

The Town of Palmer

Local Natural Hazards Mitigation Plan

Adopted by the Palmer Town Council on December 13, 2010

Prepared by:

The Palmer Natural Hazards Mitigation Planning Committee

and

The Pioneer Valley Planning Commission

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also chair of Local Emergency Planning Committee
Donald Elliot, Emergency Management Director
David Johnson, Conservation Commission Chairman
Richard Kaczmarczyk, Director Department of Public Works
Linda Leduc, Town Planner

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Table of Contents

- 1: INTRODUCTION..... 2
 - Hazard Mitigation..... 2
 - Planning Process..... 2
- 2: LOCAL PROFILE 5
 - Community Setting 5
 - Infrastructure 5
 - Natural Resources 6
 - Development..... 7
- 3: Profiling HAZARDS..... 9
 - Profiling the Natural Hazards 9
 - Natural Hazard Identification and Vulnerability Assessment 10
- 4: CRITICAL FACILITIES..... 30
 - Critical Facilities within Hazard Areas 30
 - Category 1 – Emergency Response Services..... 30
 - Category 2 – Non Emergency Response Facilities 34
 - Category 3 – Facilities/Populations to Protect..... 35
- 5: MITIGATION STRATEGIES..... 39
 - General Mitigation Measures 39
 - Flooding 40
 - Severe Snow/Ice Storm 45
 - Hurricanes/Severe Wind 46
 - Tornadoes/Microbursts 47
 - Wildfire/Brushfire 48
 - Earthquake..... 50
 - Dam Failure 51
 - Drought..... 53
 - Hazardous Materials 55
- 6: PRIORITIZED IMPLEMENTATION SCHEDULE 57
- 7: PLAN ADOPTION & IMPLEMENTATION..... 61
- APPENDICES..... 63
 - Appendix A – Technical Resources 63
 - Appendix B – List of Acronyms..... 67
 - Appendix C – Natural Hazard Profiling Methodology 68
 - Appendix D – Past & Potential Hazards/Critical Facilities Map 71
 - Appendix E – Documentation of the Planning Process..... 72
 - Appendix F – Public Outreach 77

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

Planning Process

Planning for natural hazard mitigation in Palmer involved a five-member committee: Alan Roy, Chief of Palmer Fire and Rescue, also chair of Local Emergency Planning Committee; Donald Elliot, Emergency Management Director; David Johnson, Conservation Commission Chairman; Richard Kaczmarczyk, Director Department of Public Works; and Linda Leduc, Town Planner. The natural hazard mitigation planning process for the Town included the following tasks:

- Reviewing and incorporating existing plans and other information (Appendix E lists documents consulted)
- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding.

- Identifying and assessing the policies, programs, and regulations a community is currently implementing to protect against future disaster damages.
- Identifying deficiencies in the current strategies and establishing goals for updating, revising or adopting new strategies.
- Adopting and implementing the final Local Natural Hazards Mitigation Plan.

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

Committee Meetings

Public meetings of the planning committee were all held at the Palmer Fire Station on the dates listed below. Agendas for these meetings are included in Appendix E. The Town posted agendas for public notice in advance of all meetings.

- March 11, 2008, 3 p.m.: Meeting with full LEPC for hazards mitigation planning overview, identify and organize planning team, and begin identifying critical facilities.
- April 15, 2008, 1 p.m.: Revisit critical facilities and evacuation routes potentially affected, discuss history of natural hazard events.
- May 6, 2008, 1 p.m.: Continue history of natural hazard events, review vulnerability assessment methodology, profile hazards, discuss development trends relative to natural hazard areas.
- May 27, 2008, 1 p.m.: Identify and prioritize mitigation strategies, define plan implementation process.

December 13, 2010; The plan was presented to the Town council and adopted.

Participation by Public & Entities in Surrounding Communities

On December 15, 2007 the Pioneer Valley Planning Commission sent a press release to all area media outlets to inform private citizens that the planning process for Palmer's Hazard Mitigation Plan had commenced and that all residents of Palmer were invited to attend plan development sessions. This press release (Appendix F) resulted in a series of news articles that enhanced awareness of the Hazard Mitigation Planning Process.

On June 30, 2008 the Pioneer Valley Planning Commission sent a press release (see Appendix F) to all area media outlets to inform the public that a draft of Palmer's Hazard Mitigation Plan had had been placed on PVPC's website and hard copies were available at PVPC's offices and that all residents, businesses and other concerned parties of Palmer and adjacent communities were encouraged to comment on the plan. The plans were made available in this manner for 30 days. Citizens from adjacent municipalities were also encouraged to comment on Palmer's plan and on the plans of four other communities (Westfield, Cummington, Southampton, & Westhampton) that were available for the same period.

In addition to media outreach, all public meetings were posted at Palmer's Town Hall (Appendix E) in compliance with the Commonwealth of Massachusetts' open meeting law.

Town Council Meetings

On November 16, 2006 Town Council agreed to begin the process of developing a Local Hazard Mitigation Plan. Once the plan is provisionally approved by FEMA, Town Council will hold a public hearing on the plan and then adopt the plan. Public notice will involve a legal advertisement in the local paper 2 weeks in advance of the hearing.

2: LOCAL PROFILE

Community Setting

The Town of Palmer is located in eastern Hampden County in Western Massachusetts, where the confluence of the Ware, Quaboag, and Swift Rivers form the headwaters of the Chicopee River. Palmer is made up of four villages: Bondsville, Depot Village (or Palmer Center), Thorndike, and Three Rivers. It has a total land area of just over 32 square miles, and is bordered by Monson to the south, Wilbraham and Ludlow to the west, Belchertown and Ware to the north, and Warren and Brimfield to the east. Palmer lies seventeen miles from downtown Springfield, and seventy-three miles from the metropolitan center of Boston.

Palmer spans the Ware, Quaboag, and Swift River Valleys from the Wilbraham Hills in the west, to the Warren and Brimfield mountains in the east. With these major river courses and multiple hills, the Town's landscape is very irregular. The valley plains along the riverbanks are the most populated areas for industry and commercial activity as well as residential living.

Palmer was settled in the early 1700s as a farming community in both the river valleys and on the upland hills. However, in the early to mid-nineteenth century, industry began developing the river valleys with their potential source of waterpower. Three of Palmer's four villages (Three Rivers, Thorndike and Bondsville) developed as a direct outgrowth of three single large textile mills. The fourth village, known as Depot Village (Palmer Center), was developed as a transportation center and by the turn of the 20th century, actively supported five railroads and two stage lines.

Today, the textile industry has been replaced by smaller industrial and commercial enterprises, several of which are located in an industrial park or in the former mill complexes. The former mill villages are now mainly residential communities.

Infrastructure

Palmer's infrastructure reflects its industrial roots and its prime location in terms of access to the larger region, as well as its small population and varied terrain.

Roads and Highways

Palmer's four villages are connected along two main routes – Route 181 (also named Sykes Street south of Palmer Center, and Palmer Street northward) traveling north-south through Town, and Main Street traveling east-west. In keeping with its tradition as an important transportation center, Palmer also offers direct access to the Massachusetts Turnpike (Interstate 90) at Exit 8. Other main routes include State Routes 67, 20, and 32.

Rail

Palmer was once known as the "Town of Seven Railroads." Today, there are three active rail lines remaining within the Town, which are used predominately for commercial shipping.

Public Water Service

Palmer consists of four private water companies, which serve approximately 50% of the town's potential customers within the four villages. The water lines were mainly established to service the older mill housing and have not been expanded to cover much more than the centers of the villages over the years. The remainder of the Town relies on private wells.

Sewer Service

Palmer's sewer system services 50% of the residences within the town. A major problem with the town sewer system is that it is a combined system with 26 points of direct discharge to the Chicopee, Quaboag, Swift and Ware Rivers. During rain events, excess surface run-off enters the sewer system and often causes combined surface runoff/sanitary wastewater to be discharged through the outfalls. The town is currently under federal mandate to implement a plan to address this problem. The remainder of the Town relies on private septic systems.

Natural Resources

Palmer's natural resources are varied – from the four rivers and their valleys to the surrounding hills and all the undeveloped land within town limits.

Water Resources

The four rivers passing through Palmer are significant resources to the Town, and play a key role in forming the Town's boundaries. The Quaboag River, a designated Scenic River since 1985, runs along the neighboring towns of Brimfield and Monson; whereas the Swift River borders Belchertown; and the Ware River borders Ware. All three rivers join to form the headwaters of the Chicopee River, which flows into Ludlow about a mile downstream.

At one time these rivers were a vital economic resource via waterpower for the textile mills, which were built upon their banks. Today they serve in a different capacity as a resource for recreation, conservation, and flood control. Boating and/or canoeing, fishing and swimming are popular water recreational sports on the rivers, while picnicking, bird watching, scenic viewing and hiking the green belt areas are popular activities in adjacent land.

In addition to these rivers, there are three lakes and five ponds in Palmer: Forest Lake is the largest at 44 acres and is accessible to the public; both Lake Thompson with 32 acres, and Crystal Lake with 16 acres are privately owned. The five ponds in town are: Round Pond, Ice House Pond, Allen's Pond, Knox Pond (a glacier kettle hole), and Lily Pond.

Forests and Fields

The vast majority (68%) of the total acreage of Palmer is undeveloped forestland, at approximately 14,260 acres. Much of the forest is hardwood, consisting of red and white oak, red and sugar maple, cherry, ash, and birch. The majority conifers are white pine and hemlock, with some spots of cedar, red pine, and, rarely, spruce. There are

also a few hundred acres of cropland, pastureland, and open land, providing additional vegetation types and habitat opportunities.

Development

Palmer's declining industry has been off-set by its good access to nearby metropolitan centers. Therefore, the Town has seen a slight shift in development - from villages sustained by manufacturing and trade to a more diffuse residential community. This has translated to minimal population growth in the past few decades; from 1990 to 2000, Palmer grew by just 3.6%. As would be expected with this slow growth, the downtown is struggling, while the housing industry has managed to develop several new residential areas.

Zoning was not adopted in the Town of Palmer until 1980, but the four village centers have for a long time provided a general organizing framework that has served the town well. Due to these village centers, it was natural for Palmer to be one of the first towns in the state to have mixed use districts.

Current zoning and other land use regulations constitute Palmer's "blueprint" for its future. 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.

Palmer's Zoning Ordinances establish 13 base zones, and 2 overlay zones:

- Three residential zones – Rural Residential/Agricultural (RR), Suburban Residential (SR), and In Town Residential (TR);
- Three commercial (business) zones – Neighborhood Business (NB), General Business (GB), Highway Business (HB);
- Four mixed-use zones – Village Center District I (VCI), Village Center District II (VCII), Village Center District III (VCIII), Village Center District IV (VCIV);
- Two industrial zones – Industrial A (IA), Industrial B (IB);
- One industrial park zone – Urban Renewal Industrial Park (URIP); and
- Two overlay zones – Water Supply Protection (WSP), Floodplain(F).

Although appropriate zoning is all relevant to protecting the health and safety of the Town residents, two of Palmer's districts are specifically relevant to natural hazard mitigation. These are outlined here:

- Floodplain - The floodplain overlay applies to those areas within the boundary of the one-hundred-year flood that are considered hazardous according to FEMA. The overlay district severely restricts uses within the floodplain. If new development is proposed for the floodplain, structures must be flood proof and every effort must be made to prevent the loss of floodwater storage capacity.

- Water Supply Protection - This purpose of this overlay district is to protect and preserve Palmer's groundwater resources from potentially damaging pollution or environmental degradation by regulating certain uses within the district. The regulations state specific prohibited and restricted uses, regulates drainage, details site plan requirements and special permit procedures.

The zoning ordinances also establish a Site Plan/Special Permit Approval procedure for specific uses and structures within Palmer. This review allows the Special Permit Granting Authority the ability to review development to ensure that the basic safety and welfare of the people of Palmer are protected, and includes several specific evaluation criteria that are relevant to natural hazards.

