Municipal Vulnerability Preparedness Program

Mendon, Massachusetts



Community Resilience Building Workshop Summary of Findings

June 2018

Mendon, Massachusetts Community Resilience Building Workshop Summary of Findings

Overview:

Over the past several years, the Town of Mendon has been working towards implementing Low Impact Development (LID), climate change adaptation, and disaster preparedness initiatives. Efforts have included: preserving open space and farmland; working with several state, private, and Non-Governmental Organization (NGO) partners to advance LID and green infrastructure planning in town; enacting Open Space Residential Development as a right; developing a Master Plan; applying for an Emergency Preparedness grant to develop a response plan; completing a Hazard Mitigation Plan; and adopting stormwater and non-point source discharge Best Management Practices (BMPs). The next step was to engage the community as a whole to integrate climate change into town-wide resiliency planning. This Community Resilience Building Workshop, designed as part of the Municipal Vulnerability Preparedness (MVP) program, offered Mendon an opportunity to gather valuable perspectives from a diverse range of officials, volunteers, businesses, and interested residents.

In September 2016, Governor Charles D. Baker signed Executive Order 569, instructing State government to provide grant assistance to towns and cities in Massachusetts to complete climate change vulnerability assessments and resiliency planning. In April 2017, the Baker Administration, through the Executive Office of Energy and Environmental Affairs, announced that over \$1 million in grant funding would be awarded through the MVP Program. Municipalities are to work with a MVP-certified provider through a community-driven process to identify key climate-related hazards, vulnerabilities and strengths, develop adaptation actions and prioritize next steps. Upon successfully completing the program, communities will be designated as a "MVP Program Community" and become eligible for follow-up grant funding and priority status for other State grant opportunities.

On May 5, 2017, the Mendon Board of Selectman voted unanimously to approve Mendon's application for participation in the MVP Grant Program to bolster Mendon's current efforts. Anne Mazar, Chair of the Mendon Land Use Committee and Mendon Community Preservation Committee, was designated as the Project Manager. The application included letters of support from Mass Audubon, the Blackstone River Coalition, the Blackstone River Watershed Association (BRWA), and the Central Mass Regional Planning Commission. On June 8, 2017, Mendon was notified that it was awarded a \$15,000 grant for community resiliency planning. In November, 2017, Mendon selected the BRWA to serve as contractor for facilitating this planning process. Ted Beauvais served as Lead for the BRWA facilitation team, who worked closely with Ms. Mazar and the Mendon core team, to prepare for the workshops over the next two months.

Ms. Mazar and the BRWA facilitation team interviewed key Mendon town officials from the Fire Department and Office of Emergency Management, Police Department, Board of Health, Planning Board, Highway Department, a member of the Board of Selectmen, and the Town Administrator to begin the community engagement process and to help develop a formal invitation list for the workshops. The final list included representatives from town leadership, boards, commissions, committees, public safety and hazard mitigation, and community planning, as well as business, NGO and community organizations (the full list of participants appears later in this report). The two half-day sessions were held at the Mendon Town Hall on January 31 and February 7, 2018. The first workshop included presentations on the overall Municipal Vulnerability Preparedness approach, described a down-scaled climate change model prepared by the State, and had participants prioritize hazards. The second workshop, held one week later, focused on developing and prioritizing climate change adaptation actions for implementation over both the long and short term, as well as ongoing actions. Ms. Mazar released press announcements to inform the full community of the process, included information on the town website and articles were published in local newspapers.

The Town of Mendon held a public listening session the evening of May 7, 2018 at the Town Hall. The listening session was televised over the Town's Cable Access system. The draft documents were also posted on the Town website for public review.

The Mendon MVP workshop utilized the Community Resilience Building (CRB) framework developed by The Nature Conservancy (www.communityresiliencebuiling.com) and adopted by the State for this planning initiative. Adam Whelchel, Director of Science for TNC-CT, is the creator of, and lead on CRB. He led the facilitator training for the State's MVP training sessions and provided additional technical assistance to the BRWA Team throughout the Mendon workshop planning process.

The Workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaborate to advance actions to increase resilience.

Top Hazards and Vulnerable Areas:

In January, 2017, the Town Board of Selectmen certified the Mendon Hazard Mitigation Plan. Section 4.0 of this plan includes identification and analysis of natural hazards that have or could affect Mendon. The most significant identified hazards are the following: Flooding, severe snowstorms/ice storms/Nor'easters, hurricanes, severe thunderstorms/wind/tornadoes, wildfires/brushfires, earthquakes, dam failure, drought, and extreme temperatures.

Mark Bucchino, Mendon's Director of Emergency Management, presented at the first CRB workshop, grouping top hazards by the following: extreme precipitation; wind; heat

waves/droughts; and wildfire/brushfires. The Workshop Lead Facilitator suggested that each of the three breakout groups consider adopting these four hazards. With minor variation, they did. The yellow and red groups felt that extreme cold was a unique hazard – especially for the elderly. The yellow group had strong concerns about icing events. The hazards identified by each group are shown below:

Mendon Emergency	Blue Group	Yellow Group	Red Group
Management			
Extreme Precipitation	Extreme Precipitation	Extreme Precipitation	Flooding
Wind	Wind	Damaging Winds	Storms/Wind
Heat Waves/ Drought	Heat Waves/ Drought	Heat Waves/ Drought	Heat Waves/Cold
			Snaps
Wildfires/ Brushfires	Wildfire/ Brushfires	Extreme Cold	Drought/fire

Top Hazards (as agreed by the workshop participants):

- Extreme Precipitation (includes snow, ice, rain)
- Damaging Winds
- Heat Waves/ Drought
- Wildfires/ Brushfires
- Extreme Cold

The BRWA Team took the groups' top choices and carried these priority hazards forward through the remainder of the workshop process.

Areas of Concern in Mendon:

Listed below are specific areas identified by the CRB workshop participants. There are most likely additional areas of concern to the Town, but the following ones came out of the workshops.

Neighborhoods

Lake Nipmuc shoreline homes along Taft Avenue and Kinsey Lane; Sunrise Apartments and Mendon Housing Authority (9 Blackstone Street).

Ecosystems

Lake Nipmuc (especially by beach trench, marina), Meadow Brook Woods and Meadow Brook Uplands (Millville Road, Pleasant Street, Asylum Street, Park Street); Cormier Woods Trustees property (Chapin Street); Quissett Wildlife Management Area (WMA) bordered by Blackstone Street, Mendon Street, Providence Street; Inman Pond (Henry Street).

