space and Recreation Plan, implement the Five-Year Action Plan strategies, particularly those dealing with protection of forests and farmland.

Responsible Department/Board: Conservation Commission, Planning Board, and the Board of Selectmen

Proposed Completion Date: Ongoing

Action Item: The **Town** should evaluate whether to become a part of FEMA's Community Rating System.

Responsible Department/Board: Board of Selectmen, Emergency Management Director

Proposed Completion Date: 2009

Action Item: Develop a Beaver Management Strategy.

Responsible Department/Board: Board of Health, Fire Department, Highway Department

Proposed Completion Date: 2009

Action Item: Participate in the creation of a Regional Debris Management Plan.

Responsible Department/Board: Board of Selectmen, Planning Board, and Emergency Management Director

Proposed Completion Date: 2010

Action Item: Identify all Pre-FIRM structures throughout Town that need to be elevated above the base-flood elevation.

Responsible Department/Board: Building Inspector, Fire Department

Proposed Completion Date: 2010

Action Item: Establish a program to identify and clean-up properties within flood zones with junk and hazardous materials.

Responsible Department/Board: Building Inspector, Board of Health

Proposed Completion Date: 2010

Action Item: Conduct a study to identify the appropriate flood control structures/measures to prevent flooding of the North Lane and Honey Pot Road areas.

Responsible Department/Board: Highway Department, Board of Selectmen

Proposed Completion Date: 2011

Action Item: Establish a plan to prioritize and acquire undeveloped properties within flood zones throughout Town.

Responsible Department/Board: Board of Selectmen, Conservation Commission

Proposed Completion Date: 2011

Action Item: Prepare a priority list and seek funding through the Hazard Mitigation Grant Program (HMGP) for the replacement of undersized culverts throughout Town.

Responsible Department/Board: Board of Selectmen, Highway Department

Proposed Completion Date: 2008

Severe Snowstorms/Ice Storms

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to severe snow and ice storms.

Action Item: Develop a plan for providing access to water, information, shelter, and food stores for special needs populations in Town in the event of a severe winter storm.

Responsible Department/Board: Hadley TRIAD SALT Council

Proposed Completion Date: 2009

Action Item: Participate in the creation of a Regional Debris Management Plan.

Responsible Department/Board: Board of Selectmen, Planning Board, and Emergency Management Director

Proposed Completion Date: 2010

Hurricanes and Tornadoes

The Action Items listed above, under flooding, address the flooding that can result from a hurricane.

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to high winds associated with hurricanes and tornadoes.

Action Item: Participate in the creation of a Regional Debris Management Plan.

Responsible Department/Board: Board of Selectmen, Planning Board, and Emergency Management Director

Proposed Completion Date: 2010

Wildfires/Brushfires

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to wildfires/brushfires.

Action Items: Develop and distribute an educational pamphlet on fire safety and prevention.

Responsible Department/Board: Fire Department

Proposed Completion Date: On-going

Earthquakes

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to earthquakes.

Action Item: Evaluate all Mass Care Shelters and Reception Centers to determine if they are earthquake resistant.

Responsible Department/Board: Building Inspector, Emergency Management Director

Proposed Completion Date: 2009

Action Item: Ensure that all identified shelters have sufficient back-up utility service in the event of primary power failure.

Responsible Department/Board: Building Inspector, Emergency Management Director

Proposed Completion Date: 2009

Drought

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to drought.

Action Item: Prepare a Water Conservation Plan for the Town.

Responsible Department/Board: Board of Selectmen, Conservation Commission

Proposed Completion Date: 2009

Man-Made Hazards/Hazardous Materials

Goal Statement: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to man-made hazards/hazardous materials.

Action Item: Establish an Action Plan that addresses chlorine releases at EPA Tier II locations.

