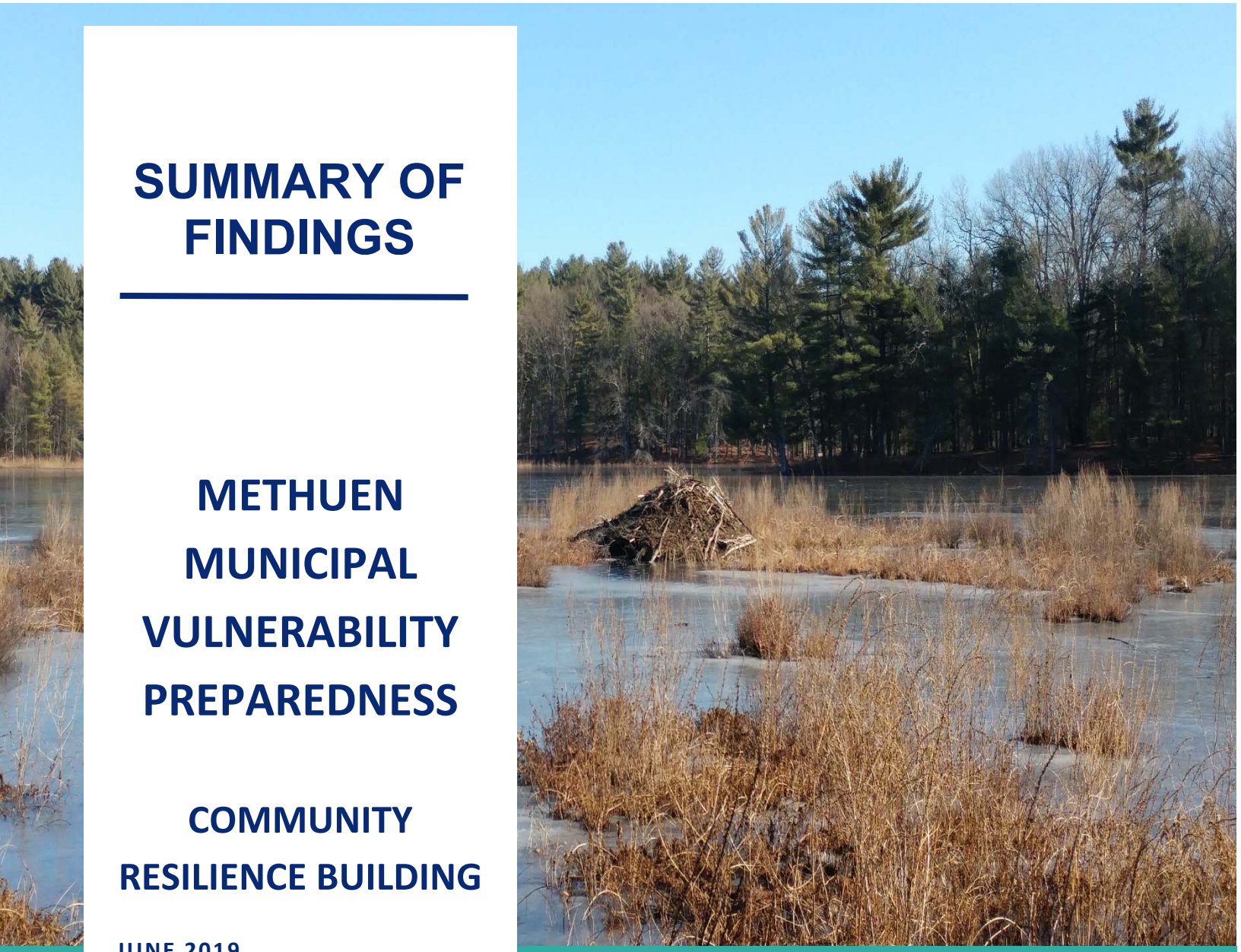
# SUMMARY OF FINDINGS



# METHUEN MUNICIPAL VULNERABILITY PREPAREDNESS

## COMMUNITY RESILIENCE BUILDING

**JUNE 2019**


## CITY OF METHUEN

**With assistance from**
**Merrimack Valley Planning Commission**
**& Horsley Witten Group**

# Table of Contents

# Overview

## Executive Order 569 and the Massachusetts Municipal Vulnerability Preparedness Program

Governor Baker in September 2016 issued Executive Order 569, directing the Secretary of the Energy and Environmental Affairs and the Secretary of Public Safety and Security to coordinate efforts across the Commonwealth to strengthen the resilience of communities, prepare for the impacts of climate change and mitigate damage from extreme weather events. The state agencies were charged with establishing a framework that each community could use to assess local vulnerabilities to climate change and to develop appropriate action-oriented response strategies.

The Commonwealth's agency response is the Municipal Vulnerability Preparedness Grant Program (MVP) which provides Massachusetts communities with support to plan for resilience and implement key adaptation actions. The MVP framework, developed by The Nature Conservancy, employs a workshop-based model designed to help local stakeholders in:

- Characterizing climate-related and extreme weather hazards of highest concern to the community;
- Understanding the science of climate change and adaptation. EOEEA has established a website www.resilientma.org as a data clearinghouse for science and state-specific geographic data on climate change;
- Identifying existing and future vulnerabilities and asset strengths in areas of infrastructure and critical facilities, socio-economic characteristics and environmental resources;
- Developing and prioritizing actions for community resilience based on identified opportunities for risk reduction and resilience building;
- Implementing key actions through community partnerships.

With completion of the resilience building planning process, a city/town can become a formally designated MVP community, eligible for MVP action grants to undertake technical plans as well as design and construct priority resilience projects.

In 2018, the City of Methuen, seeking to become an MVP-designated community, applied for and received an MVP Planning Grant to organize a community resilience building planning workshop, which took place on May 23, 2019.

Working groups focused on discussing priority actions at the May 23rd workshop held at the Methuen Armory (MVPC Photo)

Invitations were distributed to approximately 120 stakeholders with excellent participation of more than 35 people. The workshop was facilitated by MVPC in collaboration with Horsley Witten and was held at the Armory on Lowell Street. The morning focused on characterizing the City's top hazards followed by small table group discussions to identify community features most vulnerable to natural hazards exacerbated by climate change and define community assets that contribute to mitigating risk and aiding recovery. The afternoon centered on discussion of actions in the realms of infrastructure, society and environment where the City can undertake to build a more resilient Methuen and better prepare for future emergencies.

After an introduction from Mayor Jajuga, table discussions got underway (MVPC Photo)

# Planning Project Vision Statement

Methuen core team members developed the following vision for the City's Municipal Vulnerability Preparedness planning project:

Through a series of Community Resilience-Building workshops, Methuen seeks to develop an action plan to substantially and sustainably improve its resilience to and preparedness for local climate-related hazards. Methuen seeks to achieve this by:
(1) defining extreme weather and climate-related hazards impacting the City;
(2) identifying Methuen's strengths and vulnerabilities regarding each of these hazards, now and in the future; and
(3) developing a prioritized action plan to improve Methuen's resilience to and preparedness for these hazards.

In developing this action plan, the following factors should be considered:

- Maintaining and improving quality of life in Methuen
- Maintaining fiscal balance and stability despite large and unforeseeable municipal expenses during and after events
- Maintaining communication pathways, and information technology systems, during events (including power outages)
- Maintaining water quality and protecting our natural resources through changing conditions
- Maintaining and replacing aging infrastructure to withstanding current and future hazards
- Protecting transportation systems against hazards, including: 1) pothole maintenance from multiple freeze-thaw periods and 2) public transportation reliability
- Avoiding and mitigating damage to private and public property during events
- Providing emergency shelter options to vulnerable populations during events
- Culling at-risk trees and removing fallen trees during storms in a timely manner
- Avoiding poor air quality as temperatures rise, especially during heat waves
- Accommodating increasing energy use and the resulting strain on the electrical grid during heat waves
- Managing insects, pests, and wildlife with changes in precipitation patterns and increasing temperatures

## The Workshop Planning and Project Prioritization Process

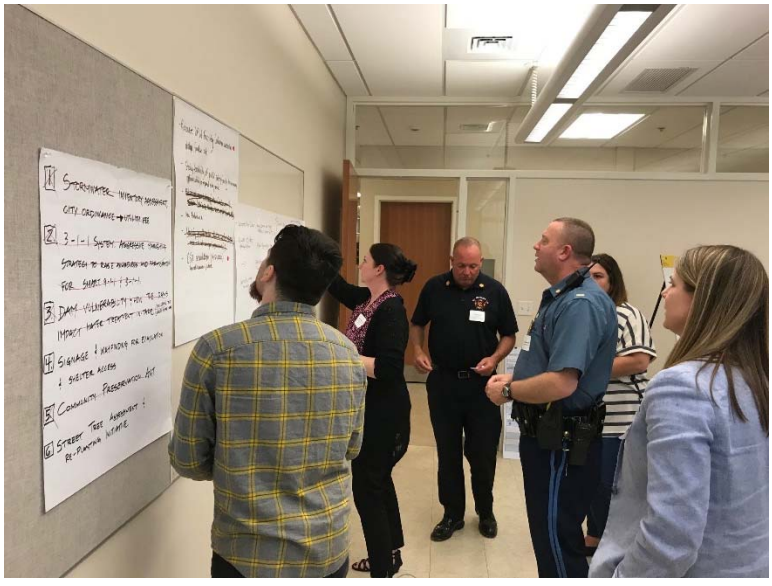
An Agenda for the May 23, 2019 workshop and presentations from that day are attached as appendices.