Current Development Trends

Today, the vast majority of Palmer's 32.7 square miles is undeveloped land, totaling close to 14,260 acres. Residential land is the second most prolific land use, at approximately 3,110 acres, followed by agricultural land at approximately 1,295 acres. Land used for industry constitutes a relatively large 470 acres, with commercial use occupying just 142 acres. Land characterized as urban open/public land constitutes 243 acres, and there are 111 acres of outdoor recreational land throughout Town. Water in the town of Palmer comprises over 470 acres.

In general, the floodplain overlay district, combined with Conservation Commission oversight, severely limits new development in hazard areas. Rather existing zoning and other land use regulations guide development interests in Palmer to seek areas where the environmental conditions and existing public utilities support such development. Instances of rugged terrain, steep slopes and unsuitable soils also act as constraints on development.

Development in Hazard Areas

Many of the 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 and inundation in the event of a dam failure. According to the Community Information System (CIS) of FEMA, there were 320 structures located within the Special Flood Hazard Area (SFHA) in Palmer as of May 1999, the most current records in the CIS for the Town of Palmer. For the high hazard dams, inundation zones are mapped as part of the Emergency Action Plans required of dam owners by the Commonwealth of Massachusetts.

3: PROFILING HAZARDS

Profiling the Natural Hazards

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

Each of these hazards was assessed by the Committee for location of occurrence, extent, previous occurrences, and probability of future events. (See Appendix C for methodology.) This resulted in a ranking of hazard, by risk, see Table 3.1. More detailed descriptions of each of the points of analysis are included in the Identification and Vulnerability Assessment (below).

Table 3.1: Hazard Profiling and Risk Index Worksheet

| Type of Hazard | Previous Occurrences | Location of Occurrence | Extent of Impacts (Damage) | Probability of Future Events | Hazard Risk Index Rating |
|---|----------------------|------------------------|----------------------------|------------------------------|--------------------------|
| Flooding (100-year) | Yes | Large | Critical | Low | 3 |
| Flooding (localized) | Yes | Medium | Critical | Very High | 1 |
| Severe Snow/Ice Storms | Yes (minimal) | Large | Limited | Very High | 2 |
| Hurricanes/Severe Wind | Yes | Large | Critical | Very Low | 4 |
| Tornado/Microburst | Micrburst only | Small | Catastrophic | Low | 4 |
| Wildfire/Brushfire | Yes | Medium | Limited | Moderate | 3 |
| Earthquake | No | Large | Catastrophic | Low | 4 |
| Dam Failure | Yes | Large | Catastroph | Very Low | 5 |
| Drought | No | Small | Minor | Very Low | 5 |
| Man-Made Hazard: Hazardous Materials | No | Medium | Minor | Low | 3 |

Natural Hazard Identification and Vulnerability Assessment

The following is a description of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Palmer. These natural and manmade disasters are: floods, severe snowstorms/ice storms, hurricanes/severe winds, tornadoes/microbursts, wildland fires/brushfires, earthquakes, dam failure, drought, man-made hazards-hazardous materials. The Past and Potential Hazards/Critical Facilities Map (Appendix D) reflects the contents of this analysis.

Vulnerability Assessment Methodology

In order to determine estimated losses due to natural hazards in Palmer, each hazard area was analyzed with results shown below. The data below was calculated using FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses*, August 2001.

Total value of all structures in Palmer (2006): \$1,013,253,582

Median value of a home in Palmer (2006): \$320,000

Average household size: 2.4 persons

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 damage calculations are rough estimate and likely reflect worst-case scenarios. Computing more detailed damage assessment based on assessor's records is a labor-intensive task and beyond the scope of this project.

Flooding

Background

The average annual precipitation for Palmer and surrounding areas in northwestern Massachusetts is 46 inches. There are three major types of storms that bring precipitation to Palmer. 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 Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard. In addition to damage of buildings directly in the floodplain, development can result in a loss of natural flood storage capacity and can increase the water levels in water bodies. Flood levels may then increase, causing damage to structures not normally in the flood path.

The Floodplain Map for the Town of Palmer shows the 100-year and 500-year flood zones identified by FEMA flood 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 Palmer, there are several 100-year floodplain areas – primarily along the Ware River, Kings Brook, Quaboag River, and Swift River. There are some smaller 500-year floodplains mapped as well, along Forest Lake, the Palmer Street Marshes, and the confluence of the Swift, Ware and Chicopee Rivers.

The major floods recorded in Western Massachusetts during the 20th century have been the result of rainfall alone or rainfall combined with snowmelt. Palmer has experienced many flooding events over the last decade. Generally, these small floods have had minor impacts, temporarily impacting roads and residents' yards. However, town-wide flooding with a 100-year storm in 1955 caused severe damage to roads, bridges, and buildings. Approximately 60% of the town had to be rebuilt. The Town of Palmer does not have and Repetitive Loss Properties, according to the NFIP as of July 2008.

As described above, flooding can happen on a range of scales. For the purposes of this analysis, the hazard has been broken into two separate types – **Flooding (100-year)** and **Flooding (localized)**. Risk and vulnerability assessment for these separate types of flooding are analyzed below.

Flooding (100-year base flood): Medium Risk

Following the last 100-year flood of 1955, when much of Palmer had to be rebuilt, the Town undertook a major flood control project at the confluence of the Swift, Ware and Quaboag rivers, which forms the Chicopee River in Three Rivers. In particular, the channel of the Chicopee River was significantly deepened and widened to increase the river's ability to pass large storm flows, and to lessen impacts on roads, bridges and buildings.

Within the FEMA mapped 100-year floodplain, there are approximately 958 acres of land, and within the 500-year floodplain, there are 409 acres of land. According to the Community Information System (CIS) of FEMA, there were 320 residential structures located within this Special Flood Hazard Area (SFHA) in Palmer as of May 1999, the most current records in the CIS for the Town of Palmer. Therefore, a vulnerability assessment for a 100-year flood equals approximately \$102.4 million of damage, with approximately 768 people impacted. [Note: this is more than 10% total value of town, more than 6% town population.]

Specific vulnerability assessments were estimated for sites within the SFHA that have been susceptible to 100-year floods in the past, are described below. This includes nearly all areas in Palmer that are adjacent to rivers and streams. At this time the Town of Palmer has no repetitive loss properties as defined by FEMA's NFIP at this time.

Areas along Route 67 and the Quaboag River

The roadway of Route 67, where it enters Palmer from West Warren to its intersection with Route 20, is built in the floodplain of the Quaboag River.

- No critical facilities in neighborhood ;
- No residential structures in this area that have been affected or could be affected by a flood incident;

- Vulnerability assessment: costs only to repair of roadway.

Areas along Route 20 and the Quaboag River

The roadway of Route 20 and many intersecting roads—from Route 67 at the Palmer/Warren Town Line, past Route 32 South at Fay’s Bridge, the DPW facility on Bridge Street, the Maple Tree Industrial Park, all the way to Wilbraham Street—are located in the floodplain of the Quaboag River. Areas along Foundry Street and Water Street are particularly vulnerable.

- 2 critical facilities in neighborhood (Department of Public Works and Galaxy Wellfield and pumping station)
- Approximately 9 residential structures in this area that have been affected or could be affected by a flood incident;
- Vulnerability assessment: \$2,880,000 (assuming 100% damage to 100% of the structures);
- Cost for repairing or replacing the 8 businesses and town facilities, any power lines, telephone lines, and contents of structures are not included.

Areas along the Ware River

Route 181 where it crosses the Ware River in Thorndike, Main Street and Church Street, and River Street in Thorndike, and Summer Street, where it crosses the Ware River are all built in the floodplain of the Ware River. Three Rivers water supply area is vulnerable, as is River and State streets in Bondsville near the old airport. Town of Palmer Wastewater Treatment Facility is in close proximity of floodplain, off Norbell Street in Three Rivers section).

- 1 critical facility in neighborhood;
- Approximately 40 residential structures in this area that have been affected or could be affected by a flood incident;
- Vulnerability assessment: \$12,800,000 (assuming 100% damage to 100% of the structures);
- Cost for repairing or replacing business and town facilities, any power lines, telephone lines, and contents of structures are not included.

Flooding (localized) – High Risk

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, Palmer often experiences minor flooding at certain locations due to proximity to rivers

and streams and to drainage problems, or problem culverts. There are numerous problem culverts or other localized flooding areas that are all over Town. Most of the flood hazard areas listed here were identified due to known past occurrence in the respective area. This includes moderate flooding in 2005 that resulted from 15 days of rain. This storm event mimicked the flood of 1955 with the same problem areas, but with reduced impacts.

There are many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff given Palmer's location at the confluence of three rivers. Additionally, culverts in town could be impacted by beavers, producing localized flooding.

To determine the vulnerability of the Town to localized flood events, the property within identified areas was outlined using the polygon function in Connect CTY, which allowed structures to be identified and tallied. Specific vulnerability assessments were estimated for sites which have been susceptible to localized flooding in the past, and are described below.

Areas along Route 20 and the Quaboag River, particularly Foundry Street and Water Street, Palmer

During the flood of 2005, floodwaters were a problem for 6 residences along Water Street that had 1 to 2 feet of water in their basements. Floodwaters also impacted several non-residential buildings, which sustained damages amounting to approximately \$1 million. The DPW was flooded and everything had to be moved out as there were some concerns regarding the release of contaminants (\$150,000 worth of damage). NB Pease Inc., an antique car parts dealer, had a fuel oil release. Kelly Oil Co. had a bulk tank that started to float, initiating action from the Fire Department and the Massachusetts Department of Environmental Protection. Kelly Oil has since reconfigured their tanks. The Maple Tree Industrial Park and Turley Publications (\$200,000) also saw significant damage. CSX rail lines were under water.

- 1 critical facility in neighborhood;
- Approximately 6 residential structures in this area that have been affected or could be affected by a flood incident;
- Vulnerability assessment: \$960,000 (assuming 50% damage to 50% of the structures);
- Cost for repairing or replacing business and town facilities, any power lines, telephone lines, and contents of structures are not included.

Wilbraham Street

- Flooding occurs due to the low elevation of the roadway and the roadway's proximity to the Quaboag River. The 2005 flood caused damage to buildings in the area. During that flood event a manhole cover on the main sewer line came off so that floodwaters poured into the sewer line and had to be pumped along with

sewage. Such a large quantity of excess water—some estimated 7 million gallons—damaged the pumps at the pumping stations. In addition, two Massachusetts Electric workers had to be rescued from their truck when they tried to drive through flood water that reached the level of their windshield.

- No critical facilities in neighborhood;
- No residential structures in this area could be affected by a flood incident;
- Costs for repairing or replacing two businesses, and New England Central Railroad's overpass have not been determined.

Route 32 South by Fay's Bridge

- Several factors seem to contribute to flooding at Fay's Bridge. These factors include a tributary feeding into the Quaboag River just upstream of the bridge, the narrowing of the Quaboag River at this juncture, the low elevation of the bridge itself. For the most part, there is floodzone into which floodwaters can spill, including a driving range and fields. With the 2005 flood, however, waters flooded out Route 32. _
- 1 critical facility in neighborhood (Osterman Gas bulk storage tanks is built on fill in this area);
- Approximately_3 residential structures in this area that have been affected or could be affected by a flood incident;
- Vulnerability assessment: \$960,000 (assuming 100% damage to 100% of the structures);
- Cost for repairing or replacing business and town facilities, any power lines, telephone lines, and contents of structures are not included.

Severe Snow/Ice Storm – Medium-High Risk

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 also 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.

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

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

Palmer's recent history has not recorded any loss of life due to the extreme winter weather, but there are usually several incidents of property damage or personal injury each winter. In addition, during heavy snow years, accumulations can reach several feet deep. Palmer's rugged topography creates some steep grades, sometimes making plowing difficult and causing snow and ice hazards. Many of the farms and open meadows and fields throughout town cause snow drifts.

Severe winter weather occurs regionally and therefore would impact the entire town. Members of the Hazard Mitigation Team indicated there are no specific problems in any part of town due to winter weather.