Transportation Infrastructure

Route 16 (town-wide, culverts by drive-in, Mendon Drive-In, marina); Rt. 140 (town-wide); Bellingham Street (Lake Nipmuc, bridges over Muddy Brook); Hartford Ave West (Rock Meadow Brook beaver dam); Northbridge Street (West River Pond outlet beaver dam); North Avenue

(Mendon public schools); Providence Road (Willow Brook culverts); George Street (Muddy Brook crossing beaver dam); Asylum Street west side (beaver dam on Wigwam Brook).

Other Infrastructure

Inman Hill Tower; Tower Hill Road fire tower; Cape Road public water supply; Rt. 140 General Business District public water supply; three gas pipelines (one runs NW/SE across entire town; one runs NE/SW along Catalpa Lane; and one runs SE from Catalpa Lane by Thayer Road); and an electric power transmission line running NE/SW parallel to the Catalpa Lane gas line.

<u>Facilities</u>

Clough Elementary School (10 North Ave); Mendon Town Hall (20 Main Street); Mendon Senior Center (62 Providence Street); Southwick's Zoo (2 Southwick Street); Mendon Drive-In (Rt. 16 near Muddy Brook); Imperial Ballroom (6 Nipmuc Drive).

Current Concerns and Challenges Presented by Hazards:

Prior to the two workshop sessions, the MVP Team interviewed key decision makers in Mendon about past natural hazards and impacts, current strengths and vulnerabilities, and the planning and preparation that the town has undertaken for mitigating future hazards. These town representatives described recent past events including ice storms, blizzards, heavy rain events, damaging winds, drought, and a recent gypsy moth infestation. There was also discussion of earlier major disasters including hurricanes in 1938 and 1955. These events resulted in a variety of impacts to Mendon including power loss from downed trees, blocked roadways, road flooding, property damage, flooded lake-side septic systems, and resulting budget overages.

As part of the first workshop, staff from Mass Audubon presented downscaled data on climate change drawing on information recently released by the Northeast Climate Science Center. These projections for Mendon (as part of the Blackstone River Watershed) were considered by workshop participants when actions were selected for building community resiliency. According to these predictions, Mendon will have to adapt to warmer temperatures, increased precipitation, increased storm intensity, and increased periods of drought. By 2069, the average annual temperature could increase 5.3°F; days above 90°F could increase by 20 days; days below 32°F could decrease by 33 days; and precipitation events with over 2" could increase 23%. Some of the implications of the climate change projections for Mendon include:

- More warm days will mean less demand for heating but more demand for cooling.
- Water infrastructure (underground pipes) will be more vulnerable to freezing due to an increased risk of subsurface freezing. This, in turn, can result from a combination of more fluctuations in winter temperatures and decreased snow cover paired with an unchanged risk of spring cold snaps.
- Increased precipitation can lead to more flooding of roadways and buildings.
- Increased storm intensity (ice, wind, snow, rain) can bring down more trees and create associated power outages and transportation restrictions.

 Stronger storms with increased precipitation means more runoff and associated nutrient loading increases that can, in turn, create algal blooms as pond and lake temperatures rise. These algal blooms can pose a threat to public health.

Specific Categories of Concerns and Challenges

Emergency Management Capacity

Most of the workshop participants' concerns regarding Mendon's capacity to respond in a timely and effective manner during natural hazard emergencies relate to infrastructure, communication, or roadways – each of which overlap one another to some extent. Emergency responders may be unable to reach those in need if roads are blocked either by flooding (related to undersized culverts, loss of pervious surface, and/or beaver dams) or storm debris (related to heavily wooded roadways and/or insect defoliation). This is a particular problem for the fire and ambulance responders located on Providence Street if they need to get anywhere north or west of the police station on Main Street. Police could have difficulty facilitating evacuation along Rt. 16 if there is heavy flooding by the Mendon Drive-In/Muddy Brook area, as commonly occurs during heavy rain events.

Emergency responders may have difficulty coordinating because there is no back-up generator for the new communication tower at Inman Hill and because the Highway Department is in a 'deadzone' for the tower's reception. If roads are passable and departments can coordinate, there remains the additional obstacle of communicating with town residents who are not connected to Mendon's Reverse 911 system or who do not have cell phones for receiving emergency text messages.

And finally, emergency responders have limited options for sheltering residents in need unless Mendon expands its capacity beyond the 30-bed senior center (which has no showers) and Clough School which has limited sheltering resources. The school's AC is limited to the office and maybe computer labs. Miscoe Hill Middle School may have showers. Ideally, a shelter should provide AC for heatwave events, heat for coldsnap events, showers, food/cooking capacity, water, and sleeping space – and generators to run all of this for extended periods.

Critical infrastructure limitations

Most of Mendon's utility lines are above ground which makes the town quite vulnerable to power and telecommunication losses during strong storms. Older and more forested parts of town are most susceptible to power loss when branches and trees come down due to heavy rains, wind, ice, or snow. A loss of power, in turn, results in a loss of water for the vast majority of residents since private wells are the rule rather than the exception in Mendon. The Cape Road area and the Dudley Road subdivision receive municipal water from the Town of Hopedale.

The challenge to Mendon is to protect the above-ground electrical and other utility lines. Additionally, emergency generators are needed to support town departments (including

schools), businesses, and residents. This was a major concern raised by workshop participants. Currently, only the senior center, highway barn, fire station, and Clough School have generators and the capacity of the Clough School generator to run an air conditioning system during a summer heat-wave or a heating system during cold weather events needs to be evaluated.

Inadequate community-wide communications and collaboration

Workshop participants raised many concerns regarding the town's communication systems. Mendon has established a voluntary Reverse 911 system for emergency notifications, but there are many residents who have not, or cannot, connect to this system. Many residents have replaced their land-lines with cellphones whereby Reverse 911 doesn't work unless they have registered their cellphone. On the other hand, 70 percent of seniors in town rely on land-lines and don't have cell phones to receive text messages. If seniors lose power, they will soon lose communication on their land-line with emergency responders including fire, police, and ambulance. Mendon currently lacks the ability to send out emergency-specific communications filtered for specific affected groups like seniors (vulnerable to extreme cold or heat waves), houses with town water (service interruptions or contamination), and local areas (for localized emergencies). While there is a very active volunteer base in town, there is no centralized contact list to mobilize use of them during an emergency like a blizzard or heat wave.

Mendon has established a new communication tower at Inman Hill, but it lacks a generator to ensure that it continues to operate during power outages. And with frequent 'dead zones' in town, even the Highway Department lacks communication with the tower.