As noted above, the morning portion of the workshop included opening presentation with summaries of the MVP Program and planning framework, climate change data and projections and Methuen's history of hazard events. In table discussions, participants identified and categorized as strengths and/or vulnerabilities critical community infrastructural, societal and environmental features. This information was recorded on a matrix for each category and is attached to this summary.

At the start of the afternoon portion of the workshop, participants focused table discussions on actions that either enhance community strengths or mitigate hazards that may be exacerbated by climate change. These actions were recorded in the matrices. Individuals then voted on their top three action items identified at their table.

Lead facilitators from MVPC and Horsley Witten guided table discussions of 8-10 people aided by volunteer scribes. Each table delegated a volunteer to report out for the table in the large group discussion.

At the end of the afternoon session, similar actions from each table were consolidated and participants voted across the three categories to select the top recommended priority resilience projects for Methuen.



Public safety officials and citizens considering action items for Methuen at the May 23rd Workshop (MVPC Photo)

# Planning Context

## Climate Data for Methuen and the Merrimack River Basin

Nine of the ten warmest years on record have all occurred since 2005, according to the U.S. National Oceanographic and Atmospheric Administration. Average global temperatures have risen steadily in the last 50 years. Scientists warn that the trend will continue unless greenhouse gas emissions are significantly reduced. [1]

What does this mean for Methuen? Here are some of the statistics:

**Changing Temperatures**

- From 1971 to 2000, the Merrimack River Watershed basin and the Merrimack Valley annually had an average of 7 days with temperatures above 90 degrees Fahrenheit.
- By the end of the century, Methuen and the region are projected to have fourteen (14) to as many as seventy-two (72) more days per year with temperatures rising above 90 degrees.
- The area can expect shorter, milder winters with seven (7) to twenty-nine (29) fewer winter season days yearly with temperatures below freezing on average.
- Mean annual temperatures in Massachusetts are expected to be 3.8-10.8°F warmer than over recent decades.
- Total heating degree days will be 15-37% lower, but cooling degree days are projected to triple by century's end.
- The agricultural season will be longer, with growing degree days expected to increase by 30 to 100%.[2]

**Changing Precipitation**

- Total annual precipitation at century's end is projected to increase by as much as 18% above the 1971-2000 baseline of 45", with most high precipitation events concentrated in the winter and spring months.
- Winter precipitation is expected to increase by as much as 36%. Winters are projected to get wetter with more precipitation occurring as rain or freezing rain, rather than snow because of the increase in temperatures.

- For summer and fall seasons, data projections are showing variable precipitation levels with potential for a moderate change in the number of consecutive dry days (less than 1 mm precipitation).
- The 1971 to 2000 baseline is 17 on average annual consecutive dry days and that is projected to increase by 3 days at the end of this century.[3]

## More Frequent, Intense Storms

According to the Fourth National Climate Assessment issued in 2018, heavy precipitation events in most parts of the United States have increased in both intensity and frequency since 1901. There are important regional differences in trends, with the largest increases occurring in our northeastern United States.

The frequency and intensity of heavy precipitation events in Methuen and the Merrimack Valley are projected to continue to increase throughout the 21st century. The northern United States, including New England, is projected to receive more intense precipitation events in the winter and spring, while parts of the southwestern United States are projected to receive less precipitation in those seasons.

Consequences of more extreme storm events include threats to transportation, water, sewer, stormwater and power infrastructure, as well as disruptions to local economies and increased public health and safety risks with more demands on local government and first responder capacity.

March 2018 Nor'easter in Methuen
Photo credit: MVP Library

[1] https://www.noaa.gov/news/2018-was-4th-hottest-year-on-record-for-globe

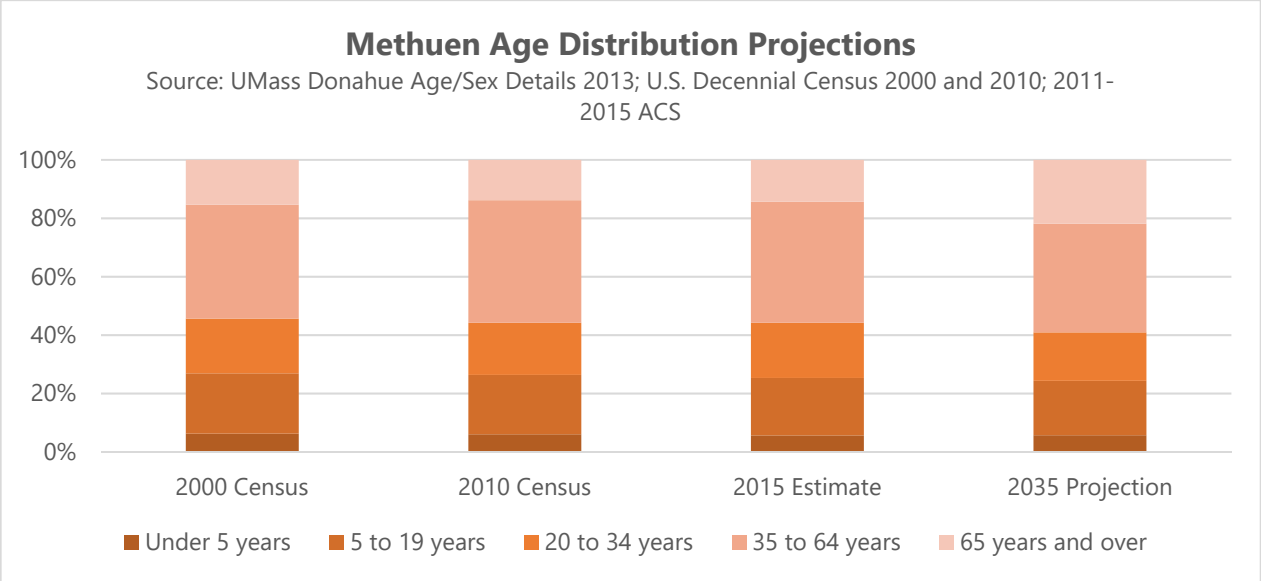
[2] http://www.resilientma.org/resources/resource::2152 National Climate Science Center at the University of Massachusetts Amherst, Massachusetts Climate Change Projections, March 2018.

[3] Ibid.