Responsible Department/Board: Hampshire Regional Emergency Planning Committee

Proposed Completion Date: 2010

Prioritized Implementation Schedule

Summary of Critical Evaluation

The Hadley Hazard Mitigation Planning Committee reviewed each of the actions identified above, as well as existing mitigation strategies using the following factors to prioritize mitigation projects:

- Social acceptability
- Technical feasibility / potential success
- Administrative workability
- Political acceptability
- Legal implementation
- Economic impact
- Environmental compatibility

(This is the recommended STAPLEE evaluation process for natural hazards)

In addition, the following were also considered:

- Ability to reduce disaster damage
- Ability to complete or be combined w/other actions
- Impact on the environment
- Ability to meet regulations
- Ability to save or protect historic structures
- Ability to meet other community objectives
- The duration of its implementation period

Project Prioritization

The Hadley Hazard Mitigation Planning Committee created the following prioritized schedule for implementation of prioritized items. The table lists items in order of priority.

Note: As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

**PRIORITIZED IMPLEMENTATION SCHEDULE
(ACTION PLAN)**

IMPLEMENTATION STRATEGY FOR PRIORITY MITIGATION ACTIONS

The Hadley Hazard Mitigation Planning Committee created the following prioritized schedule for implementation:

PRIORITY	MITIGATION ACTION	RESPONSIBLE DEPARTMENT/BOARD	PROPOSED COMPLETION DATE	POTENTIAL FUNDING SOURCE(S)	ESTIMATED COST
High	Establish an Emergency Management Planning Committee	Board of Selectmen, EMD	2007	Town Staff/Volunteers	N/A
Low	Add Flood Prevention and Mitigation to the Purpose of the Subdivision Rules and Regulations	Planning Board	2007	Planning Board Assistance (PBA) Program	N/A
Medium	Implement Standards in the Subdivision Rules and Regulations to Require Temporary and Permanent Erosion Control Measures	Planning Board	2007	Planning Board Assistance (PBA) Program	N/A
Medium	Amend Section 4.3.4 – Environmental Impact Statement - of the Hadley Subdivision Regulations by adding Requirements to Identify Potential Flooding Impacts and Mitigation Measures	Planning Board	2007	Planning Board Assistance (PBA) Program	N/A
High	Establish a Community Emergency Response Team (CERT)	EMD, Hadley TRIAD SALT Council	2008	Town Staff/Volunteers	N/A
Low	Develop a Preliminary Project Proposal and Cost Estimate for Updating Current 911 System including Feasibility of Reverse 911	Board of Selectmen, Police & Fire Departments, Hampshire Regional Emergency Planning Committee	2008	Town Staff/Volunteers	N/A
Medium	Amend the Special Permit and Site Plan Approval Provision of the Hadley Zoning Bylaw to include more Specific Requirements to Address Flood Related Issues	Conservation Commission, Planning Board	2008	Planning Board Assistance (PBA) Program	N/A
High	Prepare a Priority List for the Replacement of Undersized Culverts throughout Town	Board of Selectmen, Highway Department	2008	HMGP	To be Determined
Medium	Evaluate whether to become a part of FEMA's Community Rating System	Board of Selectmen, EMD	2009	Town Staff	N/A
Medium	Identify Existing Shelters that are Earthquake Resistant as well as	Building Inspector, EMD	2009	Town Staff	N/A

	Outside of Dam Inundation Areas				
Medium	Inventory Supplies at Existing Shelters and Develop a Needs List and Storage Requirements	Emergency Management Planning Committee, School Facilities Manager	2009	Town Staff/Volunteers	N/A
High	Ensure that all Shelters have Sufficient back-up Utility Service in the Event of a Primary Power Failure	Building Inspector, EMD	2009	??	??
Medium	Prepare a Water Conservation Plan	Board of Selectmen, Conservation Commission	2009	Smart Growth Technical Assistance Grant Program	\$7,500
Medium	Develop a Beaver Management Strategy	Board of Health, Fire Department, Highway Department	2009	Town Staff	N/A
Medium	Develop a Plan for Providing Access to Water, Information, Shelter, and Food Stores for Special Needs Populations in Town in the Event of a Severe Winter Storm	Hadley TRIAD SALT Council	2009	Town Staff/Volunteers	N/A
High	Identify all Pre-FIRM Structures throughout Town that need to be Elevated above the Base-Flood Elevation	Building Inspector, Fire Department	2010	Town Staff	N/A
Medium	Participate in the Creation of a Regional Debris Management Plan	Board of Selectmen, Planning Board, EMD	2010	Western Region Homeland Security Advisory Council Funding	To be Determined
Medium	Establish a Program to Identify and Clean up Properties within Flood Zones with Junk and Hazardous Materials	Building Inspector, Board of Health	2010	Town Staff	N/A
Low	Establish and Action Plan that Addresses Chlorine Releases at EPA Tier II Locations	Hampshire Regional Emergency Planning Committee	2010	Town Staff/Volunteers	N/A
Medium	Establish a Plan to Prioritize and Acquire Undeveloped Properties within Flood Zones throughout Town	Board of Selectmen, Conservation Commission	2011	HMGP	To be Determined
High	Conduct a Study to Identify the Appropriate Flood Control Structures/Measures to Prevent Flooding of the North Lane and Honey Pot Road Areas	Board of Selectmen, Highway Department	2011	HMGP	To be Determined