Under the subheading of collaboration, workshop participants expressed frustration that the various boards, commissions, and committees lack consistent and timely cross-communication. The need for ongoing inter-departmental coordination is especially critical in times of emergency response.

Vulnerable road networks

Mendon is centrally located within the Blackstone River valley, and the two state roads (Rt. 16 and Rt. 140) that bisect the town are used as cut-throughs for traffic, especially related to Rt. 495 access. This resulting traffic load, which is compounded by high visitor rates for the Southwick's Zoo and Mendon Drive-In, creates concerns for:

- roadway conditions, which may be worsened by flooding, snow and ice;
- emergency evacuation routes, which are not well signed and are already insufficient for daily, non-emergency use; and
- a high rate of vehicular accidents, which secondarily often create road closures due to the narrowness of the roads in Mendon.

The challenge for Mendon is to secure necessary redesign, upgrades, and maintenance for these State-managed roads and for other primary town roads (North Ave., Providence Street, Hartford Ave. W., and Blackstone Street) to ensure safe and orderly evacuation of town

residents during an emergency to local or regional shelters. This has been difficult with the highway department's minimal staffing and funding, and its unmet equipment upgrade needs.

The trees that line many of Mendon's roadways give the town a scenic beauty that is valued by its residents. However, these same trees also create significant risk during intense storms when limbs and entire trees fall on utility lines and roadways, creating power outages, cutting telephone and internet service, and preventing emergency responders from serving the community in need. They offer the additional risk of wildfires and brush fires that could quickly spread due to the high percentage of forested cover throughout town. The challenge to Mendon is to find a balance between maintaining the aesthetic character of its wooded roadways and minimizing the threat to utility lines, vehicular travel, property and life through a proactive maintenance schedule of tree cutting and pruning.

Mendon's road networks are vulnerable to flooding by storm runoff and adjacent waterways. While some culverts have been upgraded, others are undersized and unprepared to handle the increased precipitation expected with climate change. For example, there is an old stone culvert on the south end of Providence Street, by the Mill River Conservation Area and the nearby pond, which needs replacement. Adding to this is the presence of a robust beaver population throughout the wooded wetlands and ponds of Mendon. There are numerous stream crossings at which beaver dams are causing ongoing conflict with property owners, drivers, and Highway Department staff. As precipitation and storm intensity increase, causing groundwater and surface water levels to rise, this conflict will only intensify.

The challenge to Mendon is to secure the staffing and funding to monitor beaver activity and adjust population size through water flow devices that allow water to flow under the beaver dam, and trapping as a last resort. At the same time, beavers increase wetland acreage when they dam a stream, and this, along with open space conservation, can help to balance the loss of floodwater storage capacity in town due to ongoing and future residential and commercial development that is desired for economic growth. An additional consideration is that beaver-created wetlands have been documented to improve water quality by removing excess nutrients and contaminants. This is important to the public drinking water supply.

Drinking water supply

As mentioned previously, Mendon's drinking water supply is vulnerable to the extent that the vast majority of residents have private wells that do not operate during power outages. Quantity is also a concern in the face of extended droughts that are predicted by climate change. Mendon has no municipal wells. Its water is supplied by Hopedale through one connection at the Rt. 140/Hartford Avenue East intersection. This connection supplies Cape Road, the north half of Bates Street and Joseph Road/Edward Road/Talbott Farm, and the west end of Hartford Avenue East. Mill River Drive, Parker Road, and Dudley Road are also serviced. Hopedale also provides water service to a few properties on Milford Street, Harrington Street, and #8 Rod Road.

The challenge to Mendon is to increase its reliable water supply as the population grows while considering the cost to residents for construction of water lines and connection fees for adjacent houses. The town is currently maxed out in regards to its contract with Hopedale; the contract calls for replacing Hopedale's supply with that of another town's. Currently, Milford does not have surplus supply to sell to Mendon. Mendon recently reached out to Bellingham to explore options for an emergency connection, but that would be costly (estimate was ~ \$89,000 - \$100,000) and Bellingham is not interested in selling water rights. Uxbridge and Northbridge are being considered as possible water suppliers. Another option is to explore a town-owned well.

Public drinking water is supported by ground water systems, which are recharged by precipitation that soak into pervious surfaces like fields and woods. Any increase in impervious surfaces through development will further limit supplies for private and municipal wells. Workshop participants see a need to implement more low impact development, retain and expand current open space, reinforce the current subdivision by-law and provide density bonuses to builders with compliant plans.

Workshop participants also voiced concerns about water quality. High levels of manganese and iron in local wells adversely affect the taste, which can impact local businesses. Currently, there is no systematic testing of water quality for private wells in town conducted by, or required by, the Board of Health. This is an especially strong concern for homes along Lake Nipmuc, where nutrient and bacteria levels have been consistently found to be elevated at some sampling locations, and where previous flooding of septic tanks has occurred. In fact, the Town does not yet have a complete mapping of septic and tight tank systems around the lake. In addition, workshop participants advocated seeking an alternative to road salt used by the highway department, which poses a risk of contaminating water for public drinking supplies and for aquatic plants and animals in addition to degrading roadway surfaces. Any increase in storm runoff from impervious surfaces during heavy precipitation events raises the likelihood of contamination of adjacent waterbodies.

Planning and Zoning

Each of the previous areas of concern can be adversely impacted by natural hazards such as extreme precipitation, damaging winds, heatwaves & droughts, wildfire/brushfires, or extreme cold. An overarching concern voiced by workshop participants is the lack of, or inconsistent application of, LID and green infrastructure measures across Mendon's departments, committees, boards, and commissions. If the town's population increases as expected, and the business tax base is developed as needed *without* better implementing and expanding Mendon's bylaws, the negative impacts of future natural hazards is likely to be significant, lasting, and costly.

The State's MVP initiative is based on the directive to municipalities to use nature-based solutions as their first line of defense against climate change's impacts. As stated in Mass Audubon's workshop presentation, Mendon could "reduce its exposure to these impacts, resulting in reduced costs, economic enhancement, and a safer, more resilient community"

However, workshop participants stated that Mendon is run like a family rather than a professional municipality. They explained that not all applicants or projects are treated the same, with some development being permitted that fails to incorporate green infrastructure and LID as promoted by the bylaws. These favored projects miss the opportunity to minimize future flooding and water quality impairment by preserving open space and managing stormwater close to the source.