# Planning Context

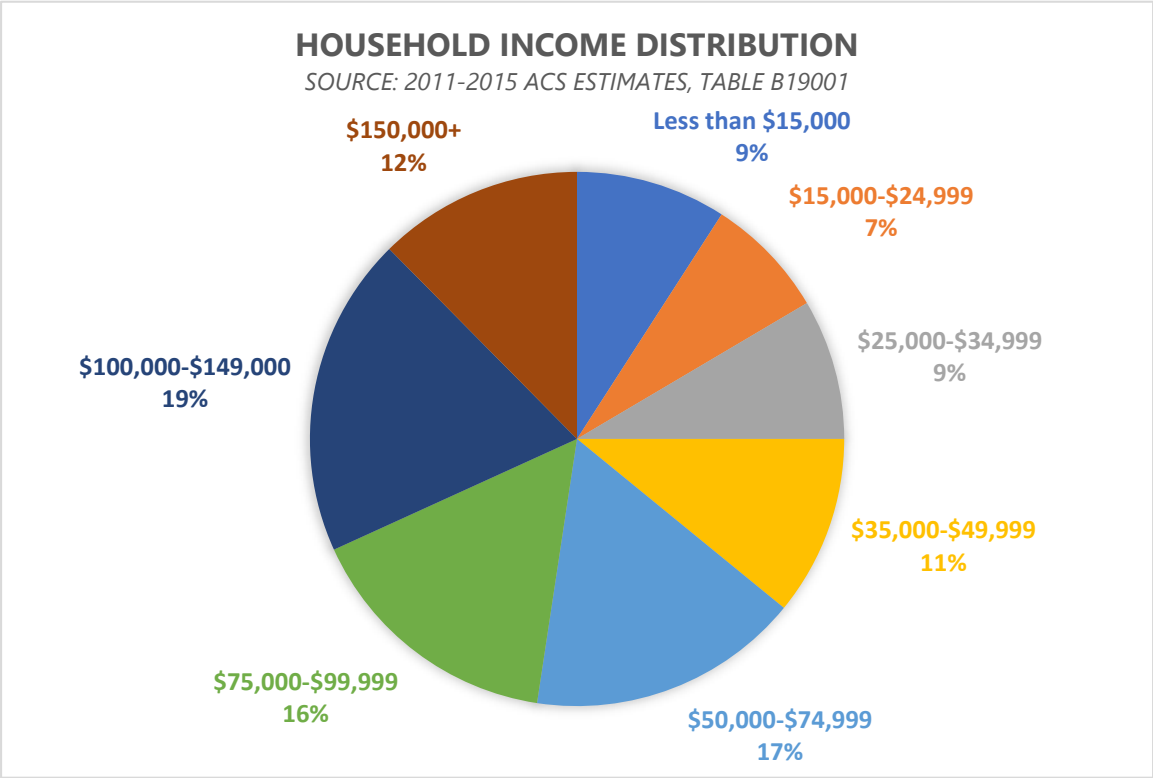
## Methuen Demographics

- Methuen's population is growing faster than the region, however household growth is much slower due to increased average household size. Projections indicate a continued growth in the coming years and a potential need for increased housing units overall.
- The composition of Methuen's households has changed with more households with children. Single-person households increased less than 1 percent and households with children increased almost 8 percent between 2000 and 2015.
- The age composition of Methuen's population is projected to change with a substantially greater number of older adults (age 65 year and over), which is anticipated to almost double between 2015 and 2035.




- The region is becoming more racially and ethnically diverse, as is Methuen. Methuen has a growing population that ethnically identifies as Hispanic/Latino – increasing from 10 percent of the total population in 2000 to about 23 percent in 2015.
- Methuen's population has comparable disability rates to the region across all age ranges, including an estimated 33 percent (about 2,209) of older adults age 65 years and over with disabilities.

- Methuen's households have slightly lower median income than households in the region, with renters having lower income than owners, as is typical, and slightly higher income than the regional weighted mean renter income. Poverty rates in Methuen are lower than the region, with an estimated 10 percent of the population living in households below the federal poverty thresholds.



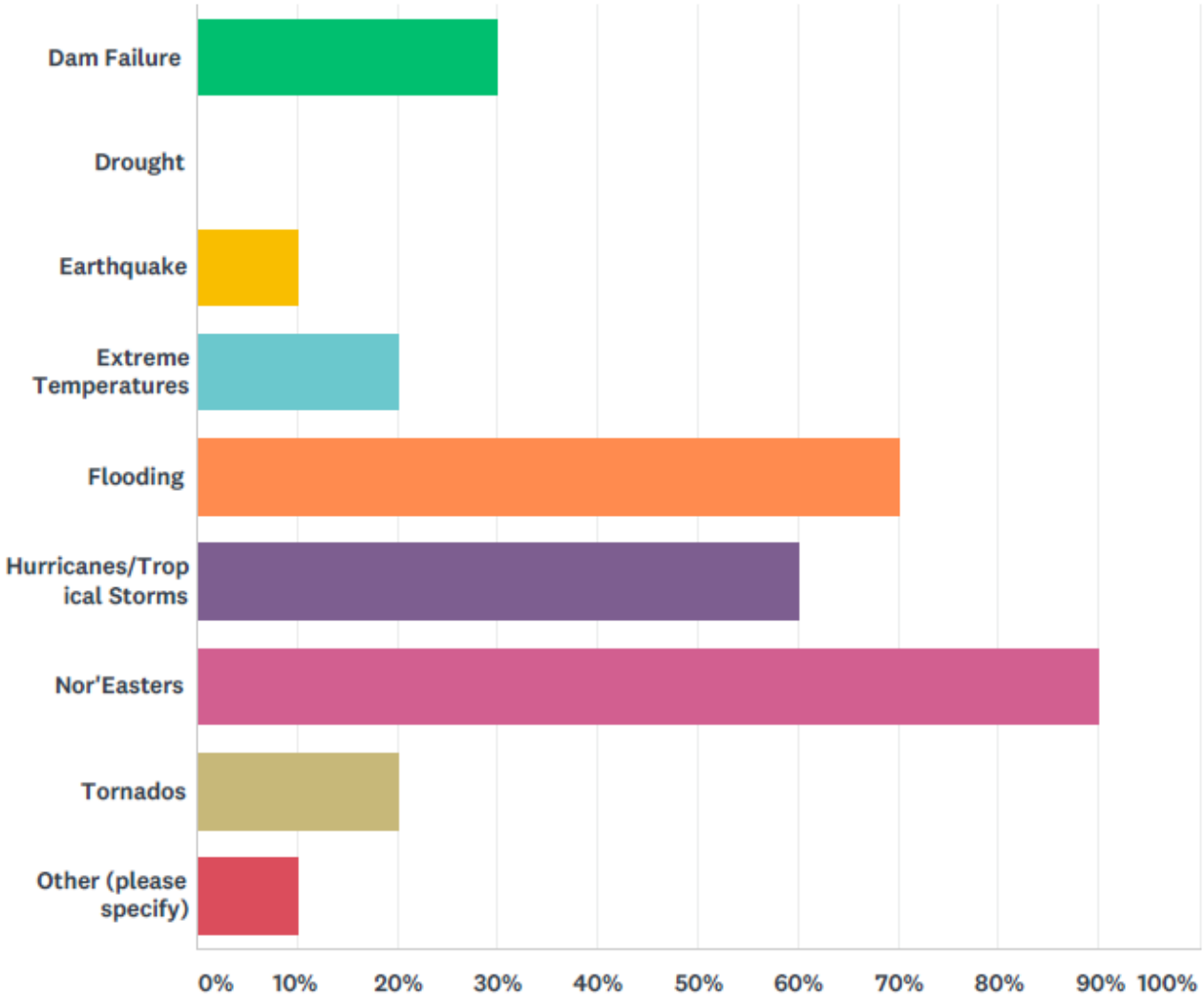

- About 71 percent of Methuen's households own and 29 percent rent their home, which is a lower percentage of renter households than in the region overall.[4]
- Methuen has designated Environmental Justice areas[5] in the area near Lawrence, extending along the Route 213 corridor and north toward the New Hampshire border.

[4] City of Methuen Housing Production Plan 2018-2022 prepared by Merrimack Valley Planning Commission with JM Goldson community preservation & planning

[5] Since 2002, the Massachusetts Executive Office of Energy and Environmental Affairs has been implementing an Environmental Justice (EJ) Policy to help ensure that all Massachusetts residents experience equal protection and meaningful involvement with respect to development, implementation, and enforcement of environmental laws, regulations, and policies, and the equitable distribution of environmental benefits.

# Top Hazards for Methuen

In preparation for the community resilience workshops, the project team sent out a community survey asking stakeholders to identify the top four potential hazard events of most concern. Ten people responded to the survey question, which generated the following response levels.



Informed by the survey, the Core Team characterized the top Methuen hazard concerns as follows:

## City of Methuen Primary Hazard Concerns Identified

**Nor'easters**

Storms of heavy winds and rain along with severe winter storms are the most frequent naturally occurring hazard in Massachusetts. And with climate change, the intensity and frequency of these storms will rise. Nor'easters have caused major tree damage and infrastructure disruption to Methuen, memorably in March 2018 and Oct. 2017 when storms precipitated road closures and extended power outages.

**Flooding**

Significant parts of the City lie within the floodplain of the Merrimack and Spicket Rivers, and as such are subject to recurring and sometimes highly damaging flooding. Risk of flooding events are heightened by the effects of climate change which portends higher precipitation levels in Winter/Spring seasons and more frequent, intense storms. In fact, parameters of the so-called 100-year storm are changing. In the 1960's, a 24-hour event that produced 6.5 inches of rain was categorized as a 100-year storm. By 2015, threshold for the 100-year storm (i.e. storm with 1% occurrence odds in any year) was 8.4 inches of rain over 24 hours. [6] Significant flood events occurred in Methuen most recently in Spring 2010 and the Mother's Day Flood of 2006, which inundated much of the Swan Street and Jackson Street area for up to a week, shutting down commercial establishments and forcing the evacuation of numerous residences. In addition, the May 2006 flood saw the Spicket River's surging floodwaters overtop the downtown dam and threaten the abutment, requiring City public safety crews to deploy sandbags to contain the water and prevent further scouring and erosion. According to the U.S. Geological Survey (USGS), the Spicket River peaked at 2,080 cubic feet per second.