Hurricanes/Severe Wind – Medium-Low Risk

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. Severe wind can also occur in the absence of a hurricane, especially impacting mountain tops. Global warming will increase the threat of hurricanes and severe wind as oceans and the atmosphere warms. Climate change research indicates that storms like hurricanes will become more intense and more frequent in the future.

The intensity of a hurricane is measured using a 1-5 rating called the Saffir-Simpson Hurricane Scale. According to NOAA's National Hurricane Center, Saffir-Simpson "...is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale..."

The 5 categories are:

- Category 1—winds at 74-95 mph, with storm surge generally 4-5 feet above normal;
- Category 2 —winds at 96-110 mph, with storm surge generally 6-8 feet above normal;
- Category 3—winds at 111-130 mph, with storm surge generally 9-12 feet above normal;
- Category 4—winds at 131-155 mph, with storm surge generally 13-18 feet above normal;
- Category 5—winds greater than 155 mph, with storm surge generally greater than 18 feet above normal.

Palmer's location in Western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it can experience some high wind events. The Hurricane of 1938, blew roofs off many homes, downed power and phone lines, and downed many trees onto homes and businesses. For most other hurricanes or severe wind events, the Town has experienced small blocks of downed timber and uprooting of trees onto structures. Hurricanes can and do create flooding, and except for the Hurricanes of 1938 and 1955 (Diane), damages from flooding have been minor according to Hazard Mitigation team members.

- Estimated wind damage: 5% of the structures with 10% damage, \$5,066,268;
- Estimated flood damage: 10% of the structures with 20% damage, \$20,265,072;
- Vulnerability assessment for a hurricane event (both wind and flood damages): \$25,331,340;
- Cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included.

Major Hurricanes and Palmer Area

| Hurricane/Storm Name | Year | Saffir/Simpson Category (when reached MA) |
|--------------------------|------|---|
| Great Hurricane of 1938 | 1938 | 3 |
| Great Atlantic Hurricane | 1944 | 1 |
| Carol | 1954 | 3 |
| Edna | 1954 | 1 |
| Diane | 1955 | Tropical Storm |
| Donna | 1960 | Unclear, 1 or 2 |
| Groundhog Day Gale | 1976 | Not Applicable |

| | | |
|--------|------|----------------|
| Gloria | 1985 | 1 |
| Bob | 1991 | 2 |
| Floyd | 1999 | Tropical Storm |

Tornadoes/Microbursts – Medium-Low Risk

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.

For more than three decades, the method for evaluating the severity of a tornado involved relating the degree of damage to the intensity of the wind, using the Fujita Scale, known as the F-scale (1 through 6 with 6 being the most severe). This generalized method has been problematic, according to information from NOAA's Storm Prediction Center, as different winds may be needed to cause the same damage depending on how well-built a structure is, wind direction, wind duration, battering by flying debris, and a bunch of other factors. The process of rating the damage itself is largely a judgment call, according to NOAA's Storm Prediction Center. Even meteorologists and engineers highly experienced in damage survey techniques often came up with different F-scale ratings for the same damage.

As of February 2007, an enhanced F-Scale should be used. NOAA's Storm Prediction Center reports,

The Enhanced F-scale is a much more precise and robust way to assess tornado damage. It classifies F0-F5 damage as calibrated by engineers and meteorologists across 28 different types of damage indicators (mainly various kinds of buildings, but also a few other structures as well as trees). The idea is that a "one size fits all" approach just doesn't work in rating tornado damage, and that a tornado scale needs to take into account the typical strengths and weaknesses of different types of construction...In the Enhanced F-scale, there will be different, customized standards for assigning any given F rating to a well built, well anchored wood-frame house compared to a garage, school, skyscraper, unanchored house, barn, factory, utility pole or other type of structure. In a real-life tornado track, these ratings can be mapped together more smoothly to make a damage analysis. Of course, there still will be gaps and weaknesses on a track where there was little or nothing to damage, but such problems will be less common than under the original F-scale. As with the original F-scale, the enhanced version will rate the tornado as a whole based on most intense damage within the path. *There are no plans to systematically re-evaluate historical tornadoes using the Enhanced F-scale.*

Within Massachusetts, tornadoes have occurred most frequently in Worcester County and in communities west of Worcester, including towns in Hampshire County.

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. Microbursts and tornadoes are expected to become more frequent and more violent as the earth's atmosphere warms, due to predictions of climate change from global warming.

No known tornados have touched down in Palmer, but the town is located in a section of the state that has been identified as having the highest density of tornadoes in the Commonwealth. In August of 2006, microbursts caused minor localized damage with downed trees, limbs, and power lines. In Western Massachusetts, the majority of sighted tornadoes have occurred in a swath east of Palmer, known as "tornado alley." Fifteen incidents of tornado activity (all F2¹ or less) occurred in Hampden County between 1959 and 2005.

Because tornadoes and microbursts rarely occur in this part of the country, assessing damages is difficult. Furthermore, buildings have not been built to Zone 2, Design Wind Speed Codes. The entire Town of Palmer is vulnerable.

- Tornadoes/microburst hazard estimates 20% damage to 10% of structures in Town;
- Vulnerability assessment estimates in damages; \$20,265,072;
- Estimated cost does not include building contents, land values or damages to utilities.

Wildfires/Brushfires – Medium Risk

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

According to FEMA, there are three different classes of wildland fires: surface fires, ground fires and crown fires. 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 wildfires or brushfires have not been a significant problem in Palmer, 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,

¹ F2 refers to the commonly used Fujita Tornado Damage Scale which ranks tornados F0-F5 depending on estimated wind speeds and damages, with F5 the most severe.

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.

Hampden County has approximately 273,000 acres of forested land, which accounts for 67% of total land area. Forest fires are therefore a potentially significant issue. Illegal brushfires in Palmer occur on average about 15 times per year, but the vast majority are small and they are quickly contained.

Significant fire events include: a 1943 wildfire that involved some 1,000 acres along Pettaquatic Road; a 1960s wildfire on Warren Road caused by an eagle going into a power line and involving some 500 to 600 acres; and a 1979 wildfire on Kings Mountain that involved some 125 acres;. More recently a 2000 wildfire on West Ware Road engulfed 30 acres.

According to the Palmer Fire Department, there are approximately 30 unauthorized burns (or brushfires) per year, on average. As a point of comparison, approximately 465 open burning permits are issued annually.

Moderate risk exists for potential wildfire incidents, especially near some of the town's forested, agricultural, and recreational lands. Forested and agricultural areas with high fuel content have more potential to burn. In addition, it is often very difficult to access some of the locations to extinguish the brushfire.

- Up to 10 structures could be impacted by a wildfire in one of the Town's agricultural areas;
- Assuming 100% damage to 100% of these 10 structures, not including costs repairing or replacing any power lines, telephone lines, and contents of structures;
- Vulnerability assessment estimates approximately \$3.2 million in damages for a wildfire.

Earthquakes – Medium-Low Risk

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. The magnitude of an earthquake is measured using the Richter Scale, which measures the energy of an earthquake by determining the size of the greatest vibrations recorded on the seismogram. On this scale, one step up in magnitude (from 5.0 to 6.0, for example) increases the energy more than 30 times.

The intensity of an earthquake is measured using the Modified Mercalli Scale. This scale quantifies the effects of an earthquake on the Earth's surface, humans, objects of nature, and man-made structures on a scale of I through XII, with I denoting a weak earthquake and XII denoting a earthquake that causes almost complete destruction.

Nineteen earthquakes, of an intensity of V or greater on the Modified Mercalli scale, have centered in Massachusetts since it was colonized by Europeans. An earthquake of an intensity of V is felt by nearly everyone; many folks are awakened. Some dishes and windows are broken. Unstable objects are overturned, and clocks may stop. A

shock in 1755 reached intensity VIII at Boston and was felt across the state. In addition, Massachusetts was affected by some of the more severe Canadian shocks plus the earthquake of 1929 that centered on Grand Banks of Newfoundland.

Strong earthquakes in the St. Lawrence Valley in 1638, 1661, 1663, and 1732 were felt in Massachusetts. The 1638 and 1663 shocks damaged chimneys at Plymouth, Salem, and Lynn. On June 11, 1643, Newbury, Massachusetts, was strongly shaken. Again in [1727 \(November 9\)](#) an earthquake described as "tremendous" in one report and "violent" in another caused much damage at Newbury. The shock was felt from the Kennebec River to the Delaware River and from ships at sea to the extreme western settlements. Several strong aftershocks were reported from the area through February 1728.

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.

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.

| Table 3.2: New England Earthquakes (1924-2002)² | | |
|---|-------------------|------------------|
| magnitude 4.2 or higher | | |
| 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 |

² Northeast States Emergency Consortium Web site: www.nesec.org/hazards/earthquakes.cfm

| Table 3.3: New England States Record of Earthquakes | | |
|---|-----------------|-----------------------|
| 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 |
| Total Earthquakes in New England (1568-1989) | | 1,239 |

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.

- Because many of the buildings were built before 1975, there is potential for damage on all of the Main Streets in the village centers;
- Structures are mostly wood frame construction, so loss estimates predict 20% of town assessed value, not including costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures;
- Vulnerability assessment estimates approximately \$202,650,716.

Dam Failure – Low Risk

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. 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. Most dam failures occur when floodwaters above overtop and erode the material components of the dam.

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. Notice for dam owners to comply with the inspection schedule did not go out until 2006. Extensions were provided to some dam owners, particularly to towns, so that they could include the costs of inspection within their next funding cycles.*

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 between inspections. More frequent inspections may be performed at the discretion of the state. 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.

* * Alice Bilbo-Miles , legal advisor to the Massachusetts Office of Dam Safety.

³ US Geological Survey Water-Supply Paper 2375. "National Water Summary 1989 – Floods and Droughts: Massachusetts." Prepared by S. William Wandle, Jr., US Geological Survey.

³ National Drought Mitigation Center – <http://drought.unl.edu>

Based on DCR sources, as well as local knowledge, there are currently 15 dams in Palmer.⁴ Of these dams, 1 is ranked as high hazard; 4 are ranked as significant hazard; and 4 are ranked as low hazard. The other 6 dams are deemed by DCR to be non-jurisdictional (the storage capacity of the impoundment and height of dam are such that they need not be regulated). Table 3.4 below identifies dams within the town, state id, name of owner, purpose, condition, last inspected date, and hazard risk classification.

Locally, there has also been some discussion about the Upper Bondsville dam, which no longer provides any function, but seems to present a very real danger for local teens looking for a summer swimming hole. In response to a teen death in 2006, the owner has surrounded the area of the upper dam with cyclone fencing. Ownership of the lower dam is under dispute.

Though beyond the Town's boundaries and maintained by the Commonwealth of Massachusetts, the Winsor Dam and the Goodnough Dike at the 50,000+ acre feet Quabbin Reservoir present perhaps the greatest possible threat to the residents of Palmer. The 1993 Emergency Action Plan (EAP) for the Quabbin Reservoir indicates, "The sudden failure of the Winsor Dam or Goodnough Dike would result in a major disaster of unforeseen magnitude...." The Emergency Action Plan indicates that the flood wave begins with a leading edge, followed by the arrival of a peak flood that is then followed by a lengthy flood recession. Following is a table showing the EAP estimates for areas of Palmer:

| Area | Leading Edge Arrival Time | Peak Flood Arrival Time | Max. Surface Water Elevation |
|--------------|----------------------------------|--------------------------------|-------------------------------------|
| Bondsville | 1 hour | 2 hours | 425 feet |
| Three Rivers | 1 hour | 5.5 hours | 376 feet |
| Palmer | 2 hours | 5.5 hours | 375 feet |

Palmer has a history of two dam failures, both occurring during the flood of 1955. The Palmer Reservoir Upper Dam owned by the Fire District gave way, flooding a development of 40 to 50 homes with two to three feet of water. The dam was later rebuilt. During that same time, flood waters overtopped the Thompson Lake Dam, washing out Smith Street and Route 32 at the location of the fish hatchery. The spillway on the dam was expanded to improve capacity after this event.