Specifically, Mendon's stormwater/LID bylaw promotes permeable paving and sidewalks, expansion of stormwater design standards to include LID, and use of curb cuts & bioswales to some degree, but more LID bylaws need to be implemented. Mendon's subdivision rules and regulations limit clearing and grading, reduce parking requirements, reduce road width and dead end/cul-de-sac turnaround space. Mendon is not consistently implementing these preventative measures and some workshop participants felt the Town needs to stop providing special privileges. They suggested that the town develop and implement a strong education/outreach campaign to help more residents and businesses understand the need for adherence to Mendon's bylaws.

Current Strengths and Assets:

Infrastructure:

- The town's Select Board certified the Mendon Hazard Mitigation Plan in January, 2017. The town's fire and police departments have emergency plans in place and are assisted by supportive town boards.
- Emergency generators are located at the Senior Center, Clough School, and DPW barn. The new police station planned for 2019 Fall/2020 Spring will also have one.
- Rt. 16 and Rt. 140 both serve as emergency evacuation routes; Rt. 16 is readily accessible to most town residents, but Rt. 140 is in better condition. Providence Street is another critical infrastructure way.
- There is a fire tower on SW Tower Rd and a new communications tower on Inman Hill.
- Mendon has a Reverse 911 system in place for residents to connect to.
- The Senior Center is an activity hub, houses the town's food bank, and serves as an emergency shelter providing climate control, food, and water for 30 evacuees.
- Drainage at Lake Nipmuc should handle 100-year storms and there are plans under consideration to increase capacity for even greater flows by opening waterways currently blocked by silt, vegetation and invasive plants.
- Mendon received a \$400k grant to use for improving road surfaces in the town center and town-wide.
- Town water (provided by Hopedale) is available only in the Cape Road (Rt. 140) area and the Dudley Road Subdivision. There is a moderate yield aquifer located east side of town by a capped landfill.

Societal:

• Mendon is blessed with an extremely strong volunteer base. Many civic, scout, sport and church-based groups exist including the Lions Club and Brothers of the Brush.

- The Mendon Drive-In and Southwick's Zoo are two of the biggest recreational attractions in the area.
- For 30 years, Mendon has had the highest income for the Blackstone Valley; in 2015 48% of households had incomes over \$50k.
- Mendon has good bylaws in place including an Open Space subdivision rule. The town's rural character is a good setting for light industry and Mendon can be very competitive as a green community, utilizing Community Preservation Act funding.

Environmental:

- Residents of Mendon treasure its rural character defined by forests and narrow treelined roads.
- There is abundant open space including several state-designated Priority Habitats (Meadow Brook Woods and Uplands, Cormier Woods, Quissett WMA, and Muddy Brook) as well as 300 acres at Southwick's Zoo and 9 acres at the Mendon Drive-In.
- Additional natural resources include several small ponds, streams and wetlands as well
 as Lake Nipmuc, which provides scenic beauty and recreation to shoreline residents and
 visitors. The town operates a municipal beach along Taft Ave, and the lake can provide
 water for local fire fighting.

Top Recommendations to Improve Resilience:

The workshop facilitators adhered to the protocol laid out in the Community Resilience Building Workshop Guide. The three breakout groups completed their individual matrixes and reported their top 3-4 priority actions when the whole group reconvened. These actions were developed by the workshop participants to reduce natural hazards' impacts and to build resiliency. The Lead Facilitator then moderated a whole-group activity to combine similar actions prior to instructing each of the participants to vote for their top three actions. The votes were tallied and announced.

The Lead Facilitator sought and obtained consensus from the participants in supporting the final list of priority actions and understood that they also did not want to lose track of all the other important actions that were identified. There were 63 votes cast by 21 participants. Some participants had to leave early and were not able to be present for the priority ranking. The following list contains the priority action groupings in order of most votes received to least. Each group contains one or more actions; they are in no particular order or priority within the grouping.

Emergency Response: #1 Grouping

- Expand current emergency shelters and establish new ones
- Create comprehensive alert system
- Establish emergency generator at communication tower/repeater at Inman Hill

Land-use Regulations and Guidance: #2 Grouping

- Adopt/Implement existing LID and Open Space Residential Development bylaws using the recommendations from the 2016 Mass Audubon report, <u>Analysis of Local Land Use</u> <u>Standards in Relation to Low Impact Development Best Practices, Mendon, MA</u>
- Implement a public outreach effort to educate community on these green development opportunities

Flooding: #3 Grouping

- Coordinate with Mass Department of Transportation (Mass DOT) on Rt. 16/Muddy Brook Crossing drainage
- Monitor beaver dams and secure funding for "beaver deceivers" (water-level control), and, as a last resort, for trapping at locations where harvest is viewed as the best management practice

Inter-departmental Communication: #4 Grouping

Hold semi-annual interdepartmental municipal meetings prior to town warrants

Other Priority Actions

- Improve town water infrastructure and acquire additional supplies for town water
- Increase town-wide volunteer network of willing, skilled volunteers
- Expand commercial tax base
- Coordinate with Mass DOT regarding Rt. 16 road-edge failure
- Work with Board of Health to test water quality of individual/home owner wells
- Work with Southwick's Zoo and schools on invasive species education
- Dredge Willow Brook Pond to reduce invasive species, increase depth by reducing sediment, and increase its use as fire control water source
- Revise Open Space Plan to incorporate climate change priorities especially flooding
- Additional actions proposed by the three participant groups that were not presented as top priorities at the whole-group phase of the workshop (Day 2) are shown on the risk matrices (one each for yellow group, blue group, and red group)

CRB Workshop Participants:

Department/Commission/Organization	Representative	
Highway Department	Alan Tetreault* **	
Senior Center	Amy Wilson Kent*	
Parks & Water	Dan Byer*	
Police	Dave Kurczy* **	
School District	Jay Byer	
Assessor's Office	Jean Berthold*	
Town Administrator	Kim Newman* **	
Fire and Emergency Management	Mark Buccino* **	
Select Board	Mark Reil*	
Board of Health	Missy Kakela-Boisvert*	
Building Inspector	Tim Aicardi	