[6] https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html National Oceanic and Atmospheric Administration, Atlas 14 Precipitation Frequency Atlas of the United States & Technical Paper # 40, U.S. Dept. of Commerce.

## Hurricanes/Tropical Storms

A 2017 U.S. Climate Science Special Report noted that there has been an upward trend in North Atlantic hurricane activity since 1970. The report forecasts that future hurricanes formed in the North Atlantic will drop more rain and may have higher wind speeds. This is because a warmer atmosphere will hold more water, and hurricanes are efficient at wringing water out of the atmosphere and dumping it on land. [7] Extreme tropical storms travel over inland areas and may release large quantities of precipitation causing rivers to overtop their banks flooding roads and damaging infrastructure.

## Dam Failure

Dams as well as bridges and culverts, many installed in the first half of the 20th century or earlier, are all vulnerable to extreme storm events. The Spicket River flows south through Methuen from Salem, NH, and is divided into three distinct sections by considering the different reaches of the river created by two dams. The first section extends from the New Hampshire state line south to the dam at Lowell Street. This area has a large floodplain, a portion of which, known as the Nevins Pond and Wildlife Area, is under the management of the Methuen Conservation Commission. The development pressure on this section of the river corridor is significant due to its rural character and prime location at the Interstate 93 and Route 213 interchange. This section also contains the only sizeable floodplain for its run in Massachusetts, and the last floodplain which can mitigate the detrimental effect of floodwaters before they enter the urbanized sections of Methuen and Lawrence. The remaining two reaches are in a more urban setting with floodplain development up to the riverbanks.

The second section, extending from the Lowell Street dam to the Memorial Music Hall dam on Broadway, has minimal open land. A high, steep banking along the Union Street side is subject to erosion and needs attention. The dam located at the Music Hall was repaired in the 1990s and this significantly improved this scenic spot. The last section of the Spicket River extends from the Music Hall dam to the Lawrence city line. A continuous strip of land on the north side of the river, from the bridge on Broadway to the Neil Playstead on Lawrence Street, should be maintained as a green corridor. Even though the Spicket River is a small river, every spring its floodwaters frequently spill over its banks into adjoining wetlands and have inundated and damaged numerous homes and businesses.

[7] http://www.resilientma.org/resources/resource::2152 National Climate Science Center at the University of Massachusetts Amherst, Massachusetts Climate Change Projections, March 2018.

# Concerns & Challenges Presented by Hazards and Climate Change

## Methuen Infrastructure & Critical Facilities – Vulnerabilities Identified

**Roadways, Bridges and Culverts:** Methuen is located near two interstate highways, I-93 and I-495, and is served by State Routes 28, 110, 113, and 213. Methuen has approximately 200 miles of roadway, of which 165 miles are owned and maintained by the City. Workshop participants described the City's unique shape with a constriction in the middle causing bottleneck issues which would be enhanced in an evacuation/emergency and could potentially cut residents off from vital services. Bridges and undersized culverts can act as choke points restricting stream flow. Significant parts of the City of Methuen lie within the floodplains of the Merrimack River and the Spicket River and are subject to recurring (and sometimes highly damaging) flooding. A GIS analysis of the City's FIRM flood hazard area maps by MVPC in 2012 determined that 1,938 acres (3.0 square miles) of land area in Methuen is located within the 100-year floodplain, which is vulnerable to flooding. An additional 727 acres (1.1 square miles) lies within the 500-year floodplain. Together, these two flood zones constitute nearly one-fifth (18.1%) of the total area of the community. According to the City's Comprehensive Emergency Management Plan (CEMP), the Merrimack River generally floods along Armory and Lowell Streets. The Spicket River generally floods where it approaches Methuen on Hampshire Road, the center of the city along Pine Street, Horne Street, Bentley Circle, and occasionally on Cross and Pelham Streets. Workshop participants cited flooding of concern near Reservoir and Lowell Streets as well as in the central downtown area.

Workshop participants identified several culverts of concern including one at Brook and Jackson Streets and another at the intersection of Jackson and Swan Streets. Evaluation of these culverts including their drainage areas and flows was recorded as a needed action.

**Dams:** Methuen has two privately-owned dams: the Lowell Street Dam and the Music Hall Dam on Broadway. The dam located at the Music Hall was repaired in the 1990s and this significantly improved this scenic spot. Workshop participants expressed

concern for the dam operated by Olsen Electric in New Hampshire, citing a need for better communication between the City and the dam's owner. Flood gates on the Lowell Street Dam were also a cited concern.

**Utilities:** National Grid is the electricity distributor for Methuen and maintains a regional grid network that includes six substations, limited underground conduit and extensive overhead wires considered highly vulnerable to intense storms and associated winds as well as extreme heat. The City suffered prolonged power outages from a series of Nor'easters in October 2017 and again in March 2018, impacting residents, businesses, schools and local government as up to 80% of the City was without power for at least four successive days. Columbia Gas provides natural gas supply to Methuen. Vulnerability of aging gas infrastructure was tragically demonstrated in the September 2018 explosions which occurred through accidental over pressurization of 100-year-old gas lines in the neighboring Merrimack Valley communities of Lawrence, Andover and North Andover. The Maritime New England gas pipeline, a cross country pipeline which runs through Methuen, was also identified as a vulnerability.

**Water, Sewer & Stormwater Infrastructure:** Methuen's water, sewer and drainage infrastructure is vulnerable because of age and condition in some areas but is also a strength in mitigating hazards and protecting public health.

Methuen's primary drinking water supply source is the Merrimack River (MassDEP Source I.D. #3181000-1S). The Massachusetts Surface Water Quality Standards classify the Merrimack River as a Class B waterway. This means that the water withdrawn for drinking water purposes must be treated prior to delivery and consumption. Water pumped from the Merrimack River is treated at the City-owned water treatment plant, located on Burnham Road, before being distributed through the system to area homes, institutions, and businesses. With the Merrimack's large watershed and high-flow volumes, capacity is not an issue for the communities that withdraw, but water quality is another concern. The river passes through densely-developed urban areas where stormwater runoff and other sources of pollution are important issues. Workshop participants expressed concern for the intake, as well as concern for upstream Combined Sewer Overflows (CSOs). A desire for an alternative water supply source (drinking and fire protection) was a top-rated action.

With the exception of a few, isolated rural sections, most of Methuen is part of the public wastewater system. The City is a member of the Greater Lawrence Sanitary

District (GLSD), a regional wastewater management district that also includes Lawrence, Andover, North Andover, and Salem, NH. GLSD's wastewater treatment plant is located in North Andover, with maximum treatment capacity of 52 million gallons of wastewater per day. While the GLSD system currently processes fewer gallons per day than design, there are specific elements of the Methuen system that are vulnerable to flooding events that result in CSOs. Methuen has 105 miles of sewer lines to collect and transport wastewater to the GLSD treatment plant.

The Greater Lawrence area is one of 772 urban areas across the country with a combined sewer/drainage system at its urban core. Other cities with combined sewer overflow (CSO) systems on the Merrimack River include Manchester and Nashua, NH and Lowell and Haverhill, MA. Under normal conditions, the combined sewer system collects rainwater runoff, industrial wastewater and domestic sewage all in one pipe and transports flows to the regional treatment plant. Heavy rainfall events, however, can overtax system capacity and cause combined sewer overflows (CSOs) with discharges of untreated sewage and street runoff into the Merrimack River. With more intense precipitation events generated by climate change, the concern is that the number of CSOs will increase despite long-term control plans and investments by wastewater treatment operators including GLSD.

According to MVPC GIS data, Methuen maintains 6,803 catch basins, 690 outfalls and 2,696 drainage manholes. In 2016, the U.S. EPA and MassDEP updated the permit regulating municipal management of separate storm sewer systems (MS4s). It went into effect in 2018 and requires that urbanized Massachusetts communities, including Methuen, take proactive steps to implement tracking systems to guard against illicit discharges that could pollute waterways. The permit also prescribes maintenance of stormwater infrastructure and mandates promotion of low impact development techniques including nature-based stormwater treatment systems. This increased maintenance and oversight could be a strength as the community works to improve the quality of its waterways.

**Municipal Facilities & Resources:** Workshop participants identified the DPW Facility as a top concern due to its location on Lindberg Avenue, access to which is prone to flooding. A conceptual design for a new DPW facility has been completed, and workshop participants wanted to see that plan advance. A final location for the new facility would be needed. Antiquated public safety facilities were identified, including Fire Station #2 on Sawyer Street. A new ambulance was also recognized as a community need.