8 – PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon completion, copies of the Draft Local Hazard Mitigation Plan for the Town of Hadley were distributed to the Town boards for their review and comment. A public meeting was held by the Hadley Board of Selectmen to present the draft copy of the Hadley Local Natural Hazards Mitigation Plan to Town officials and residents and to request comments from this Committee and the general public. The Hadley Hazard Mitigation Plan was formally approved by the Board of Selectmen and forwarded to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their approval.

Plan Implementation

The implementation of the Hadley Hazard Mitigation Plan will begin following its formal adoption by the Hadley Board of Selectmen and approval by MEMA and FEMA. Specific Town departments and boards will be responsible for ensuring the development of policies, bylaw revisions, and programs as described in Sections 5 and 6 of this plan. The Hadley Hazard Mitigation Planning Committee will oversee the implementation of the plan.

Plan Monitoring and Evaluation

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

The Hadley Hazard Mitigation Planning Committee will meet on an annual basis or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm for strategies to remove obstacles to implementation. Following these discussions, it is anticipated that the Committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different Town departments and/or revise the goals and objectives contained in the plan. At a minimum, the Committee will review and update the plan every five years, beginning in the spring of 2012. The meetings of the Committee will be organized and facilitated by the Emergency Management Director or the Hadley Board of Selectmen.

CERTIFICATE OF ADOPTION
TOWN OF HADLEY, MASSACHUSETTS
BOARD OF SELECTMEN
A RESOLUTION ADOPTING THE HADLEY
HAZARD MITIGATION PLAN

WHEREAS, the Town of Hadley established a Committee to prepare the Hadley Hazard Mitigation plan; and

WHEREAS, several public planning meetings were held between October 2006 and April 2007 regarding the development and review of the Hadley Hazard Mitigation Plan; and

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

WHEREAS, a duly-noticed public hearing was held by the Hadley Board of Selectmen on _____, 2007 to formally approve and adopt the Hadley Hazard Mitigation Plan.

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

ADOPTED AND SIGNED this day of _____, 2008.

John P. Connor, Chair
Board of Selectmen

Joyce Chunglo
Board of Selectmen

Kate Nugent
Board of Selectmen

Brian West
Board of Selectmen

Gerald Devine
Board of Selectmen

ATTEST

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

2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP)	Massachusetts Emergency Management Agency
406 Public Assistance and Hazard Mitigation	Massachusetts Emergency Management Agency
Community Development Block Grant (CDBG).....	DHCD, also refer to RPC
Dam Safety Program.....	MA Division of Conservation and Recreation
Disaster Preparedness Improvement Grant (DPIG)	Massachusetts Emergency Management Agency

Emergency Generators Program by NESEC [†]	Massachusetts Emergency Management Agency
Emergency Watershed Protection (EWP) Program.....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP)	Massachusetts Emergency Management Agency
Flood Plain Management Services (FPMS).....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP).....	Massachusetts Emergency Management Agency
Mutual Aid for Public Works.....	Western Massachusetts Regional Homeland Security Advisory Council
National Flood Insurance Program (NFIP) [†]	Massachusetts Emergency Management Agency
Power of Prevention Grant by NESEC [†]	Massachusetts Emergency Management Agency
Roadway Repair & Maintenance Program(s).....	Massachusetts Highway Department
Section 14 Emergency Stream Bank Erosion & Shoreline Protection	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing	US Army Corps of Engineers
Shoreline Protection Program.....	MA Department of Conservation and Recreation
Various Forest and Lands Program(s).....	MA Department of Environmental Protection
Wetlands Programs	MA Department of Environmental Protection

[†]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) Websites

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

Appendix B

Documentation of the Planning Process

Hadley Hazard Mitigation Planning Committee

Meeting #1

AGENDA
October 24, 2006
6:30 p.m.