⁴ It is difficult to track down accurate records of dams, as ownership and exact location is not clear. Furthermore, many very old dams listed in DCR records are not in existence anymore, according to local knowledge. This list is compiled from a combination of sources, and then verified by the Committee.

Table 3.5: Palmer Dams, Classified by Hazard Risk

| Dam name/ date built | ID | Owner | Purpose | Condition/last inspected | Hazard Risk | Location |
|--|---------|----------------------------------|------------|-----------------------------|-----------------------|--|
| Diamond International Corp. Upper Dam/1876 † | MA00562 | Energy Thorndike, Inc. | Hydropower | Fair/ December 2006 | High | Hill Street |
| Diamond International Corp. Lower Dam/1872 † | MA00563 | Energy Thorndike, Inc. | Hydropower | Fair/June 2007 | Significant | Along Commercial Street (before Church and Main) |
| Palmer Reservoir Upper Dam/1900 | MA00557 | Palmer Fire District #1 | Storage | Good/ October 2003 | Significant | Reservoir Road |
| Bondsville Upper Dam/1900 | MA00560 | Belchertown Land Trust | Recreation | Poor/June 1999 | Significant | |
| Bondsville Lower Dam/1900 | MA00561 | Unknown | Recreation | Poor/June 1999 | Significant | |
| Sasur Pond Dam/ | MA02374 | John and Maxine Sasur | | | Low—applied for NJ | |
| Thompson Lake Dam/1900 | MA00558 | Lake Thompson Civic Assoc. | Recreation | | Low | Smith Street |
| Forest Lake Dam/1900 | MA00559 | Linda Resser | Recreation | | Low | Bennett Street |
| Mango Pond Dam*/ | MA01958 | Turnpike Authority | | | Low | |

| | | | | | | |
|---------------------------------------|---------|-------------------------------|---|-------------------|-------------------------|----------------|
| State Fish Hatchery Upper Dam/1900 | MA02537 | Comm. of MA, DFG | P | Fair/June 1987 | Non jurisdictional** | |
| State Fish Hatchery Lower Dam/1900 | MA02538 | Comm. of MA, DFG | P | Good/June 1987 | Non jurisdictional** | |
| V.V. Mcnitt Dam/1900 | MA01957 | Osterman Gas | | | Non jurisdictional** | Nipmuck Street |
| Lizak Pond Dam | MA01959 | Comm. of MA, DFG | | | Non jurisdictional** | |
| Lizak #2 Basin Dam/ | MA01960 | Heritage Hills Farms, Inc. | | | Non jurisdictional** | |
| Lizak #3 Basin Dam/ | MA01961 | Heritage Hills Farms, Inc. | | | Non jurisdictional** | |

Source: Massachusetts Department of Conservation and Recreation, Office of Dam Safety, December 2007

† Licensed by the Federal Energy Regulatory Commission.

* Palmer's DPW Director indicates that this dam is nothing more than a dropped inlet.

** Jurisdictional determinations made by DCR based on storage capacity of impoundment and height of dam.

Drought – Low Risk

Drought is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector.

Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

In Massachusetts, six major droughts have occurred statewide since 1930. They range in severity and length, from three to eight years. In many of these droughts, water-supply systems were found to be inadequate. Water was piped in to urban areas, and water-supply systems were modified to permit withdrawals at lower water levels.

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. Even so, there have been several years of drought-like conditions in Western Massachusetts: 1940-1952, 1980-1983, and 1995-2001. Furthermore, 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. Additionally, even minor droughts will increase the risk of wildfire, especially in areas of high recreational use.

Palmer has had limited experience with severe drought conditions. The town has not experienced a threat to its water supply, and does not anticipate any severe water shortages throughout town.

Man-Made Hazards – Hazardous Materials – Medium Risk

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.

Hazardous materials are a consideration at 21 facilities in Palmer. Seventeen of these facilities in town are considered Tier II Hazardous Materials storage facilities. The Toxics Release Inventory (TRI) is a publicly available EPA data base that contains information on specific toxic chemical releases and other waste management activities reported annually by certain industry groups as well as federal facilities. According to the 2006 TRI Public Data (released February 2008), 6 industries are releasing hazardous materials within Palmer's town limits (2 of these are also Tier II facilities). All of these facilities are

listed in table 3.6 below and shown on the Past & Potential Hazards/Critical Facilities Map (Appendix D).

| Table 3.6: Hazardous Materials Sites in Palmer, MA | |
|---|--|
| Industry | Address |
| American Dry Ice Corporation * | 19 Second Street, Palmer Industrial Park, Palmer |
| Cascades Diamond # | 4145 Church Street, Thorndike |
| Churchill Coatings* | 103 Water Street, Palmer |
| GAC Water Treatment Plant* | Off Salem Street, Palmer |
| Gravel Pack Well #1* | Off Salem Street, Palmer |
| Gravel Pack Well #2* | Off Salem Street, Palmer |
| Jarvis East (Standex International Corp.) # | 1127 South Main Street, Palmer |
| Mustang Motorcycles, Inc. # | 4 Springfield Street, Three Rivers |
| Noonan Energy Corporation* | 1488 North Main Street, Palmer |
| Noonan Energy Corporation* | 70 Foundry Street, Palmer |
| Osterman Gas * | 1 Blanchard St, Palmer, MA |
| Palmer #503 National Grid Substation* | 9 Fuller Street, Thorndike |
| Palmer Foundry Inc. *# | 22 Mt. Dumplin Road, Palmer |
| Palmer Paving Corp. * | 25 Blanchard St, Palmer, MA |
| Palmer Water Pollution Control * | 1 Norbell Street, Three Rivers |
| Profiles, Inc. # | 7 First Street, Palmer |
| Rathbone Precision Metals, Inc. *# | 1241 Park Street, Palmer |
| Thorndike #523 National Grid Substation* | Park Street off Route 20 |
| UMass Wing Memorial Hospital | 40 Wright Street, Palmer |
| USPS-Palmer, Main Post Office * | Park Street, Palmer |
| Verizon Palmer Co. * | 1028 Pleasant Street, Palmer |

* = Tier II Facility

#= TRI Facility

In addition, 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.

Palmer relies on Springfield's HazMat team for responding to incidents involving hazardous materials through a mutual aid agreement. There is no history of any major accidents involving some sort of oil or chemical spill, but transportation of chemicals and bio-hazardous materials by vehicle transport both on the railroad and on Route 181, or the Massachusetts Turnpike is a concern. Small areas of hazardous materials storage increase the potential for future incidents.

4: CRITICAL FACILITIES

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

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

Critical Facilities within Hazard Areas

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 Palmer has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Palmer's Hazard Mitigation Committee has broken up this list of facilities into four 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 Palmer.
- The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster.
- The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster.

The critical facilities and evacuation routes potentially affected by hazard areas are identified in Table 4-1, following this list. The Past and Potential Hazards/Critical Facilities Map (Appendix D) 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 (informal; not official)

Town Administration Building – 4417 Main Street, Palmer

Secondary: Palmer Fire Station – 12 Walnut Street, Palmer

Three Rivers Fire District 2 Radio Repeater Site, Pathfinder Regional Vocational

School - 240 Sykes Street, Three Rivers

2) Fire Stations

Palmer Fire Station – 12 Walnut Street, Palmer

Bondsville Fire Station – 3174 Main Street, Bondsville

Three Rivers Fire Station – 50 Springfield Street, Three Rivers

3) Police Station

Palmer Town Police Department – 4417 Main Street, Palmer

4) Department of Public Works

Palmer DPW – 1015 Bridge Street, Palmer

5) Water Districts

Palmer Water Department – 30 Reservoir Street, Palmer

Three Rivers Water Department – 2031 Main Street, Three Rivers

Bondsville Water Department, 3147 Main Street, Bondsville

Thorndike Water Department, 4070 Church Street, Thorndike

6) Emergency Fuel Stations

MassHighway Depot – Park Street

Palmer DPW – 1015 Bridge Street

Amerigas – 1162 Park Street

7) Facilities with Backup Power

Town Administration Building – 4417 Main Street, Palmer - emergency generator to serve Emergency Operations Center and Police Department

Palmer Fire Station – 12 Walnut Street, Palmer

Bondsville Fire Station – 3174 Main Street, Bondsville

Three Rivers Fire Station – 50 Springfield Street, Three Rivers

Palmer DPW – 1015 Bridge Street, Palmer (2 portable generators)

Palmer Waste Water Treatment Plant – 1 Norbell Street, Three Rivers

Converse Middle School – 24 Converse Street, Palmer

Old Mill Pond School – 4107 Main Street, Thorndike

Palmer High School – 4105 Main Street, Thorndike

Pathfinder Regional Vocational Technical High School – 240 Sykes St., Three Rivers

St. Thomas, 1076 Thorndike Street, Palmer *

UMass Wing Memorial Hospital and Medical Centers – 40 Wright Street, Palmer

8) Emergency Shelters

Converse Middle School – 24 Converse Street, Palmer*

Faith Baptist Christian Academy – 251 Shearer Street, Palmer

Old Mill Pond School – 4107 Main Street, Thorndike*

Palmer High School – 4105 Main Street, Thorndike*

Pathfinder Regional Vocational Technical High School – 240 Sykes St., Three Rivers*

St. Peter & Paul Church – 2383 Main Street, Three Rivers

St. Thomas, 1076 Thorndike Street, Palmer *

*Shelters also have generators.

9) Helicopter Landing Sites (Lifeflight-Lifestar preapproved)

Palmer Fire District 1

CrossRoads, Intersection Rt. 20 & Rt. 67

Rt.67 / Boston Rd. — West of Washington St.

King Brook Farm / Pat Turley Residence

Route 20 Batting Cages, Park Street

Pioneer Plaza, Park & Breckenridge Street

Sanderson McCloud Field, South Main Street

Converse Middle School (Legion Field): enter from either 1 Walnut Street or 2 Converse Street

Cedar Foods, Wilbraham Street

Big Y / Ames Parking Lot. Thorndike Street

Wing Memorial Hospital, (Pre-Approved Lifeflight), Wright Street

Burleigh Park, Old Warren Road

Palmer High School, Main Street, Thorndike

St. Joe's Field, Pine Street, Thorndike

Three Rivers, Fire District 2

1Mart, Enter From: 1 Calkins Street, 2 Wibraham Street

Laviolette Field, Belanger Street

Pulaski Park, Belchertown Road

Pathfinder Reg. Voc. Tech. High School, Rt. 181

Pathfinder Reg. Voc. Tech. High School, Panek Street

St. Peter & Paul Church Parking Lot, Rt. 181

Bondsville, Fire District 3

St. Peter & Paul Cemetery, Fuller Street
Palmer Airport, Emery Street, Pre-approved Lifelight,

10) Communications

Bald Peak Fire Repeater, Hovey Hill Road, Palmer
Cell Tower, 80 Stimson Street, Palmer
Cell Tower, Wilbraham Street, Palmer
Cell Tower, south end of Peterson, Palmer
Cell Tower, off Robinson, Palmer
Antennae, water tank at top of Breckenridge Street, Palmer
Three Rivers Fire District 2 Radio Repeater Site, Pathfinder Regional Vocational School - 240 Sykes Street, Three Rivers

11) Hospitals

UMass Wing Memorial Hospital and Medical Center – 40 Wright Street, Palmer
Palmer Ambulance – Shearer Street Extension

12) Primary Evacuation Routes

Route 32 (most reliable, can go north and get to Ware)
Route 90 (most reliable for east or west travel)
Route 181 (prone to flooding)
Route 67 (prone to flooding)
Route 20 (least reliable, problematic with flood events)

13) Bridges/Culverts Located on Evacuation Routes

Bridge Street - Chicopee River, Three Rivers
Main Street - Quaboag River, Three Rivers
Palmer Street - Quaboag River, Palmer
Route 181/Palmer Street - Ware River, Palmer
East Main Street - Ware River Canal, Thorndike
Main Street - Ware River, Thorndike
Church Street - Ware River Canal, Thorndike
Church Street - Ware River, Thorndike
State Street - Ware River, Thorndike (to be replaced)
Route 20/Wilbraham Street - Quaboag River, Palmer
Route 67/Boston Road - Kings Brook, Palmer CLOSED

Interstate 90, Eastbound - Quaboag River, Palmer
Interstate 90, Westbound - Quaboag River, Palmer
Route 20 @ corner of Breckenridge
Route 20 @ ¼ of a mile west under RR crossing, Palmer
South Main Street @ Fox, Palmer
Route 32 @ Fish Hatchery, Palmer

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 Palmer.