## Methuen Societal Features – Vulnerabilities Identified

**Senior, Disabled, Youth and Non-English Language Households**: Methuen's population is growing faster than the region and is becoming more ethnically and racially diverse. The age composition of Methuen's population is also changing with a substantially greater number of older adults (over 65) with approximately 33 percent identified with a disability.[8] The number of residents considered vulnerable to hazard events and climate change include an increasing senior population, significant numbers of youth and a diversity of households with non-English speakers. Communications and emergency protocols are a challenge particularly in messaging to Methuen's non-English speakers and over-65 population. Methuen has a reverse 911 system that requires registration and may not be accessible for those who may be unfamiliar with the technology. Messaging in the various languages spoken in Methuen is not currently available.

**Vulnerable Populations within Methuen's Housing Complexes:** Methuen has a significant and growing senior population, many of whom wish to either age in place in their current home or in their community. There are several housing options within the City, which cater to the spectrum of potentially vulnerable residents – those over 65, disabled, extremely low-income and those within facilities with a medical component (i.e. nursing homes and assisted living facilities). A list of housing complexes is provided below:

| | |
|---|---|
| Appleton Square | East Street |
| Cedar View Rehabilitation Center | Jackson Street |
| Cedars Home | Pelham Street |
| Grace Morgan House | Prospect Street |
| Halcyon Rest Home | Berkeley Street |
| Mill Falls Apartments | Osgood Street |
| Merrimack Valley Apartments | Calumet Road |
| Methuen Housing Authority | Broadway, Edgewood Avenue & Mystic Street |
| Methuen Village Assisted Living | Gleason Street |
| Nevins Manor/Nursing/Rehab/Day Health | Ingalls Court |
| Park Gardens Apartments | 10 Burnham Road |

[8] City of Methuen Housing Production Plan 2018-2022 prepared by Merrimack Valley Planning Commission with JM Goldson community preservation & planning

The need to consider emergency plans for vulnerable populations was highlighted as part of the need for better planning and communication.

Spicket River Mother's Day 2006 (MVPC Photo)

**Vulnerable Neighborhoods:** Even though the Spicket River is a small river, every spring its floodwaters frequently spill over its banks into adjoining wetlands and have inundated and damaged numerous homes and businesses from the downtown area to the Lawrence city line.

**Access to Regional Services:** Methuen is served by a regional hospitals and various medical facilities including Holy Family Hospital on East Street in Methuen. Workshop participants raised concerns about limited access to medical facilities, shelters and other emergency services in the event of flooding or downed trees along arterial streets. Methuen previously had a Citizen Emergency Response Team (CERT) that several participants would like to see revived. Emergency response planning and communication topped the list of action items at several of the table discussions.

Wind damage to a Longwood Drive home from October 2017 Nor'easter (Photo Credit: Eagle Tribune)

## Methuen Environmental Features – Vulnerabilities Identified

**Resource Areas:** Methuen boasts several water resources and protected conservation lands. One of Methuen's prized natural resources is the Merrimack River. More than six miles of the river's 110 miles run through the city. Beginning at the West End boundary with Dracut, this magnificent river corridor offers Methuen and other communities in the area outstanding opportunities for active and passive recreation, nature education, and habitat preservation.

The Spicket River flows south through Methuen from Salem, NH, and may be divided into three distinct sections by considering the different reaches of the river created by two dams. The first section extends from the New Hampshire state line south to the dam at Lowell Street. This area has a large floodplain, a portion of which, known as the Nevins Pond and Wildlife Area, is under the management of the Methuen Conservation Commission. The development pressure on this section of the river corridor is significant due to its rural character and choice location at the Interstate 93 and Route 213 interchange. This section also contains the only sizeable floodplain for its run in Massachusetts, and the last floodplain which can mitigate the detrimental effect of floodwaters before they enter the urbanized sections of Methuen and Lawrence. The remaining two reaches are in a more urban setting, with floodplain development up to the river banks.

Despite these areas, workshop participants expressed concern about the lack of open space preservation occurring in Methuen and prioritized protection of open space in the face of development pressures. Participants advocated for tree planting as well as a program to remove hazardous trees.

As in many urban areas, land development in Methuen has the potential to adversely impact the local environment. Impacts can occur during and after construction as vegetation is altered and topsoils are disturbed, temporarily allowing wind, rainfall, and snowmelt to increase erosion, sedimentation, and stormwater runoff. In Methuen, stormwater runoff contributes to the periodic impairment of local water quality, most notably in the larger surface waters of the Merrimack and Spicket Rivers and Forest Lake, but also in smaller streams, ponds, and wetlands. Preventing and repairing erosion, particularly near Riverside Drive, was recorded by workshop participants.

Water quality is a concern in several of Methuen's waterbodies. Impairments, according to Mass DEP, include:[9]

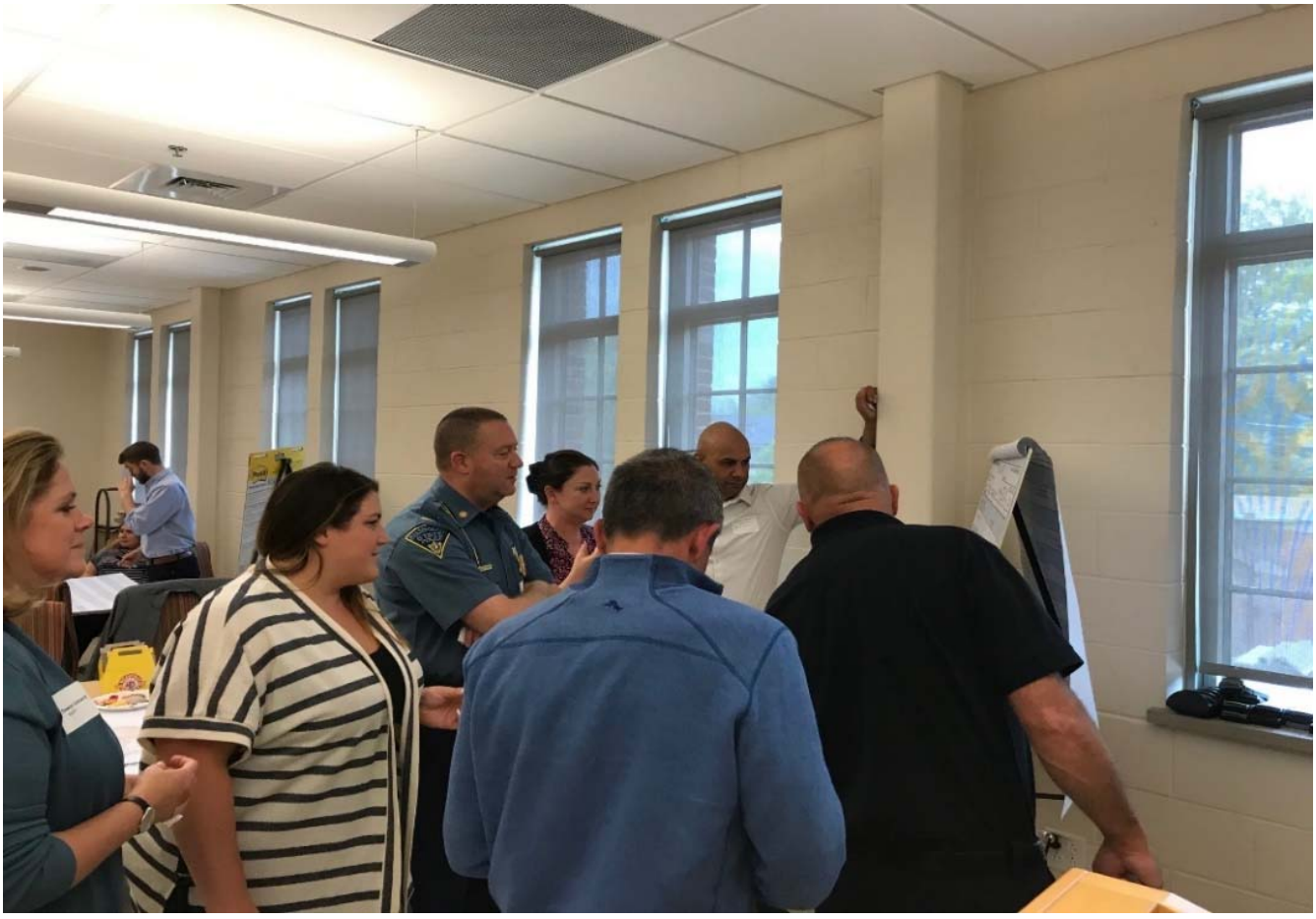
- Merrimack River: Impaired for metals, nutrients, pathogens
- Spicket River: Impaired for copper, e. coli, other nutrients, aquatic macroinvertebrate bioassessments
- Bartlett Brook: Impaired for E. coli, sedimentation, turbidity
- Bare Meadow Brook: Impaired for E. coli, sedimentation, turbidity
- Forest Lake: Impaired for mercury in fish tissue

**Regulatory Structure/ Planning:** Many participants identified a need to update the local land use regulatory structure to protect more open space. Among suggestions are the need to enact the Community Preservation Act, update subdivision regulations to require more tree planting, and meet stormwater regulations through best management practices.