1) Introduction

2) Purpose of Committee

- Why selected to serve on Committee
- What we are doing and why

3) What is Hazard Mitigation Planning?

- PowerPoint Presentation on Hazard Mitigation

4) Step 1: Organize Hazard Mitigation Team

- Establish a chairperson/point of contact

5) What must we do to prepare a Hazard Mitigation Plan?

- Explain/set milestones (4-5 committee meetings)
- Agree on next committee meeting date

6) Question and Answer Period

Hadley Hazard Mitigation Planning Committee

Meeting #2

AGENDA

November 14, 2006

2:00 p.m.

Location: Hadley Public Safety Complex

1) Identify Hazards (past and potential) on Base Map

- What are the hazards?
- What is at risk from those hazards?

2) Develop Base Map with Critical Facilities

- Identify Critical Facilities on Base Map. The following list contains items that should be clearly identified on the map, as they apply to your community:

- | | |
|--------------------------------|---------------------------------------|
| - Emergency Operations Center | - Nursing Homes |
| - Emergency Fuel Facilities | - Elderly Housing |
| - Town/City Hall | - Day-Care Facilities |
| - Police Station | - Correctional Facilities |
| - Fire Station | - Other Congregate Care Facilities |
| - Public Works Garages | - Shelters |
| - Water Treatment Facilities | - Special Needs Populations |
| - Sewage Treatment Plants | - Hazardous Materials Facilities |
| - Water Tower/Supply Pumps | - Access Roads to Critical Facilities |
| - Power Plants | - Evacuation Routes |
| - Electrical Power Substations | - Unique or Historic Resources |
| - Schools | - Commercial Economic Impact Areas |
| - Major Highways and Roadways | - Socio-Economic Impact Areas |
| - Bridges | - Areas with Second Language Needs |
| - Dams | - Hospitals |

3) Question and Answer Period

4) Set Goals for Next Meeting

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

AGENDA

December 12, 2006

2:00 p.m.

Hadley Public Safety Complex

1) Review Identification of Hazards

- Past and Potential
- Critical Facilities

2) Analyze Development Trends

- Looking at Community Change
- Map out Development Patterns

3) Existing Protection Measures

- Review of Draft Existing Protection Measures

4) Question and Answer Period

5) Set Goals for Next Meeting

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

AGENDA

January 9, 2007

2:00 p.m.

Hadley Public Safety Complex

1) Identify What's in Place & Identify gaps in the current protection

- Review Draft Existing Protection Measures
- Identify gaps in existing protection

2) Review of Draft Goal Statements

3) Brainstorm Mitigation Actions

- What actions can be taken?
- Evaluating Action Feasibility

4) Prioritize Final List of Actions

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

5) Question and Answer Period

6) Set Goals for Next Meeting

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

AGENDA

March 13, 2007

2:00 p.m.

Hadley Public Safety Complex

- 1) Develop Strategy to Implement Selected Prioritized Actions**
 - Who will be responsible for implementing each prioritized action;
 - When will these actions be implemented?
 - How will the community fund the projects?

- 2) Develop Process for Adoption and Monitoring of the Plan**

- 3) Review & Revise as Necessary Final Draft of the *Hadley Hazard Mitigation Plan***

- 4) Discuss Next Steps for the *Hadley Hazard Mitigation Plan* including FEMA/MEMA Review and Adoption by the Board of Selectmen.**

- 5) Question and Answer Period**

Hadley Hazard Mitigation Planning Committee
Meeting #6

AGENDA

April 17, 2007

2:00 p.m.