1) Water Supply

Palmer Water District

- Galaxy Wellfield #1 and Gravel Pack Well #2, Salem Street (under water with flood);
- Upper and Lower Graves Brook Reservoir, off Breckenridge Street – 30 Reservoir Street

Three Rivers

- Groundwater wells located near the Ware River on Route 181 near Pathfinder Regional Vocational High School (under water with flood)

Bondsville

- River Road, Belchertown

2) Drinking Water Treatment Plants

Palmer Water District

- Graves Brook Reservoir Treatment Facility, 30 Reservoir Road, Palmer
- Granular Activated Carbon Treatment Plant – Salem Street

Three Rivers

- 280 Sykes Street (corrosion control only)

3) Water Storage

Palmer Water District

- 750,000 gallon steel water storage tank – top of Breckenridge Street
- 1 million gallon clearwell, Graves Brook Reservoir Treatment Facility, 30 Reservoir Street, Palmer

Three Rivers

- 1.5 million gallon water tanks – Baptist Hill

Bondsville

- Tank top of High Street, Bondsville

Thorndike

- Tank on Center Street (supplies Diamond International Corp.)

- 4) Waste Water Treatment Plants
 - Palmer Waste Water Treatment Plant – 1 Norbell Street, Three Rivers

- 5) Critical Culverts (roads with stream crossings)
 - Quaboag Valley Mobile Home Park,
 - Route 181 @ Burgundy Brook, Bondsville
 - Nipmuck Road, Palmer
 - Emery Street (3), Bondsville
 - Foster Street, Bondsville
 - Main Street, Bondsville
 - High Street, Thorndike (by Junction Store)
 - Center Street, Thorndike (on evacuation route)
 - Bacon Road, Palmer
 - West Ware Road, Palmer
 - Route 20 @ corner of Breckenridge, Palmer (on evacuation route)
 - Route 20 @ ¼ of a mile west under RR crossing, Palmer (on evacuation route)
 - South Main Street @ Fox, Palmer (on evacuation route)
 - Route 32 @ Fish Hatchery, Palmer (on evacuation route)

Category 3 – Facilities/Populations to Protect

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

- 1) Special Needs Population
 - Bright Beginnings Child Care Center – 15 Linda Street, Three Rivers
 - Camp Ramah – 39 Bennett Street, Thorndike
 - Camp Stanica – Phillip Street, Bondsville
 - Converse Middle School – 24 Converse Street, Palmer
 - Faith Baptist Church Academy – 251 Shearer Street, Palmer
 - Learning Factory – 62 Springfield Street, Three Rivers
 - Old Mill Pond School – 4107 Main Street, Thorndike
 - Palmer Head Start – 4023 Main Street, Thorndike
 - Palmer Healthcare Center – 250 Shearer Street, Palmer
 - Palmer High School – 4105 Main Street, Thorndike
 - Pathfinder Regional Vocational Technical High School – 240 Sykes St., Three Rivers
 - Quaboag Children’s Center – 60 Central Street, Palmer
 - Rainbow Connection Nursery School and Day Care – 17 Highland Street, Palmer
 - The Cute Kids Daycare – 24 Lawrence Street, Palmer

2) Elderly Housing/Assisted Living

Kirkwood Place Elderly Housing Independent Living – 4216 Main Street, Thorndike
Laurel Manor/Palmer Housing Authority – 13 Fletcher Street, Palmer
Palmer Green Estates – 1 Beacon Drive, Palmer
Palmer House Alzheimer’s Center, 250 Shearer Street, Palmer

3) Public Buildings/Areas

Bondsville Post Office – 3069 Main Street, Bondville
Palmer District Court – 235 Sykes Street, Thorndike
Palmer Post Office – 1057 Park Street, Palmer
Thorndike Post Office – 36 Church Street, Thorndike
Three Rivers Post Office – 2020 Bridge Street, Three Rivers
Roger Reed State Salmon Hatchery – Route 32, Thorndike
Town Administration Building – 4417 Main Street, Palmer
Palmer Public Library, 1455 North Main Street, Palmer

4) Schools

Converse Middle School – 24 Converse Street, Palmer
Faith Baptist Church Academy – 251 Shearer Street, Palmer
Old Mill Pond Elementary School - 4107 Main Street, Thorndike
Palmer High School - 4105 Main Street, Thorndike
Pathfinder **Regional** Vocational Technical High School – 240 Sykes St., Three Rivers
St. Thomas, 1076 Thorndike Street, Palmer *

5) Churches

Crossway Christian Church, 1130 South Main Street, Palmer
Faith Baptist Church – 251 Shearer Street
Second Baptist Church – 1050 Thorndike Street, Palmer
Second Congregational Church – 1080 Pleasant Street, Palmer
St. Annes Church, Main Street, Palmer
Saint Bartholomew, Main Street, Bondsville
St. Paul’s Universalist Church, 1060 Central Street, Palmer
Saint Thomas, 1076 Thorndike Street, Palmer

6) Historic Buildings/Sites

Four Corners Cemetery, Main Street, Thorndike
Palmer Center Cemetery, Flint Street, Palmer

Oak Knoll Cemetery , Thorndike Street, Palmer
Palmer Center Cemetery, Route 32 and Warren Street
Palmer Memorial Hall, 1029 Central Street , Palmer (State Register)
Thorndike Mills, Church Street, Thorndike
Thorndike Street High School, Park Street and Converse Street, Palmer
Three Rivers Cemetery, Main Street, Three Rivers
Union Station/Steaming Tender Restaurant, 28 Depot Street, Palmer (State Register)
Wright Wire Mills, Route 20, Palmer
King Brook Farm, Route 67, Palmer
Harry Johnson House, Route 67, Palmer
U.S. Post Office, Palmer Main Branch, Park and Central streets (State Register)

7) Apartment Complexes (5 units or more)

1302 South Main Street, Palmer
1295-1307 South Main Street, Palmer
1089 Park Street, Palmer
1035 Central Street, Palmer
1 Shearer Street, Palmer
98-104 Springfield Street, Three Rivers
2014-2020 Palmer Street, Three Rivers
25-39 Front Street, Three Rivers
9-19 Kelley Street, Three Rivers
9-15 Springfield Street, Three Rivers
4014 School Street, Thorndike

8) Major Employers (Industrial Parks, Factories, etc.)

Carpenter Metals, Route 20, Palmer
Sanderson McCloud, South Main Street, Palmer
Maple Tree Industries, Wilbraham Street, Palmer
Hastings, Chamber Road, Three Rivers
Mustang Seats, Springfield Street, Three Rivers
Palmer Industrial Park, Fuller Road, Bondsville

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) | Route 20 and Route 67 at Palmer/Warren Town Line; Area surrounding Route 181; Ludlow Dam Area; Emery Street Area; Route 32 south of Fay's Bridge | <ul style="list-style-type: none"> ▪ Palmer DPW, 1015 Bridge Street, Palmer ▪ Palmer Waste Water Treatment Plant, 1 Norbell Street, Three Rivers ▪ Galaxy Wellfield | Routes 20, 90, 181, and 32 (@ southern end) |
| Flooding (localized) | Water Street, Palmer Foundry Street, Palmer | ▪ Palmer DPW, 1015 Bridge Street, Palmer | None |
| Severe Snow/Ice Storm | Entire Town | None | Routes 67, 20, 90, 181 |
| Hurricane/Severe Wind | Area adjacent to Routes 20 and Routes 181 | All facilities | Routes 67, 20, 90, 181 |
| Wildfire/Brushfire | Forested areas surrounding Fox Hill, Pottaquatic Mountain (bounded by routes 67, 90, and 32) | Woodland Hill Academy in Ware, Malbouf Road | Route 67 |
| Earthquake | Entire Town | All facilities | Routes 67, 20, 90, 181 |
| Dam Failure | Depends on dam | Depends on dam | Depends on dam |
| Drought | Entire Town | All 4 water districts | N/A |
| Hazardous Materials | Properties along Routes 90, 181, 20 | Depends on incident | Routes 90, 181, 20 |

(Past & Potential Hazards/Critical Facilities Map Located In Appendix D)

5: MITIGATION STRATEGIES

One of the steps of this Natural Hazard Mitigation Plan is to evaluate all of the town's existing policies and practices related to natural hazards and identify potential gaps in protection. Once these gaps in protection are identified, future mitigation strategies can be crafted and recommended. This is done by evaluating existing and future measures in comparison to the Town's goal statement for natural hazard mitigation.

Goal Statement

To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to natural disasters. 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 or man-made disaster.

For the extent of this analysis, the Committee reviewed the following Town documents:

- CEM Plan
- Open Space and Recreation Plan
- Community Development Plan
- Zoning By-Laws
- Subdivision Rules and Regulations
- Other relevant By-Laws as identified (Fire Department Burn Permit Procedures, Building Code, etc.)

This section of the plan serves to identify current mitigation strategies and recommend future mitigation strategies. This is done both generally, and by hazard type.

General Mitigation Measures

Several of the recommended mitigation measures have multiple benefits because, if implemented, they will mitigate or prevent damages from more than one type of natural hazard. These do not fall under one hazard type, but could be put into place for facilitation of better natural hazard protection generally.

Some of these general hazard-related strategies and measures do not fall specifically under the category of

What's the CEM Plan?

An important existing general preparedness and response tool is Palmer's Comprehensive Emergency Management Plan (CEM Plan). Although the CEM Plan is focused on the procedural response to an emergency, it organizes information, includes supply and information inventories, and outlines detailed steps for increasing preparedness.

"mitigation," but are instead tools for preparedness. The Hazard Mitigation Planning Committee recognizes that these are also important recommendations for the Town, and has included them here:

Action Item: Establish true Emergency Operations Center, pending availability of funding.

Responsible Department/Board: Town Manager, Town Council, and Emergency Management Director
Proposed Completion Date: 2011

Action Item: Contact television channels 3, 22, and 40 to understand procedures for emergency notification as a way to supplement existing Connect-CTY emergency notification system.

Responsible Department/Board: Emergency Management Director
Proposed Completion Date: 2008

Action Item: Collect, periodically update, and disseminate information on emergency information via town website on 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: Local Emergency Planning Committee, Emergency Management Director
Proposed Completion Date: 2009 and ongoing

Action Item: Work with Community Emergency Response Team to equip and maintain emergency response trailer.

Responsible Department/Board: Emergency Management Director
Proposed Completion Date: 2008 and ongoing

Action Item: Work to attain regional status for Local Emergency Planning Committee and certification for all hazards emergency planning.

Responsible Department/Board: Local Emergency Planning Committee, Emergency Management Director
Proposed Completion Date: Ongoing

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways.