Gaunt Park, Methuen (MVPC Photo)

[9] Massachusetts Year 2016 Integrated List of Waters, Executive Office of Energy and Environmental Affairs

# Community Strengths & Assets



One group identifying Community Strengths and Assets at the Methuen Armory (MVPC Photo)

MVP workshop participants identified community strengths that contribute to Methuen's resilience in responding to and recovering from hazard events. See below the list of Infrastructural, Societal and Environmental assets highlighted:

**Infrastructure Assets:**

- 2 water towers
- Access to Malden Mills retention pond for fire suppression
- Wastewater Treatment Plant on Burnham Road – facility upgrade

**Transportation Network:**

- An established transportation network with convenient highway access (I-93 & I-495) as well as Route 213
- Regional transit with Merrimack Valley Regional Transit Authority local and commuter bus service
- Commuter rail service to Boston is available to Methuen residents in the neighboring communities of Haverhill, Lawrence, and Andover

**Senior and Youth Services:**

- Methuen's Senior Activity Center is proactive in organizing a broad range of services and activities promoting wellness, education, creativity and advocacy for over 65 residents
- Several 55+ communities, whose residents who can assist one another in the event of an emergency
- The five public schools (Tenney, Timony, CGS, Marsh and Methuen High School), in terms of physical infrastructure and in positive culture and environment

**Other Services:**

- Community organizations offering strong neighborhood support and stability including Methuen Arlington Neighborhood, Inc., for its contributions in public safety, youth programming, affordable housing advocacy and placement, social services, transportation, employment and child care

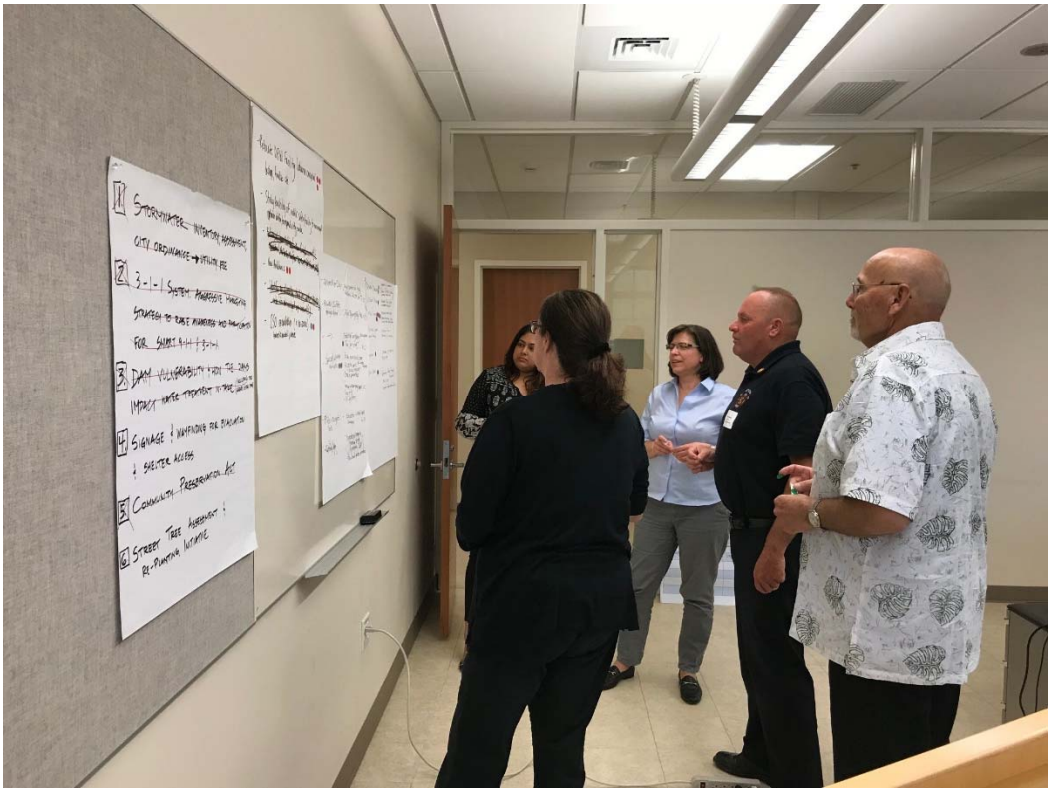
**Medical Reserve Corps**: Methuen participates in the regional Greater Merrimack Valley Medical Reserve Corps, which consists of medical professional volunteers available to assist in emergency response and recovery operations.

**Emergency Services and Shelters:** Although a new ambulance was identified as a need, Methuen has three ambulances currently in use and is able to provide mutual aid to surrounding communities. Methuen has a designated multi-community Red Cross Shelter located at the Field House at Methuen High School, with several other schools able to provide temporary shelter. Methuen is also strengthened by having Holy Family Hospital within the City. The Methuen Armory/National Guard Facility is also equipped to provide services and programming on an as-needed basis.

**Character and History:** In 1992, the City established the Searles Tenney Nevins Historic District to preserve the distinctive architecture and rich character of one of the Merrimack Valley region's and Massachusetts' most unique features. Workshop participants were proud to list Methuen's distinct character and history as a strength.

**Conservation Land and Open Space Resources:** Methuen workshop participants acknowledged their strong Conservation Department as a community asset and wish to ensure the continuation of protective policies and procedures long after their long-serving staff eventually turns over. Specific mention of access to the Merrimack River, including development of the Bea's Boat Ramp, was acknowledged as a community strength that serves as a recreational destination and launch site for river rescues by the Methuen Police Department which owns its own boat.

Bea's Boat Ramp (photo credit: Eagle Tribune)



Methuen residents and staff assessing options while voting on top priority actions at the May 23rd workshop at the Methuen Armory (MVPC Photo)

# Top Recommendations for a More Resilient Methuen

In small table groups, workshop participants identified actions focusing, given time availability, on infrastructural, societal and environmental features and issues of most concern. Each table identified their priority actions. Participants came together at the end of the workshop to vote for their top recommendations. The highest priority actions selected by participants are outlined below:

**Recommendation #1:** Improve **outreach and communication** City-wide including through the following methods:

- Establish an Emergency Management Team comprised of government staff
- Improve municipal communication across the board including in various languages and utilizing social media

- Establish partnerships between entities with ties to vulnerable populations (government/non-profit/community)
- Provide funding for emergency supplies
- Better utilize the Smart 911 system, including the incorporation of multiple languages
- Establish a 311 System
- Improve signage and wayfinding for shelter access and emergency routes
- Identify and improve communication to special/vulnerable populations

**Recommendation #2:** Explore **additional water supply sources** for both drinking water and fire protection. This should include evaluation of the current intake system based on proximity to the Merrimack River and potential failure.

**Recommendation #3: Preserve open space** including identifying grants and donations and passing the Community Preservation Act.