Economic Development Commission	Tom Merolli*		
Board of Health	Alan Greenberg*		
Board of Health	Tom Fitchner* **		
Planning Board/Local Business Rep	Bill Ambrosino* **		
ADA	Kevin Rudden*		
Historic Commission	Kathy Schofield*		
Housing/Planning Commission	Peter Denton		
Water Board	Allan Kent*		
Metacomet Land Trust	Patrice Murphy*		
Agricultural Commission	Larry Pearson		
Trail Steward	Bill Dakai		
Conservation Commission	Emilio Perez*		
Conservation Commission	Carl Hommel*		
Conservation Commission	Peter Coffin*		
Select Board, Assessor's Office	Ken O'Brien		
Unitarian Congregation of Mendon & Upton	Ralph Clarke*		
Southwick's Zoo	Betsy Brewer*		
Imperial Cars	Kevin Mehan		
Imperial Cars	Elaine Baci Snow		
Bethany Community Church	Main Office Invitation		
Local Business (Realtor)	Judy Leonelli		
Local Business (Realtor)	Gary Smith		
Local Business (Engineering)	Chris Hack*		
Central Mass Regional Planning Commission	Adam Menard*		
Local Business (Surveyor)	Fred Lapham		
Local Business (Greenhouse)	Colleen Oncay		
Uxbridge Planning Board	James Smith		
Uxbridge Planning Board	Lynn Marchand		
Upton Planning Board	Thomas Davidson		
Upton Planning Board	Denise Smith		
Hopedale Water/Sewer	Tim Watson*		
Hopedale Building Commissioner	Robert Speroni		
Bellingham Town Planner	James Kupfer		
Blackstone Valley Chamber of Commerce	Jeannie Hebert		
Local Business (Restaurant)	Sarah Svenson *		
Tufts University (Graduate Student)	Darya Mattes*		
Fire Chief	Richard Harris*		
Scribe	Jan Wiersma*		
Scribe	Ann Vandersluis*		
Scribe	Pat Vandenberg*		
Scribe	Cheryl Kearsley*		
Scribe (back-up)	Sue Carlson		

*Attendee

**Core Team

Citation:

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CRB Workshop Project Team:

Organization	Name	Role
Town of Mendon	Anne Mazar	MVP Project Coordinator **
BRWA	Ted Beauvais	Lead Facilitator
		Project Leader
BRWA	Susan Thomas	Breakout Group Facilitator
		Project Assistant
BRWA	Joy Trahan-Liptak	GIS Specialist
BRWA	Pieter de Jong	MVP Project Advisor
Mass Audubon	Dan Brown	Climate Change Presenter
Mass Audubon	Stefanie Covino	LID Presenter
		Breakout Group Facilitator
Resilience Partners	Lee Dillard Adams	Breakout Group Facilitator

Acknowledgements:

This MVP Summary of Findings was made possible by the commitment of many individuals and organizations. The lead Mendon representative and driving force behind the workshops was Anne Mazar who serves as Mendon's Land/Energy Use Committee Chair, Community Preservation Committee Chair, and Economic Development Committee Member. Key background information was provided via interviews early in the process by the following Mendon officials: Kim Newman (Town Administrator), Alan Tetreault (Highway Dept.), Tom Fitchner (BOH), Bill Ambrosino (Planning Board), Dave Kurczy (Police Chief), and Mark Bucchino (Assistant Fire Chief, Emergency Mgmt. head). Jean Bertthold (Town Assessor), Kevin Rudden (Assessor's Office, Water Commission, ADA, CoA) and Jay Byer (MURSD Finance and Operations Director) provided additional background information via questionnaires. Dan Byer (Department of Parks & Recreation, Water Commission) offered technical assistance for the workshop presentations. Sarah Svenson, Manager of the Muffin House Cafe, generously donated refreshments for both days of the workshop. The Mendon Senior Center provided volunteer scribes to record critical workshop content. Adam Whelchel (TNC-CT) offered invaluable guidance throughout the planning and implementation of the workshops and report development. Funding for the planning and implementation of the workshops as well as development of this Summary of Findings came from a grant awarded to the Town of Mendon by the Massachusetts Executive Office of Energy and Environmental Affairs.

Appendices:

- 1. GIS base map of Mendon
- 2. Participatory mapping maps: transportation concerns, flooding hot spots, generators
- 3. Supporting risk maps
- 4. Photos: historic flood events, current areas of concern, MVP workshops (Please see separate attachment "Appendix 4 All Mendon Photos" to see more photos.
- 5. Workshop PowerPoint presentations: CRB and MVP Overview, Mendon Emergency Management Plan, Climate Change with Mendon Downscaled Data, Nature-based Solutions and LID (Please see separate attachment for "Appendix 5 Workshop Presentations" to see the PowerPoint presentation.)
- 6. Breakout-group Risk Matrices and Whole-group Risk Matrix
- 7. One-page descriptions of climate change projections and nature-based solutions

Appendix 1: GIS Base Map of Mendon

This map was generated from state-wide GIS layers publicly available from Mass GIS and clipped down by town to show Mendon's features. Additional layers for transmission lines and public wells were requested as required for security reasons. The Mendon Map shows main infrastructure (parcels, roads, transmission lines, and dams), municipal buildings, water resources, FEMA flood zones, land use (including open space), and DEP permits.