Hadley Public Safety Complex

- 1) Develop Process for Adoption and Monitoring of the Plan**
- 2) Review & Revise as Necessary Final Draft of the *Hadley Hazard Mitigation Plan***
- 3) Discuss Next Steps for the *Hadley Hazard Mitigation Plan* including FEMA/MEMA Review and Adoption by the Board of Selectmen.**
- 4) Question and Answer Period**

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 Past and Potential Hazards/Critical Facilities Map

Appendix E

Public Notice

PRESS RELEASE

CONTACT: Andrew Smith, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE

September 12, 2007

Public Input Sought on Pre-Disaster Mitigation Plans

The Pioneer Valley Planning Commission has completed final working drafts of pre-disaster mitigation plans for thirteen communities in the region: Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton, and South Hadley.

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

The draft plans are posted for public review and comment on PVPC's website at www.pvpc.org. Please submit comments to PVPC's Andrew Smith at (413) 781-6045 or asmith@pvpc.org no later than November 30, 2007. Communities with approved plans will be eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

These pre-disaster mitigation plans are being developed with assistance from the Pioneer Valley Planning Commission with funding provided by the Massachusetts Emergency Management Agency.

—30—

The Republican.

'Predisaster plans' readied for grants
Sunday, September 23, 2007

By NANCY H. GONTER
ngonter@repub.com

It's the public's turn to weigh in on plans prepared by local communities to keep the damage from natural disasters to a minimum. Sixteen "predisaster mitigation plans," developed by the Pioneer Valley Planning Commission working with local officials from each community, are part of an effort to secure grant money from the Massachusetts Emergency Management Agency, said Catherine M. Miller, principal planner with the commission.

"This comes from an effort by the Federal Emergency Management Agency that while we are aware you can't prevent natural disasters from happening, you can prevent the long term consequences," Miller said.

The plans, which average more than 100 pages each, can be viewed on the agency's Web site at www.pvpc.org Plans for Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton, South Hadley, Southwick, Ware and Wilbraham are available, she said.

"This is largely an education exercise so people know local government is looking into these things and thinking about what the consequences of natural disasters would be. It's reassuring to know local governments are looking at this kind of thing especially after all the awareness following (hurricane) Katrina," Miller said.

Comments may be made by calling Andrew Smith at the Commission at (413) 781-6045 or by e-mailing him at asmith@pvpc.org by Nov. 30.

The plans were developed with a state grant of \$224,962 which was supplemented by local communities for total cost of just under \$300,000, she said.

Each plan looks at the risks communities may face from natural disasters such as flooding, tornadoes, drought and earthquakes, and what can be done to prevent damage to property and loss of life. They also prioritize projects for funding for mitigation efforts, Miller said. An example of a mitigation project is Greenfield's purchase of the Wedgewood Gardens mobile home park which was badly flooded by the Green River in 2005 and had previously been flooded, although that was not part of this program, Miller said.

The commission is working with 32 communities in this area and a second round of 16 more communities will soon be started. They are Amherst, Belchertown, Brimfield, Chicopee, Cummington, Goshen, Granby, Huntington, Palmer, Southampton, Springfield, Westfield, West Springfield, Westhampton, Williamsburg and Worthington.

After that, a plan for the entire region will be prepared, Miller said.

Northampton Deputy Fire Chief Dana Cheverette, a member of the local committee that worked with the commission on the city's plan, said going through the process of preparing the plan was helpful.

"You identify the flood plans and you identify the area where you need to put your resources. In 1988 when the Oxbow area flooded, a lot of people got isolated. Now we know where the people could get isolated," Cheverette said.

Sunday's news briefs

Posted by The Republican Newsroom September 30, 2007 12:04PM

Predisaster plan drafts

The Pioneer Valley Planning Commission has completed final working drafts of predisaster mitigation plans for 13 communities in the region. The draft plans are posted for public review and comment on the commission's Web site at www.pvpc.org. The deadline for comments is Nov. 30.

This planning effort is being undertaken to help communities assess the risks they face from natural hazards, identify action steps that can be taken to prevent damage to property and loss of life, and prioritize funding for mitigation efforts. Communities with approved plans will be eligible for Hazard Mitigation Grant Program funding from the Massachusetts Emergency Management Agency.

Affected are Agawam, Chester, Chesterfield, Easthampton, Hadley, Hampden, Hatfield, Holland, Holyoke, Ludlow, Monson, Northampton and South Hadley.