Current Mitigation Measures

The Town currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the Town's zoning by-law, subdivision regulations, as well as a proposed stormwater management by-law. Relevant goals are included in the adopted Open Space and Recreation Plan. Infrastructure like dams and culverts are in place to manage the flow of water. These current mitigation strategies are outlined in the following table.

| Table 5-1: Existing Flood Hazard Mitigation Measures | | | |
|---|---|---|---|
| Existing Strategy | Description | Effectiveness | Potential Changes |
| Flood Control Structures | Three Rivers flood control structures installed in 1960s by Army Corps of Engineers. | Very effective. | |
| Culvert Replacement | Priority list of necessary culvert replacements and other construction projects to effectively manage flooding. | Very effective for managing flood control needs. | Funding needed to do replacements. |
| Stormwater Management Ordinance | Maintain or reduce predevelopment runoff characteristics to the extent feasible | Effective for reducing peak flows | |
| Earth Removal Ordinance | Some requirements for large-scale earth removal, restricting location and regulating drainage, vegetation, etc. | Not effective for preventing water pollution and sedimentation. | Need to include requirement for cash or surety bond. Also need more monitoring and enforcement. |

| | | | | |
|-------------------------|------------------------------------|---|--|---|
| Zoning Ordinances | Floodplain District | Overlay district to protect areas delineated as part of the 100-year floodplain by regulating uses and special permit requirements. (This also includes any development within the floodway in the Village Center Districts.) | Very effective for preventing incompatible development within the flood prone areas. | |
| | Water Supply Protection District | District to protect surface and ground water resources by regulating certain uses, drainage, and other requirements within recharge area of aquifer. | Very effective for preventing water contamination and promoting infiltration. | Revise hazardous materials definitions for clarification, using state model from DEP. |
| | Open Space Residential Development | Provides regulations for higher density subdivision development by right.. Requires 50% protection of contiguous open space. | Effective for minimizing impervious surface, allowing for more groundwater infiltration. | |
| | Common Driveway | Provides for minor residential development without additional roads thereby lessening environmental impact. | Effective for minimizing impervious surface, allowing more groundwater infiltration. | |
| Subdivision Regulations | Special Permit | Some uses require special permit approval, and must meet environmental standards. | Somewhat effective for preventing incompatible development. | Introduce better background checks on developers, and introduce more inspections. |

| | | | | |
|--|--|--|--|---|
| | Definitive Plan | 100-year floodplain, wetlands, waterbodies, conservation areas, drainage patterns, proposed septic or sewer and water supply must all be shown. | Somewhat effective for managing run-off and preventing contamination. | |
| | Additional Requirements | Development Impact Statement; Wetlands Protection; Water Supply Protection District; Hydrology Study and Drainage Calculation; Sanitary Sewer Study; Water Study; Erosion/Sediment Control Plan | Effective for managing impacts from development. | |
| | Design Standards | Protection of Natural Features/ Conservation Restrictions – details what must be preserved. | Very effective for protecting natural drainage systems (wetlands, streams, floodway, etc.) | |
| | Palmer Open Space and Recreation Plan | The OSRP inventories natural features and promotes natural resource preservation in the town, including the floodplain; wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks. The Plan also identifies key goals and strategies to protect open space. | Effective in identifying sensitive resource areas, including floodplains. Encourages forest, farmland protection, help conserve the town's flood storage capacity. | Implement relevant goals and policies in Plans. |
| | National Flood Insurance Program Participation | As of 2006, there were 30 homeowners with flood insurance policies. | Somewhat effective, provided that the town remains enrolled in the National Flood Insurance Program. | |

Future Mitigation Measures

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

Action Item: Revise earth removal ordinance to include requirement for cash or surety bond, and to introduce more monitoring and enforcement.

Responsible Department/Board: Planning Board

Proposed Completion Date: 2009

Action Item: Replace priority culverts on Stormwater Management Project List, pending availability of funding.

Responsible Department/Board: Department of Public Works

Proposed Completion Date: ongoing

Action Item: Implement the goals and strategies of the Palmer Open Space and Recreation Plan dealing with protection of floodplain, forests, and farmland, including working with head assessor to resolve taxation issues on open space.

Responsible Department/Board: Conservation Commission, Planning Board, Town Council, and Head Assessor

Proposed Completion Date: 2008 and ongoing

Action Item: Revise the Water Supply Protection Overlay District bylaw, using the state model from DEP, with a focus on clarifying the definition for hazardous materials.

Responsible Department/Board: Planning Board, Water Districts, Fire, Local Emergency Planning Committee, Emergency Management Director

Proposed Completion Date: 2009

Action Item: Educate citizens living in the floodplain about the NFIP, pending availability of funding.

Responsible Department/Board: Building Inspector, Conservation Commission

Proposed Completion Date: ongoing

Action Item: For special permits, introduce better background checks on developers, and introduce more inspections.

Responsible Department/Board: Planning Board, Conservation Commission

Proposed Completion Date: 2009

What is the NFIP's Community Rating System?

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), 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.

Severe Snow/Ice Storm

Winter storms can be especially challenging for emergency management personnel. 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. Even though the storm has usually been forecast, there is no certain way for predicting its length, size or severity. Therefore, mitigation strategies must focus on preparedness prior to a severe snow/ice storm.

Current Mitigation Measures

The Town's current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. These current mitigation strategies are outlined in the following table.

Note: 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 in the previous section can also be considered as mitigation measures for severe snow/ice storms.

Table 5-2: Existing Severe Snow/Ice Storm Hazard Mitigation Measures

| | Existing Strategy | Description | Effectiveness | Potential Changes |
|--------|-------------------|--|--------------------------------|-------------------|
| Zoning | Common Driveways | Allows for two adjacent lots to share a driveway, fewer curb cuts. | Effective for providing access | |

| | | | | |
|-------------|---|---|---|--|
| | Special Permit: Telecommunication Towers, Antennae, and Facilities | Structures are required to be as minimally invasive as possible to the environment, and regulations call for a large setback as a further precaution. | Very effective for preventing damage in the case of a severe storm. | |
| | Site Plan Review/Approval Process | Utilities must be placed underground, unless applicant proves impractical. | Effective for preventing power loss. | |
| Subdivision | Design Standards | Street grade regulations (maximum ranges from 5% to 8% depending on street category); minimum sight distances at intersections. | Effective. | |
| | State Building Code | The Town of Palmer has adopted the Massachusetts State Building Code. | Effective. New utilities must go underground in new developments. | |
| | Backup Electric Power | Shelters have backup power. | Very effective in case of power loss. | |
| | Tree Management | List of dangerous trees created annually for National Grid. | Very effective, preventative collaboration. | |

Future Mitigation Measures

No potential changes to the Town’s current strategies have been identified in the above table, and discussion with the Natural Hazards Mitigation Committee confirms that no future mitigation measures are needed.

Hurricanes/Severe Wind

Of all the natural disasters that could potentially impact Palmer, 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). Even with significant warning, hurricanes can do significant damage – both due to flooding and severe wind.

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 5-1 can also be considered hurricane mitigation measures.

The high winds that oftentimes accompany hurricanes can also damage buildings and infrastructure. But regulations can be put into place to help minimize the extent of wind damages.

The Town’s current mitigation strategies to deal with severe wind are equally applicable to wind events such as tornadoes and microbursts. Therefore, the analysis of severe wind strategies is coupled with this hazard.

Tornadoes/Microbursts

The location and extent of potential damaging impacts of a tornado are completely unpredictable. Most damage from tornadoes or microbursts 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. In addition, current land development regulations can also help prevent wind damages.

The following table outlines the Town’s existing mitigation strategies that help prevent wind damages, whether from hurricanes, tornadoes, microbursts, or any other event.

**Table 5-3: Existing Severe Wind Hazard Mitigation Measures
(Including Hurricane, Tornado, Microburst Hazards)**

| Existing Strategy | | Description | Effectiveness | Potential Changes |
|-------------------|------------------------------|--|--|-------------------|
| Zoning Ordinances | Special Permit: Mobile Homes | Special permit is required for individual mobile homes/trailers to be temporarily allowed in residential districts (prohibited in Floodplain District, or any Village Center District) | Somewhat effective for preventing damage to susceptible structures | |

| | | | |
|--|---|---|--|
| Special Permit: Telecommunication Towers, Antennae, and Facilities | Structures are required to be as minimally invasive as possible to the environment, and regulations call for a large setback as a further precaution. | Very effective for preventing damage in the case of a severe storm. | |
| Site Plan Review/Approval Process | Utilities must be placed underground, unless applicant proves impractical. | Effective for preventing power loss. | |
| State Building Code | The Town has adopted the MA State Building Code. | Effective. | |
| Emergency Preparedness with Verizon, Mobile Pipeline, Baystate Gas, Comcast, National Grid | Regular annual meetings with utility companies on emergency preparedness | Effective | Continue annual meetings; secure phone numbers for contact during emergencies. |
| Tree Management | List of dangerous trees created annually for National Grid. | Very effective, preventative collaboration. | |

Future Mitigation Measures

Several potential changes to the Town’s current strategies have been identified in the above table. There is one mitigation strategy for the future:

Action Item: Continue annual meetings with utility companies and secure phone numbers for contact during emergencies.

Responsible Department/Board: Local Emergency Planning Committee
Proposed Completion Date: Ongoing

Wildfire/Brushfire

Although somewhat common, the vast majority of brushfires in Palmer are small and quickly contained. However, as with any illegal fire or brushfire, there is always the risk that a small brushfire could grow into a larger, more dangerous wildfire, especially if conditions are right. Therefore, it is important to take steps to prevent wildfires and brushfires from turning into natural disasters.

Current Mitigation Measures

The following table identifies what the Town is currently doing to manage brushfires and makes some suggested potential changes and recommendations for decreasing the Town's likelihood of being heavily impacted by a wildfire or brushfire.

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

| Existing Strategy | | Description | Effectiveness | Potential Changes |
|----------------------------|----------------------------------|--|---------------------|--|
| Zoning | Water Supply Protection District | Special permitted businesses must file hazardous materials management plan with Fire Chief and other Town officials. | Somewhat effective. | |
| Subdivision Regulations | Definitive Plan | The Fire Chief, along with the Planning Board, is involved in the review of the definitive plan; plans must include location of hydrants and account for adequate fire flow. | Effective. | |
| | Construction Standards | Fire alarm boxes must be installed under the supervision of the Fire Department. | Effective. | |
| Burn Permits | | Residents must obtain burn permits, and personnel provide information on safe burn practices. | Somewhat effective. | Increase enforcement of burning regulations, perhaps invoke penalties for offenders. |
| Public Education/ Outreach | | The Fire Department has an ongoing educational program in the schools. | Effective. | |

Future Mitigation Measures

Several potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

Action Item: Increase education and enforcement of burn permits; including pre-season review of regulations in public outreach campaign and/or invoking penalties for offenders

Responsible Department/Board: Fire Department

Proposed Completion Date: ongoing

Earthquake

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.

Current Mitigation Measures

The Town's most relevant existing mitigation measures are described in the following table.

| Table 5-5: Existing Earthquake Hazard Mitigation Measures | | | | |
|---|--|---|---|-------------------|
| Existing Strategy | | Description | Effectiveness | Potential Changes |
| Zoning | Special Permit: Telecommunication Towers, Antennae, and Facilities | Structures must have large setback (105%) of height. | Very effective for preventing damage to nearby structures in the case of an earthquake. | |
| State Building Code | | The Town of Palmer has adopted the State Building Code. | Effective for new buildings and substantial renovations. | |

Future Mitigation Measures

Potential changes to the Town's current strategies have been identified in the above table, and these are compiled below:

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

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2012

Dam Failure

Dam failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has no where to flow.

Current Mitigation Measures

The only mitigation measures currently in place are the state regulations governing the construction, inspection, and maintenance of dams. This is managed through the Office of Dam Safety at the Department of Conservation and Recreation.

Table 5-6: Existing Dam Failure Hazard Mitigation Measures

| Existing Strategy | Description | Effectiveness | Potential Changes |
|------------------------------|--|---|-------------------|
| New Dam Construction Permits | State law requires a permit for the construction of any dam. | Effective. Ensures dams are adequately designed. | |
| Dam Inspections | DCR has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard). | Low. The responsibility for this is now on dam owners, who may not have sufficient funding to comply. | |

Future Mitigation Measures

Recent changes in legislation have shifted some of the responsibility of dam safety onto dam owners. The Town recognizes the need to adjust to this change. While there are no changes to the Town’s current strategies, recommendations for future mitigation strategies, are compiled below:

Action Item: Work with State of Massachusetts to understand and get training relative to Emergency Action Plan for Winsor Dam and Goodnough Dike. (If 1990 EAP for dam and dike are most recent, exert pressure for updates to these plans.)