Town of Mendon



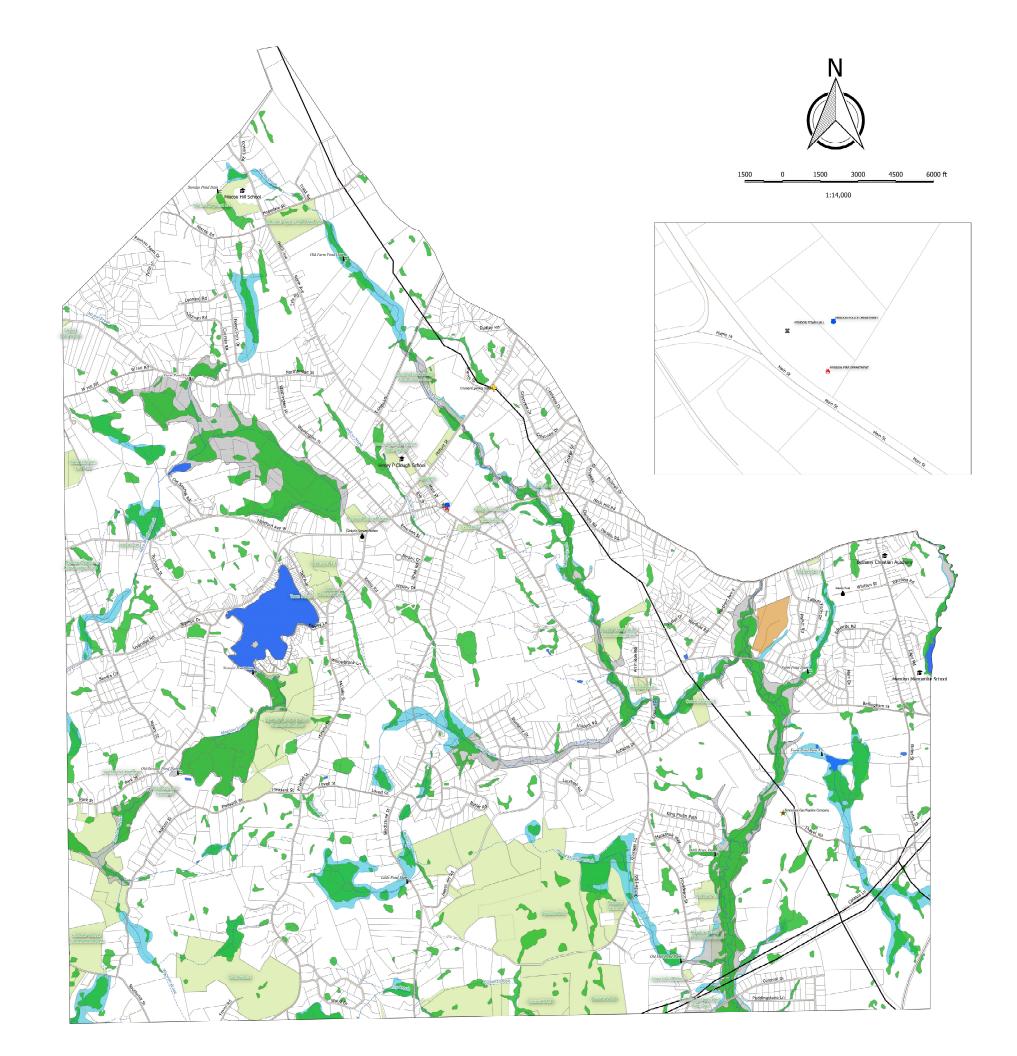
Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure Parcels Schools (4) Fire Station Police Station **Water Features** Open Water Wetland 100-year - 1% Annual Chance of Flooding 500-year - 0.2% Annual Chance of Flooding Land Use Open Space MA DEP Permit Facilities Underground Storage Tank (2) ★ DEP BWP Major Facilities with Air Operating Permits (1) MassDEP Tier Classified Oil and/or Hazardous Material Site (1)

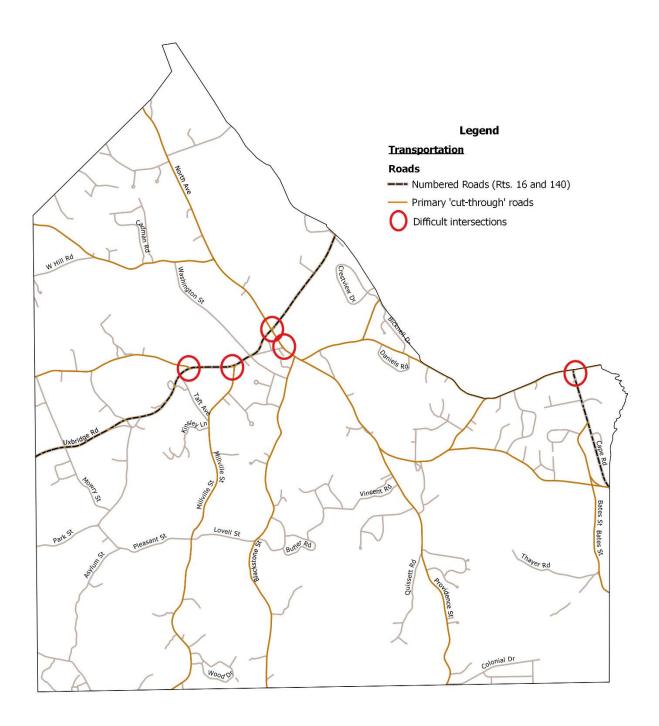
Landfill - Closed (1)

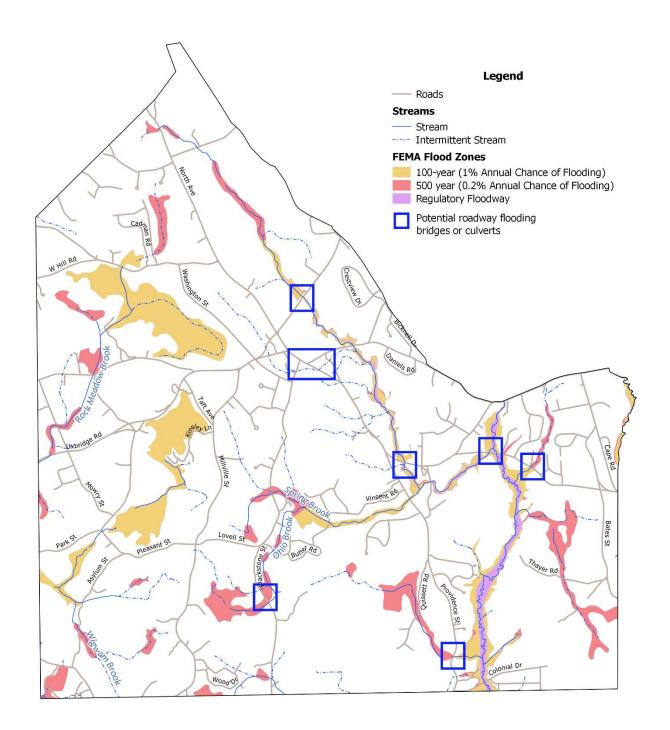
This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.

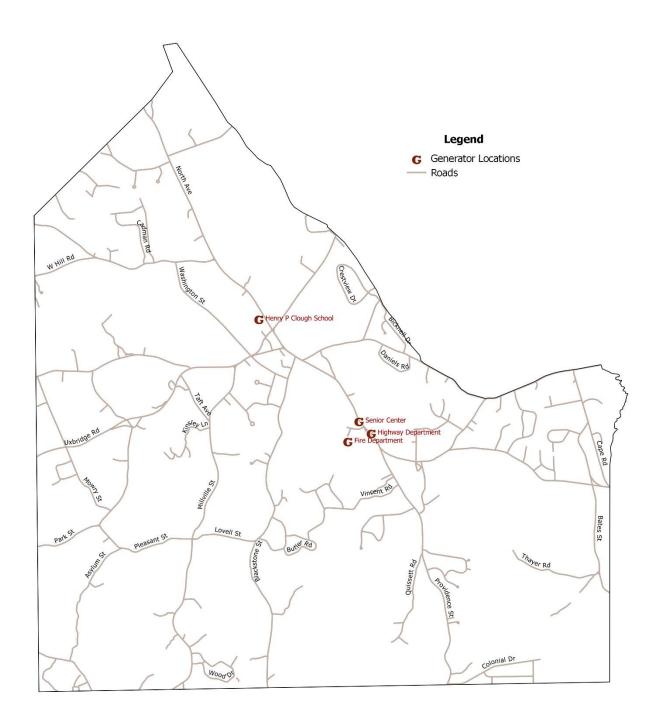


Appendix 2: Participatory Mapping Maps

These maps were generated by the three breakout groups during both workshop sessions. Workshop participants used them to mark the location of important infrastructure, societal, and environmental town features during the development of the breakout risk matrices.