**Recommendation #4: Relocate the DPW Facility** including advancing the conceptual design and finalizing a site

**Recommendation #5: Stormwater Management Assessment, Regulations & Planning** including exploration of a stormwater utility fee and re-evaluating combined sewer overflows (CSOs) (what is needed and where)

**Recommendation #6: Municipal Infrastructure Assessments & Improvements** with priority given to:

- Water system /supply for both drinking water and fire protection
- Infrastructure related to flooding including dams, bridges and culverts
- Infrastructure subject to flooding including sewer system and pump stations and other utilities

**Recommendation #7: Public Safety Facility** including assessment of locations to maximize/optimize the ability to respond to emergencies City-wide

Other High Priority community resilience projects identified by Workshop stakeholders and MVP core team were:

- Conduct a street tree assessment and re-planting initiative with focus on hazardous trees
- Purchase a new ambulance
- Focus on the Spicket River considering upgrades to floodgates and a vulnerability assessment
- Address erosion by developing and implementing a preventative maintenance plan for culverts and upgrading culverts
- Implement regulations to prohibit location of assisted/senior housing in the floodplain

# Appendices

- **Workshop Participants & Resource Staff**
- **Reference Sources**
- **Citations & Acknowledgements**
- **Risk Matrices**
- **Workshop Agenda**
- **GIS Maps**

# Workshop Participants

Honorable James Jajuga, Mayor *
Bill Barry, Fire Department *
Jim Beagan, Methuen Commission on Disabilities
Lieutenant Eric Bernstein, MA State Police
Debra Blood, Methuen Commission on Disabilities
Amy Blount, Columbia Gas
Bill Buckley, Director, Methuen Dept. of Economic & Community Development *
Kathleen Colwell, Assistant Director of Planning, Dept. of Economic & Community Development
Heidi Conlon, Code Enforcement Officer *
Cheri Cousens, Executive Director, Greater Lawrence Sanitary District
Stephen DeFeo, Chairman, Community Development Board
Charles DeJesus, Police Department *
Purnima Dey, IndusPAD
Christina Eckert, Co-Interim Director, Merrimack River Watershed Council
Jessica Finocchiaro, City Councilor
Joseph Giarrusso, Conservation Officer *
Karen Hayden, Methuen Cable TV *
Shimat Kamal, National Grid
Brian Keating, City Planner, Department of Economic & Community Development *
Frank McCann, DPW *
Chris Parsons, Conservation Commission
Sage Rabito, Merrimack River Watershed Council
Tim Sheehy, Fire Chief *
Maria Syrniotis, Executive Assistant to Mayor Jajuga
Laura Walta, Zoning Board of Appeals
Mike Weiser, Resident, Regency at Methuen

Karen Conard, Executive Director, Merrimack Valley Planning Commission
Jennifer Hughes, Environmental Program Manager, Merrimack Valley Planning Commission
Jerrard Whitten, GIS/IT Program Manager, Merrimack Valley Planning Commission
Nancy Lavallee, Office Administrator, Merrimack Valley Planning Commission
Ellie Baker, Senior Environmental Planner, Horsley Witten Group
Brian Laverriere, Landscape Designer, Horsley Witten Group

***indicates member of MVP Project core planning team (need workshop participants)**

# Reference Sources

*Massachusetts State Hazard Mitigation & Climate Adaptation Plan*, September 2018, Executive Office of Energy and Environmental Affairs.

*Merrimack Valley Multi Hazard Mitigation Plan Update*, April 2016, Merrimack Valley Planning Commission.

*Massachusetts Climate Change Projections*, March 2018, Northeast Climate Adaptation Science Center (NECASC) for the MA Executive Office of Energy and Environmental Affairs.

*Special Report-Global Warming of 1.5 Degree Centigrade*, Intergovernmental Panel on Climate Change, October 2018.

*Fourth National Climate Assessment*, U.S. Global Change Research Program, November 2018.

*City of Methuen Housing Production Plan 2018-2022*, prepared by Merrimack Valley Planning Commission with JM Goldson community preservation & planning, 2018.

American Community Survey, Five-year Estimates 2013-2017.

*Methuen Open Space and Recreation Plan*, 2017.

# Citations & Acknowledgements

For future referencing of this project and report, the following citation should be used: *Municipal Vulnerability Program Community Resilience Building Workshop Summary of Findings,* City of Methuen, 2019. Prepared by Merrimack Valley Planning Commission.

**This City of Methuen planning project was funded through a Municipal Vulnerability Planning Grant awarded by the Massachusetts Executive Office of Energy and Environmental Affairs.**

**Special thanks to all stakeholders who participated in the planning workshops.**

# Methuen Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

**H**-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
**V** = Vulnerability **S** = Strength

**Top Priority Hazards** (floods, hurricanes, nor'easters, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | NOR'EASTERS | FLOODING | HURRICANES/ TROPICAL STROMS | DAM FAILURE | Priority H - M - L | Time Short Long Ongoing |
|---|---|---|---|---|---|---|---|---|---|
| **Infrastructural** | | | | | | | | | |
| DPW Facility | Lindberg Ave | City | V | Identify $ for construction of new facility | | | | H | S |
| | | | | Adveance conceptual design and finalize site | | | | H | S |
| Antiquated Public Safety Facilities | Multiple | City | V | Study combined facility feasibility (Crest site on 28) to eimprove ability to respond | | | | H | S |
| Communication Systems | | City | V | Upgrade/develop inter-operable radio communication (ex. NH) | | | | M | S |
| Sewer Pump Station | multiple | City/Private | V/S | Analyze which pump stations need replacement putting in energy efficient Pun | | | | H | O |
| Older Above-Ground Utilities | City-Wide | National Grid/Verizon | V/S | √ | | √ | | | |
| Storm Drainage | City-Wide | City | V | | √ | Develop a storm water management plan | | H | S/O |
| Spicket River | Lowell St Dam | Private | S | | √ | Encourage upgrade of flood gates | √ | M | O |
| Interstate/Transportation Corridor | City-Wide | Federal/State | V | √ | √ | Support state wide evacuation routes, support maintenance & upgrade, look at transit options (bus depot), explore MBTA expansion | | H | O |
| Private Dam on Spicket River | | Privae/Olson Electric | V | √ | √ | √ | √ | H | O |
| | | | | Have contact information readily available -better communication | | | | | |
| Water Intake | Merrimack River | | V | | √ | Review Emergency Plans | | H | O |
| Major Gas Pipeline through city | | Private | V | Have contact information - communication | | | | L | L |
| Power lines (above-ground) Prolonged Outages | | | V | Emergency funding for inspectors/Regional MOU for inspectors | | | | L | L |
| Culvert Poor Condition | Brook/House Street | | V | Stowrmwater Assessment & Inventory - Stormwater Utility Fee | | | | | S |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Water Treatment Plant - Intake Station @ high water - Systems & Safety | Merrimac River | Town | V | Vulnerability Assessment for WTP/in-take plant | | Backup generator | | | H | O |
| Poor Drainage & Flooding | Reservoir & Lowell Streets | | V | Stormwater Ordinance | | | | | | S |
| | | | | Town-wide Dam Assessment & Lawrence Great Stone Dam | | | | | | 0 |
| | | | | Uptrades for DPW & Water Department - Facility & Equipment | | | | | | S |
| Interstates (93&495) & Rte 213 | see map | fed/state | S | √ | √ | √ | √ | | | |
| Shelters - MHS, Tenny, Timony | | | S | | | | | | | |
| Municipal Bridges - Ostood St Bridge & Searles Bridge | | | | ID priorities from DPW project list | | | | | H/M/L | O |
| Salem St/Hamshire Road, Jackson St, Lowell St @ Armory, Hampstead St./Maple btwn Howe & Hampstead | | | V | Culvert Replacement, underground drainage (needs analysis/prioritization wengineer | | | | | H | O |
| Phone/Telecom - Oakland@Broadway | see map | Verizon | V | | √ | | | | M | S |
| Armory Building/National Guard Facility | Along 110 | Federal/State | V/S | | √ | | | | | |
| Electric Power Loss - Forest/Salem/Hampshiret | | Ngrid/Verizon/ Tree Dpt | V | City Work with Utilities to clear ROWs | | | | | | |
| Water Supply Tanks | City-Wide | City | S | Continue good preventative maintenance | | | | | M | O |
| GLSD | North Andover | | V | At capacity | | | | | | |
| Mosquito borne disease | City-Wide | | V | Explore development of state-wide standard | | | | | M | O |
| Wildlife Management | City-Wide | | S | Continue to support exiisting successful process | | | | | M | O |
| Combined drainage & sewer system | Downtown Area | | V | √ | √ | √ | Need plan to separate | | H | L |
| Culvert | Jackson & Swan | | V | Evaluate culverts, flow & drainage area | | | | | M | O |
| National Grid Transformer Station | Pelham St | | V | | √ | | | | M | S |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| High School designated Red Cross Shelter (multi comm) | Ranger Rd | | | Communicate with Red Cross to maintain status | | | | | M | O |
| Municipal Services/Shelters all east of 93 (Isolated) | | | | Identify emergency shelter west of Rte 93 | | | | | H | S |
| NH Dam on Spicket River | | | S/V | Have contact information and communication | | | | | H | O |
| Lowell Sanitary Plant | | | V | Notification of CSOs, all plants and overflows need to be fixed | | | | | H | L |
| Fire Station #2 | Sawyer St | City | V | | √ | | | | | |
| MSPCA - high tension lines, underground utilities | | | V/S | Has emergency plan? Need to share information, communicate | | | | | M | S |

# Methuen Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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**Top Priority Hazards** (floods, hurricanes, nor'easters, drought, sea level rise, heat wave, etc.)