Responsible Department/Board: Town Council, Emergency Management Director

Proposed Completion Date: 2010

Action Item: Obtain all most recent maps of inundation areas and evacuation routes for other high hazard dams.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2011

Action Item: Educate citizens living in inundation zones about evacuation routes in case of dam failure, pending the availability of funding.

Responsible Department/Board: Emergency Management Director

Proposed Completion Date: 2012

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.

Current Mitigation Measures

Palmer 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.

| Table 5-7: Existing Drought Hazard Mitigation Measures | | | | |
|---|--------------------------------------|---|---|--|
| Existing Strategy | | Description | Effectiveness | Potential Changes |
| Zoning Ordinances | Water Supply Protection District | District to protect groundwater resources by regulating certain uses, drainage, and other requirements within recharge area of aquifer. | Very effective for preventing groundwater contamination and increasing infiltration. | Revise hazardous materials definitions for clarification – utilize state model from DEP. |
| | Cluster Development | Provides regulations for cluster subdivision development by special permit. Allows protection of contiguous open space. | Somewhat effective for minimizing impervious surface, allowing for more groundwater infiltration. | |
| | Common Driveway | Provides for minor residential development without additional roads thereby lessening environmental impact. | Effective for minimizing impervious surface, allowing more groundwater infiltration. | |
| | Earth Products Excavation Operations | Rigorous requirements for large-scale earth removal, restricting location and regulating drainage, vegetation, etc. | Effective for preventing water pollution and sedimentation. | |

| | | | | |
|---|-------------------------|--|--|---------------------------|
| Subdiv Regs | Definitive Plan | Proposed septic or sewer and water supply must be shown. | Somewhat effective for determining water supply and quality, preventing contamination. | |
| | Additional Requirements | Hydrology Study and Drainage Calculation; Sanitary Sewer Study; Water Study; Development Impact Statement; | Effective for determining water supply, quality prior to development. | |
| Stormwater Management Ordinance | | Provides for recharge of groundwater sources | Effective | |
| Palmer Open Space and Recreation Plan | | Makes recommendation to protect Town's water supply. | Effective to support water conservation/protection efforts. | Implement recommendations |
| Public Water Supply Emergency Response Plan (required by Massachusetts Department of Public Works). | | These response plans include various types of emergencies and could include major fires, main pipe failures, contamination (long term and immediate health risk), long term electrical failures, floods, critical equipment failure and drought. | Effective as each contingency plan is outlined specifically for each system. | |

Future Mitigation Measures

Potential changes to the Town's current strategies have been identified in the above table, and these, as well as recommendations for other future mitigation strategies, are compiled below:

Action Item: Revise the Water Supply Protection Overlay District, using the state model from DEP, with a focus on clarifying the hazardous materials definitions,

Responsible Department/Board: Planning Board, Water Districts, Fire, Local Emergency Planning Committee, Emergency Management Director

Proposed Completion Date: 2009

Action Item: Implement the goals and strategies of the Palmer Open Space and Recreation Plan dealing with protection of floodplain, forests, and farmland.

Responsible Department/Board: Conservation Commission, Planning Board, Town Manager, Agricultural Commission

Proposed Completion Date: Ongoing

Hazardous Materials

Hazardous materials are in existence throughout Town, and are constantly being moved on Palmer'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 Palmer has some regulations currently in place to mitigate the impacts of a hazardous materials disaster.

Table 5-8: Existing Hazardous Materials Hazard Mitigation Measures

| Existing Strategy | | Description | Effectiveness | Potential Changes |
|--|----------------------------------|--|--|---|
| Zoning Ordinances | Water Supply Protection District | No hazardous materials permitted within areas delineated as recharge areas for groundwater aquifers. | Very effective for preventing groundwater contamination. | Update definitions to be consistent with State definitions. |
| | | Special permitted businesses must file hazardous materials management plan with Fire Chief and other Town officials. | Somewhat effective. | |
| Tier II Facilities Reporting | | Evacuation response plan required for each facility. | Effective | |
| Public Water Supply Emergency Response | | These response plans include various types of emergencies | Effective as each contingency plan is | |

| | | | |
|--|--|--|------|
| Plan (required by Massachusetts Department of Public Works). | and could include major fires, main pipe failures, contamination (long term and immediate health risk), long term electrical failures, floods, critical equipment failure and drought. | outlined specifically for each system. | |
| LEPC Annual Exercise | Exercises range from table top scenario to full scale exercise. | Effective | None |
| Post analysis review after actual events | Review of what went well; what did not | Effective | None |
| Annual posting that Tier II data available | Information of hazardous materials made available | Effective | None |

Future Mitigation Measures

Potential changes to the Town’s current strategies have been identified in the above table, and these are compiled below:

Action Item: Revise the Water Supply Protection Overlay District, using the state model from DEP, with a focus on clarifying the hazardous materials definitions,

Responsible Department/Board: Planning Board, Water Districts, Fire, Local Emergency Planning Committee, Emergency Management Director

Proposed Completion Date: 2009

6: PRIORITIZED IMPLEMENTATION SCHEDULE

Summary of Critical Evaluation

The Palmer Hazard Mitigation Planning Committee reviewed each of the recommendation future mitigation measures identified, and used the following factors to prioritize mitigation projects. This list of factors is derived from FEMA's STAPLE+E criteria.

- Ability to reduce loss of life
- Ability to reduce disaster damage
- Social acceptability
- Ability to complete or be combined w/other actions
- Technical feasibility / potential success
- Impact on the environment
- Administrative workability
- Ability to meet regulations
- Political acceptability
- Ability to save or protect historic structures
- Legal implementation
- Ability to meet other community objectives
- Economic impact
- The duration of its implementation period
- Environmental compatibility

Project Prioritization

The Palmer 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.

Table 6.1: Prioritized Implementation Schedule – Action Plan

| Mitigation Action | Responsible Department/Board | Proposed Completion Date/ Reporting Date | Funding Source | Estimated Cost |
|---|--|---|----------------------------------|----------------|
| Work with State of Massachusetts to understand and get training relative to Emergency Action Plan for Winsor Dam and Goodnough Dike. (If 1990 EAP for dam and dike are most recent, exert pressure for updates to these plans.) | Town Council, Emergency Management Director | 2008 and ongoing | Town Staff/Volunteers | NA |
| Work to attain regional status for Local Emergency Planning Committee and certification for all hazards emergency planning. | Emergency Management Director, Local Emergency Planning Committee, | ongoing | Town Staff/Volunteers | NA |
| Replace priority culverts on Stormwater Management Project List, pending availability of funding. | Department of Public Works | ongoing | Hazard Mitigation Grant Program | TBD |
| Work with Community Emergency Response Team to equip and maintain emergency response trailer. | Emergency Management Director | 2008 and ongoing | Town Staff/Volunteers and grants | TBD |
| Contact television channels 3, 22, and 40 to understand procedures for emergency notification as a way to supplement existing Connect-CTY emergency notification system. | Emergency Management Director | 2008 | Town Staff/Volunteers | NA |

| | | | | |
|--|--|------------------|-----------------------------------|---------|
| Implement the goals and strategies of the Palmer Open Space and Recreation Plan dealing with protection of floodplain, forests, and farmland, including working with head assessor to resolve taxation issues on open space. | Conservation Commission, Planning Board, Town Council, and Head Assessor | 2008 and ongoing | Town Staff/Volunteers | NA |
| Educate citizens living in the floodplain about the NFIP, pending availability of funding. | Building Inspector, Conservation Commission | ongoing | Town Staff/Volunteers, and grants | \$5,000 |
| Continue annual meetings with utility companies and secure phone numbers for contact during emergencies. | Local Emergency Planning Committee | ongoing | Town Staff/Volunteers | NA |
| Increase education and enforcement of burn permits; including pre-season review of regulations in public outreach campaign and/or invoking penalties for offenders | Fire Department | ongoing | Town Staff/Volunteers and grants | TBD |
| Revise the Water Supply Protection Overlay District bylaw, using the state model from DEP, with a focus on clarifying the definition for hazardous materials. | Planning Board, Water Districts, Fire, Local Emergency Planning Committee, Emergency Management Director | 2009 | Town Staff/Volunteers | NA |
| For special permits, introduce better background checks on developers, and introduce more inspections. | Planning Board, Conservation Commission | 2009 | Town Staff/Volunteers | NA |
| Collect, periodically update, and disseminate information on emergency information via town website on what to include in a 'home survival kit,' how to prepare homes | Local Emergency Planning Committee, Emergency Management Director | 2009 and ongoing | Town Staff/Volunteers and grants | \$8,000 |

| | | | | |
|--|---|------|----------------------------------|---------|
| and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster. | | | | |
| Revise earth removal ordinance to include requirement for cash or surety bond, and to introduce more monitoring and enforcement. | Planning Board | 2009 | Town Staff/Volunteers | NA |
| Obtain all most recent maps of inundation areas and evacuation routes for other high hazard dams. | Emergency Management Director | 2011 | Town Staff/Volunteers | NA |
| Establish true Emergency Operations Center, pending availability of funding. | Town Manager, Town Council, and Emergency Management Director | 2011 | Town Staff/Volunteers and grants | TBD |
| Ensure that all identified shelters have sufficient back-up utility service in the event of primary power failure. | Emergency Management Director | 2012 | Town Staff/Volunteers | NA |
| Educate citizens living in inundation zones about evacuation routes in case of dam failure, pending the availability of funding. | Emergency Management Director | 2012 | Town Staff/Volunteers and grants | \$6,000 |

7: PLAN ADOPTION & IMPLEMENTATION

Plan Adoption

Upon completion, copies of the Draft Local Hazards Mitigation Plan for the Town of Palmer were distributed to the town boards for their review and comment. A public meeting was held by the Palmer Town Manager to present the draft copy of the Palmer Local Natural Hazards Mitigation Plan to town officials and residents and to request comments from this committee and the general public. The Natural Hazards Mitigation Plan was formally approved by the Town Manager 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 Palmer Local Natural Hazards Mitigation Plan will begin following its formal adoption by the Palmer Town Manager and approval by MEMA and FEMA. Those town departments and boards responsible for ensuring the development of policies, bylaw revisions, and programs as described in Sections 5 and 6 of this plan will be notified of their responsibilities immediately following approval. The Palmer Local Emergency Planning Committee will oversee the implementation of the plan.

Palmer's Natural Hazards Mitigation Plan will also serve as a foundation document as the Town moves into the development of a comprehensive plan.

Plan Monitoring and Evaluation

The Palmer Emergency Management Director will call meetings of all responsible parties to review plan progress on an annual basis in each of the following years: 2009, 2010, 2011, 2012, 2013 and as needed (*i.e.*, following a natural disaster). The public will be notified of these meetings in advance through a posting of the agenda at Town Hall. Responsible parties identified for specific mitigation actions will be asked to submit their reports in advance of the meeting. Meetings will be organized and facilitated by the Emergency Management Director. Meetings will entail the following actions:

- Review events of the year to discuss and evaluate major issues, effectiveness of current mitigation, and possible mitigation for future events.
- Review and evaluate progress toward implementation of the current mitigation plan based on reports from responsible parties.
- Amend current plan to improve mitigation practices.

Following these discussions, it is anticipated that the committee may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. The committee will review and update the Palmer Local Natural Hazards Mitigation Plan

every five years. This plan will expire in 2015. The first updated plan will be submitted to MEMA and FEMA in the fall of 2014.



Town Council

Councillors

Paul E. Burns
President

Barbara A. Barry
Vice President

Philip J. Hebert
Council Clerk

Roger R. Duguay, Jr.

Michael R. Magiera

Raymond Remillard

Karl Williams

Eric Duda

William Heilman

Patricia A. Kennedy
Acting Town
Manager

4417 Main Street
Palmer, MA 01069
Town: (413) 283-2603

tcouncil@townofpalmer.com

December 13, 2010

Resolution 2011-10 – Adoption of Hazards Mitigation Plan

WHEREAS, the Town Council of the Town of Palmer, established a committee to prepare the Hazards Mitigation Plan; and

WHEREAS, several public planning meetings were held in 2008 regarding the development and review of the Hazards Mitigation Plan; and

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

WHEREAS, a duly-noticed meeting of the Town Council was held on December 13, 2010 to formally approve and adopt the Hazards Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED, that the Palmer Town Council hereby adopts the Palmer Hazards Mitigation Plan.