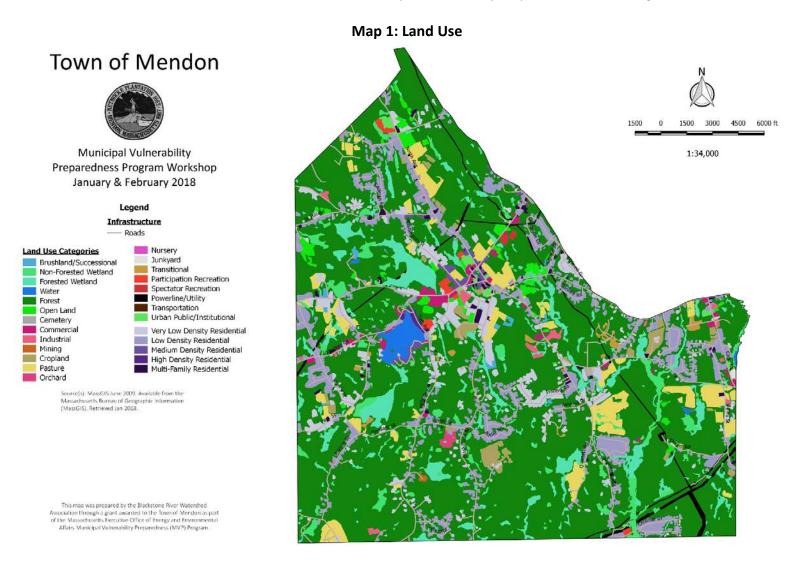




Appendix 3: Risk Maps

Mendon Municipal Vulnerability Preparedness Program Workshop Maps

These maps were prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.



Map 2: Water Supply and Aquifer Areas

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcel

— Road

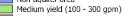
Water Supply

Public Water Supply Points

- Community groundwater well
- Non-Transient non-community
- Transient non-community
 Zone I Protection Area
- Zone I Protection Area
 Wellhead Protection Areas

Aquifers

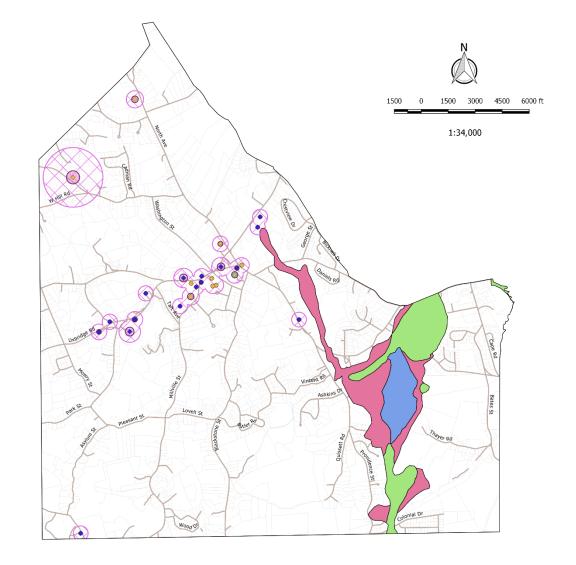
Non-aquifer area



Low yield (< 50 gpm)

Source(s): Aquifers- MassGIS Jul 2007. PWS- MassGIS Oct 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.



Map 3: Open Space Parcels

Town of Mendon



Municipal Vulnerability Preparedness Program

Legend

<u>Infrastructure</u>

Parcels

Open Space*

Federal

Land Trust
Municipal

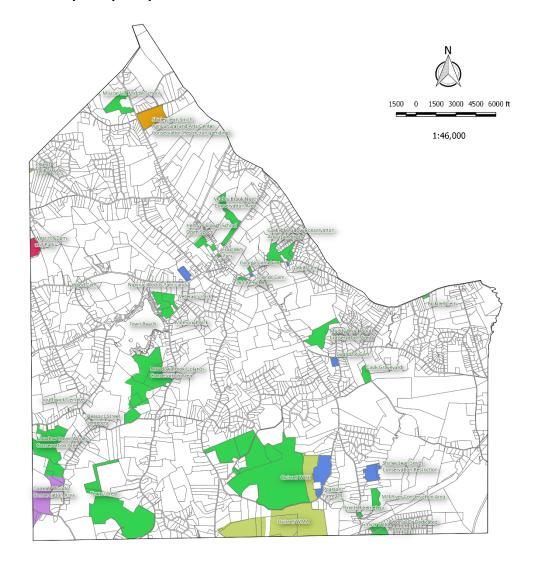
Private for profit

State

Source: MassGIS/MA DEP Oct 2017, Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

* Names and recent parcel additions as of May 2018 per A. Mazar

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Vunicipal Vulnerability Preparedness (MVP) Program.



Map 4: Natural Heritage Areas

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcel

---- Road

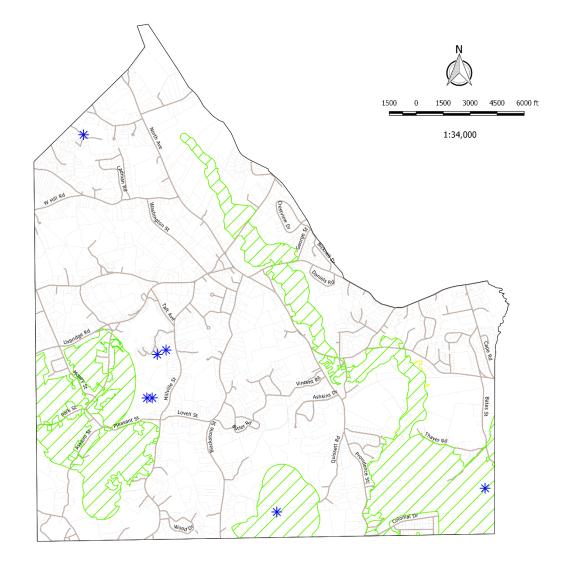
Natural Heritage and Endangered Species

Estimated Habitats of Rare WildlifePriority Habitats of Rare Species

* Vernal Pool

Source: Natural Heritage & Endangered Species Program (NHESP) Aug 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Nunicipal Vulnerability Preparedness (MVP) Program.