| Features | Location | Ownership | V or S | NOR'EASTERS | FLOODING | HURRICANES/ TROPICAL STROMS | DAM FAILURE | Priority H - M - L | Time Short Long Ongoing |
|---|---|---|---|---|---|---|---|---|---|
| **Socio-Economic** | | | | | | | | | |
| Methuen Housing Authority Properties | | | V | Update/optimize exisitng emeregency management plan/EMS Zone Pl | | | | L | O |
| Arlington Neighborhood - no parking, communication issues (Spanish, Asian, Lebonese) | | | V | Need for municipal/departmental translation services follow school department bilingual requirement | | | | H | O |
| Getting People to sign up for Reverse 911 (Smart 911) | | | V | Education campaign - bilingual | | | | H | O |
| Ambulances (own 3) - Mutual Aid | | | S | Buy 4th | | | | H | S |
| Assisted Living Facility | Gleason Street | Private | V | | √ | Develop more Regulations restricting development in flood zones/Emergency Management Plan | | M | O |
| Public Schools | City-Wide | City | S | Ensure Schools have coordinated emergency plans; coordinate with Columbia Gas plans | | | | M | O |
| MAN Inc. | Tenney Street | | S | Partner for communication planning effort (to reach vulneralble popoulations) | | | | H | O |
| Lack of Emergency Preparedness (residents) - education, medicine, pets | Town-Wide | | V | Videos, social media, other technology to prepare residents (in different languages) | | | | H | O |
| Vulnerable Populations (Homebound seniors, people with mental health issues | Town-Wide | | V | Better understand where people are and how to reach them | | | | H | O |
| Citizen Emergency Response Team (CERT) - no longer active | | | V | Reactivate CERT | | | | M | S |
| Community Emergency Planning Preparedness | | | V | Establish Emergency preparedness team - governmental and citizen members | | | | H | O |
| Smart 911 - in place/not used | Police/Firet | | S/V | 311 System | | | | | |
| High Pressure Natural Gas | West Side | | V | Upgrades to aging pipes & Valves - Continued Communication | | | | | S |
| Accessibility to information & mobility | | | V | Improve signage and wayfinding on evacuation routes & shelter locations | | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Environmental** | | | | | | | | | |
| One Drinking Water Supply | Merrimack River | | V | Identify an alternative source; enter into intermunicipal agreement | | | | H | S/O |
| CSOs | | | V | CSO Study | | | | H | S |
| Erosion | Riverside Drive | City | V | | √ | Upgrae culvert ; implement preeventative maintenance plan | | H | S/L |
| EPA Storm Water Regulations | City-Wide | Federal/City | V/S | | √ | Develop a storm water management plan | | H | O |
| Open Space Preservation | City-Wide | City/Mayor | S | | √ | Identify funding & donations | | M | O |
| Strong Conservation Department | | | S | Succession planning, make sure procedures and policis are documented | | | | M | O |
| Open Space Loss to Development | | Private | V | Review regulations | | | | L | L |
| Ticks & Mosquitoes | | | V | Education, social media, communicaiton | | | | L | O |
| Subdivision Regs on Trees | Town-Wide | | V | Campaign: The importance of Trees, benefits | | | | | |
| Lack of Open Space | | | V | Community Preservation Act | | | | | |
| Merrimac Boat Ramp - Waterfront Rec & Trails | Waterfront | | S | Bea's Boat Ramp & WTP for public - Waterfront Park/gathering/recrational destination | | | | | L |
| Zoning Bylaw - OS Preservation | Town-Wide | | S | | | | | | |
| Hazardous Trees | Town-Wide | | V | | | | | | |
| Lack of access to Merrimack River | Waterfront | | V | | | | | | |
| River Rescue - MFD owns boat | | | S | Strategic acquisition of land along Merrimack - storage facility for public safety watercraft | | | | | |
| Malden Mills retention pond - fire supression | | | S | | | | | | |

**Methuen Municipal Vulnerability Preparedness (MVP) Workshop**

Thursday, May 23, 2018, 8:30 am - 3:30 pm

Methuen Armory

**AGENDA**

| TIME | ACTIVITIES |
|---|---|
| 8:30 AM | Registration and Refreshments |
| 8:45 AM | Welcome |
| 8:50 AM | Introductions and Overview of the Workshop |
| 9:00 AM | **Overview Presentation** on Science, Past Planning Efforts and Outcomes, and Data Resources<br><br>Review recent climate related events.<br><br>Present summary of anticipated climate changes.<br><br>Present summary of recent/existing planning efforts and results of survey |
| 10:00 AM | **Discussion #1: Small Group Breakouts (by table)**<br><br>• Table Introductions / Identify Spokesperson and Scribe<br>• Review Risk Matrix format and base maps<br>• Identify features and characterize as Strength or Vulnerability (or both) on Risk Matrix and Base Map for:<br>1. Infrastructure<br>2. Socio-Economic<br>3. Environmental |
| 11:45 PM | 45 MINUTE LUNCH |
| 12:30 PM | **Discussion #2: Small Group Breakouts (by table)**<br><br>• Identify and Prioritize Actions to address Vulnerabilities or protect Strengths for:<br>1. Infrastructure<br>2. Socio-Economic<br>3. Environmental<br>• Discuss timeframe, responsibility, funding, as time allows.<br>• Prioritize top 5-6 Actions |
| 2:15 PM | **Report Outs by table: Large Group**<br><br>Each group reports out top 5-6 Priority Actions, create Master List |

| | |
|---|---|
| 2:45 PM | **FINAL DISCUSSION: Large Group**<br><br>From Master List, vote for top Priority Actions for Municipal Climate Resilience<br><br>Discuss timeframe, responsibility, funding |
| 3:15 PM | **Wrap Up and Closing Remarks** |
| 3:30 PM | Adjourn |

# City of Methuen

## Municipal Vulnerability Preparedness Program

### (Critical Infrastructure)

Windham,NH

Salem,NH

Pelham,NH

Haverhill

Dracut

Andover

Lawrence

North Andover

## Legend

- Municipal Boundary
- Property Parcels
- Open Space
- 100-Year Floodplain
- 500-Year Floodplain
- Pond, Lake, Reservoir
- Perennial Stream
- Intermittent Stream
- Evacuation Routes
- Interstate
- Major Road
- Local Roads
- Commuter Rail
- Bridges
- City Offices
- Clinic
- E911 Dispatch Center
- Emergency Operations Center
- Emergency Shelter
- Fire Station
- Hospital
- Library
- Nursing Home/ Assisted Living
- Parking
- Police Station
- Post Office
- Power Substation
- Public Health Office
- Public Works Garage
- Recreation
- Residential Care
- School
- Sewage Pumping Station
- Bus Station
- Water Supply/ Pumping

N

1:13,200 1 inch = 1,100 feet

2,200 1,100 0 2,200 Feet

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# City of Methuen

## Municipal Vulnerability Preparedness Program

(Socio-Economic)

Windham,NH

Salem,NH

Pelham,NH

Haverhill

North Andover

Lawrence

Andover

Dracut

## Legend

- Municipal Boundary
- Property Parcels
- Subsidized Housing Locations
- Open Space
- 100-Year Floodplain
- 500-Year Floodplain
- Pond, Lake, Reservoir
- Perennial Stream
- Intermittent Stream
- Evacuation Routes
- Interstate
- Major Road
- Local Roads
- Commuter Rail

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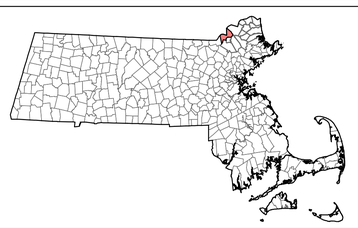
2,200 1,100 0 2,200 Feet



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# City of Methuen

## Municipal Vulnerability Preparedness Program

(Environmental)

Windham,NH

Salem,NH

Pelham,NH

Haverhill

North Andover

Lawrence

Andover

Dracut

## Legend

- Municipal Boundary
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- Perennial Stream
- Intermittent Stream
- Evacuation Routes
- Commuter Rail
- Interstate
- Major Road
- Local Roads

**Chemical Release Sites**

- Oil
- Hazardous Material
- Oil and Hazardous Material
- Unknown
- Dams

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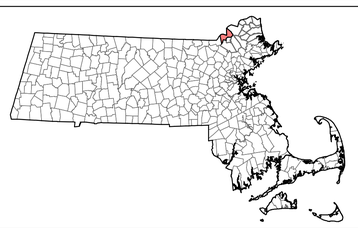
2,200 1,100 0 2,200 Feet



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