DATED: December 13, 2010

VOTED:

YES 6

NO

ABSTAIN

ABSENT 2


Philip Hebert, Council Clerk

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 |
| University of Massachusetts/Amherst..... | 413/545-0111 |
| Natural Resources Conservation Services (NRCS)..... | 413/253-4350 |
| MA Historical Commission..... | 617/727-8470 |
| U.S. Army Corps of Engineers..... | 978/318-8502 |
| Northeast States Emergency Consortium, Inc. (NESEC)..... | 781/224-9876 |
| National Oceanic and Atmospheric Administration: National Weather Service; Tauton, MA..... | 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) Internet Resources

| 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 | http://nemaweb.org | Association of state emergency management |

| | | |
|--|---|--|
| Association | | 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://ftpwww.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 |
| The Tornado Project Online | http://www.tornadoject.com/ | Information on tornadoes, including details of recent impacts. |
| National Severe | http://www.nssl.uoknor.edu/ | Information about |

| | | |
|--|---|--|
| Storms Laboratory | | and tracking of severe storms. |
| Independent Insurance Agents of America IIAA Natural Disaster Risk Map | http://www.iaaa.iix.com/ndcmap.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 – 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 |
| HMGF | 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 | Town Manager |
| BOH | Board of Health |
| LEPC | Local Emergency Planning Committee |
| EMD | Emergency Management Director |
| Con Com | Conservation Commission |
| EOC | Emergency Operations Center |
| CEM Plan | Comprehensive Emergency Management Plan |
| WMECO | Western Massachusetts Electric Company |
| HAZMAT | Hazardous Materials |

Appendix C – Natural Hazard Profiling Methodology⁵

In order to adeptly profile each of the hazards, 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, Previous Occurrences, Location of Occurrence, Extent of Impacts, Probability of Future Events, and Hazard Risk Index Rating. The Hazard Risk Index Rating was completed to rank the hazards according to the frequency of occurrence and the amount of potential damage likely to occur. The Hazard Risk Index Rating 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 as Table 3.1 (Chapter 3, page ??).

Previous Occurrences

Whether or not previous hazard events had occurred is indicated. Specific previous occurrences are described within the hazard identification and vulnerability assessments narrative in Chapter 3.

Location of Occurrence

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

| Table C.1: Location of Occurrence, Percentage of Town Impacted of Given Natural Hazard | |
|---|------------------------------------|
| Location of Occurrence | Percentage of Town Impacted |
| Large | More than 50% of the town affected |
| Medium | 10 to 50% of the town affected |
| Small | Less than 10% of the town affected |

Extent of Impacts

The extent of impacts describes the potential magnitude of damage an affected area could potentially suffer. Extent of impacts are classified according to the following scale:

| Table C.2: Extent of Impacts, Magnitude of Multiple Impacts of Given Natural Hazard | |
|--|--------------------------------------|
| Extent of Impacts | Magnitude of Multiple Impacts |

⁵ Source: information adapted from Town of Holden Beach, NC Community-Based Hazard Mitigation Plan, July 15, 2003, and Hyde County, NC Multi-Hazard Mitigation Plan, Sept 2002; and the Massachusetts Emergency Management Agency (MEMA).

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

Probability of Future Events

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

| Table C.3: Frequency of Occurrence and Annual Probability of Given Natural Hazard | |
|--|---|
| Frequency of Occurrence | Probability of Future Events |
| Very High | 70-100% probability in the next year |
| High | 40-70% probability in the next year |
| Moderate | 10-40% probability in the next year |
| Low | 1-10% probability in the next year |
| Very Low | Less than 1% probability in the next year |

Hazard Risk Index Rating

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 – Medium Low Risk

5 – Low Risk

Appendix D – Past & Potential Hazards/Critical Facilities Map

Appendix E – Documentation of the Planning Process

Incorporation of existing plans and other information

Existing plans, studies, reports and technical information were reviewed and incorporated throughout the planning process. This included significant information from the following key documents:

- ☞ *Palmer Comprehensive Emergency Management Plan* (particularly the Critical Infrastructure Section) – the Critical Infrastructure section was used to identify those infrastructure components in Palmer that have been identified as crucial to the function of the Town; also, this resource was used to identify special needs populations as well as potential emergency shortcomings.
- ☞ *Palmer Open Space and Recreation Plan* – this Plan was used to identify the natural context within which 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.
- ☞ *Palmer Community Development Plan*—this Plan was used to identify any action items that might prove successful, based on previous planning efforts.
- ☞ *Palmer Zoning Bylaw/Ordinance* - The Town’s Zoning Bylaw was used to gather and 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.
- ☞ *Subdivision Rules and Regulations*- These rules and regulations were used to gather and identify those actions that the Town is already taking that are reducing the the potential impacts of a natural hazard (i.e. floodplain regulations) to avoid duplicating existing successful efforts.
- ☞ *Draft State of Massachusetts’ Multi-Hazard Mitigation Plan* - This plan was used to ensure that the Town’s Hazard Mitigation Plan is consistent with the State’s Plan.

Town of Palmer
Hazards Mitigation Planning, Meeting #1
Tuesday, March 11, 2008
3 p.m.
Palmer Fire Station

1) Hazards Mitigation Planning Overview

- What is it?
- What is the process?
- What funding is available?

2) Organize Hazard Mitigation Planning Team

3) Identify Critical Facilities

- The following list contains items that should be clearly identified in the narrative and on the map, as they apply to your community:
 - Emergency Operations Center
 - Emergency Fuel Facilities
 - Town/City Hall
 - Police Station
 - Fire Station
 - Public Works Garages
 - Water Treatment Facilities
 - Sewage Treatment Plants
 - Water Tower/Supply Pumps
 - Power Plants
 - Electrical Power Substations
 - Schools
 - Major Highways and Roadways
 - Bridges
 - Dams
 - Nursing Homes
 - Elderly Housing
 - Day-Care Facilities
 - Correctional Facilities
 - Other Congregate Care Facilities
 - Shelters
 - Special Needs Populations
 - Hazardous Materials Facilities
 - Access Roads to Critical Facilities
 - Evacuation Routes
 - Unique or Historic Resources
 - Commercial Economic Impact Areas
 - Socio-Economic Impact Areas
 - Areas with Second Language Needs
 - Hospitals

4) Homework for next meeting

- Think about critical facilities and the evacuation routes potentially affected by hazard areas. (Chapter 4)
- Review pages 9-26 in Chapter 3 and provide additional details and information about hazards wherever possible.

5) Schedule next meeting

- Agenda and posting of meetings

**Town of Palmer, Hazard Mitigation Planning
Meeting #2
Tuesday, April 15, 2008, 1 to 3 p.m.
Palmer Fire Station**

1. Review Revised List of Critical Facilities and Map (Chapter 4)
2. Review Critical Facilities and Evacuation Routes Potentially Affected By Hazard Areas (Chapter 4)
3. Discuss history of following natural hazard events (Chapter 3, pages 9-26 of draft plan):
 - Flooding (100-year)
 - Flooding (localized)
 - Severe Snow/Ice Storm
 - Hurricanes/Severe Wind
 - Tornadoes/Microbursts
 - Wildfires/Brushfires
 - Earthquakes
 - Dam Failure
 - Drought
 - Man-Made Hazards—Hazardous Materials
4. Review Vulnerability Assessment Methodology and Potential Loss Estimates (Chapter 3)
5. Profile Hazards (Chapter 3 and Appendix C)

Homework for next meeting

- Think about development trends and come prepared to discuss. Local zoning districts, planned and proposed subdivisions and other common developments. Is planned development at risk by natural hazards? Are there mitigation measures that can be taken to prevent loss of life, property damage, and disruption of governmental services and general business activities. (Chapter 2, page 7 of draft)
- Review Chapter 5 and think about which mitigation strategies make sense, and what needs to be added.

TOWN CLERK: Please Post this notice per M.G. L. Chapter 39, Section 23, A-C

Town of Palmer–Hazard Mitigation Planning

c/o Pioneer Valley Planning Commission, 26 Central Street West Springfield, MA 01089

MEETING NOTICE

Date: Tuesday, May 6, 2008
Time: 1 to 3 p.m.
Place: Palmer Fire Station

Agenda

1. Provide comments on history of natural hazard events, Chapter 3
2. Review Vulnerability Assessment Methodology and Potential Loss Estimates, Chapter 3
3. Profile Hazards, Chapter 3 and Appendix C
4. Discuss development trends to inform narrative in Chapter 2, page 7 of draft
(What are the planned and proposed subdivisions and other common developments? Is planned development at risk by natural hazards? Are there mitigation measures that can be taken to prevent loss of life, property damage, and disruption of governmental services and general business activities?)
5. Review and discuss goal statement (Chapter 5, page 34 of draft)
6. Identify Mitigation Strategies for Natural Hazards (Chapter 5)
7. Schedule next meeting when will:
 - Prioritize and Schedule Mitigation Strategies (Chapter 6, page 51 of draft)
 - Review Plan Adoption and Implementation (Chapter 7)

TOWN CLERK: Please post this notice per M.G.L. Chapter 39, Section 23b.

Town of Palmer–Hazard Mitigation Planning

c/o Pioneer Valley Planning Commission, 26 Central Street West Springfield, MA 01089

MEETING NOTICE

Date: Tuesday, May 27, 2008
Time: 1 to 3 p.m.
Place: Palmer Fire Station

Agenda

1. Review and discuss goal statement (Chapter 5, page 34 of draft)
2. Identify Mitigation Strategies for Natural Hazards (Chapter 5)
3. Prioritize and Schedule Mitigation Strategies (Chapter 6, page 51 of draft)
4. Review Plan Adoption and Implementation (Chapter 7)
5. Review updates to Hazard Mitigation map
6. Discuss draft plan review process

TOWN CLERK: Please post this notice per M.G.L. Chapter 39, Section 23b.

Appendix F – Public Outreach

PRESS RELEASE

CONTACT: Catherine Miller, Pioneer Valley Planning Commission, (413) 781-6045

FOR IMMEDIATE RELEASE
December 14, 2007

Pre-Disaster Mitigation Plans Under Development

The Pioneer Valley Planning Commission is beginning the process of drafting pre-disaster mitigation plans for the Communities of Amherst, Belchertown, Brimfield, Chicopee, Cummington, Goshen, Granby, Huntington, Palmer, Southampton, Springfield, Westfield, West Springfield, Westhampton, Williamsburg, and Worthington.

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.

Individuals interested in their community's Hazard Mitigation plan can contact PVPC to request information on their community's plan development. In 2006-2007, PVPC facilitated development of plans for 16 communities in Hampshire and Hampden counties. Following completion of this second round of 16 hazard mitigation plans, PVPC will be developing a regional Hazard Mitigation plan. 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. For additional information, please contact Catherine Miller at (413) 781-6045 or cmiller@pvpc.org.

PRESS RELEASE

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FOR IMMEDIATE RELEASE

June 30, 2008

Pre-Disaster Mitigation Plans Public Comment Period

The Pioneer Valley Planning Commission is produced drafts of pre-disaster mitigation plans for the communities of Cummington, Palmer, Southampton, Westfield and Westhampton. Residents, business owners and other concerned parties of the named municipalities as well as of adjacent communities are encouraged to comment on each and all of the plans. The plans are currently able to be viewed on the Pioneer Valley Planning Commission website (under Projects and Plans) and the websites of the municipalities, where possible. Paper copies of the plans may be obtained at the Pioneer Valley Planning Commission offices at 26 Central Street, West Springfield or at the individual City/Town Halls. The plans will be available for the next 30 days.

Over the upcoming months pre-disaster mitigation plans will be developed for Amherst, Belchertown, Brimfield, Chicopee, Goshen, Granby, Huntington, Springfield, West Springfield, Williamsburg, and Worthington and will also be available for public comment as they are developed.

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