Map 5: Hydrogeography and Wetlands

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcel

---- Road

⇔ Dam

Hydrogeography

Streams

--- Stream

---- Intermittent Stream

Wetlands

Open Water Deep Marsh

Shallow Marsh Meadow or Fen

Bog

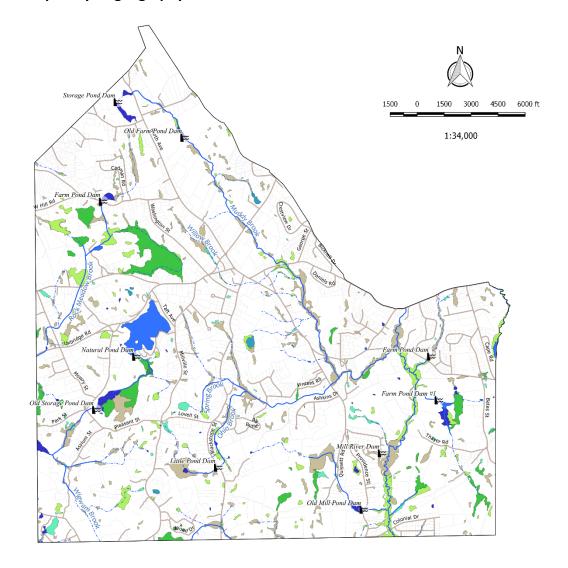
Shrub Swamp

Wooded Swamp Coniferous

Wooded Swamp Mixed Trees Wooded Swamp Deciduous

Source: MassDEP Hydrography April 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.



Map 6: MA DEP Permit Areas

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcels

---- Roads

Transmission Lines

DEP Permit Facilities

HassDEP Tier Classified Oil and/or Hazardous Material Sites



★ DEP BWP Major Facilities with Air Operating Permits

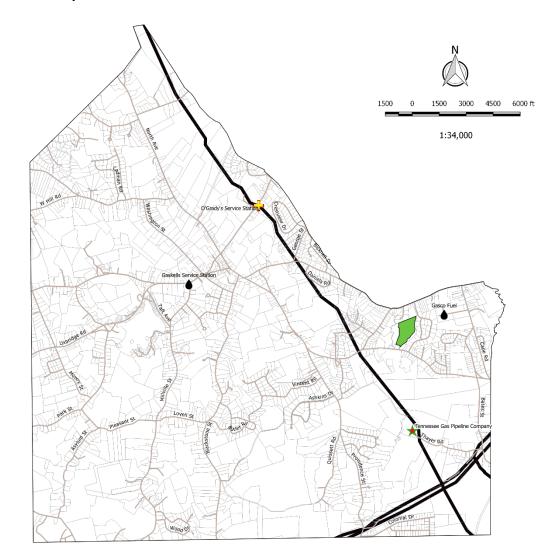


■ Underground Storage Tank

Landfill - Closed

Source: MassGIS/MA DEP Oct 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.





Map 7: Flood Hazards

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcel
Road

≈ Dam

Hydrogeography

Streams

--- Stream

---- Intermittent Stream

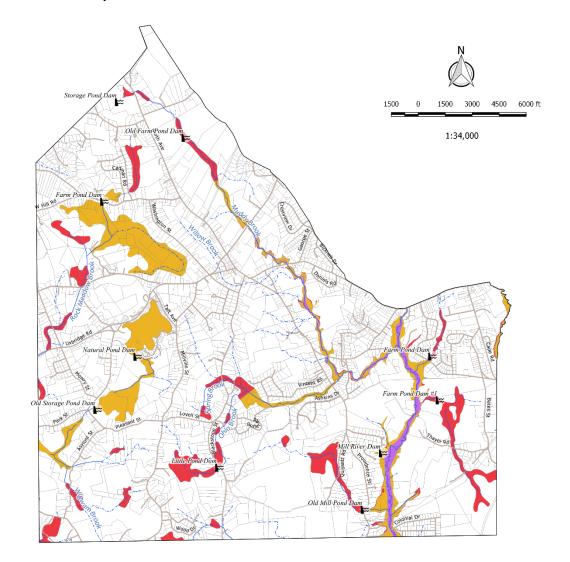
FEMA National Flood Hazard Levels

100-year (1% Annual Chance of Flooding) 500-year (0.2% Annual Chance of Flooding)

Regulatory Floodway

Source: MassGIS/FEMA Flood insurance Rate Maps July 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.



Map 8: Municipal Buildings

Town of Mendon



Municipal Vulnerability Preparedness Program Workshop January & February 2018

Legend

Infrastructure

Parcels

Roads

---- Rail Road Tracks

Transmission Lines **Municipal Structures**

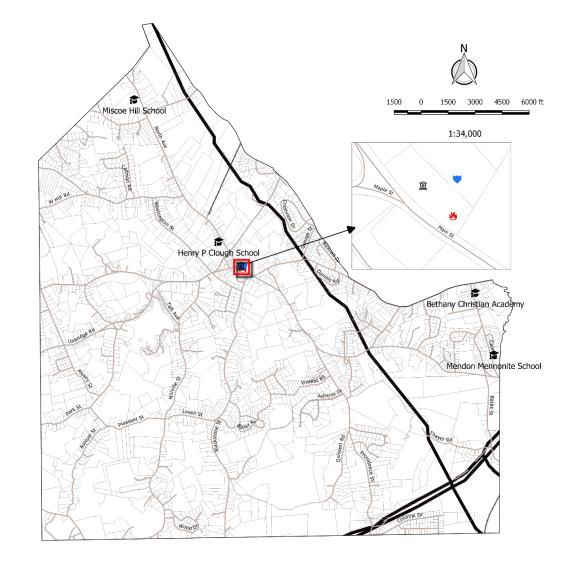
School

Fire Station

Police Station

Source: MassGIS July 2017. Available from the Massachusetts Bureau of Geographic Information (MassGIS). Retrieved Jan 2018.

This map was prepared by the Blackstone River Watershed Association through a grant awarded to the Town of Mendon as part of the Massachusetts Executive Office of Energy and Environmental Affairs Municipal Vulnerability Preparedness (MVP) Program.



Appendix 4: Photos

These photos depict historic flood events,	, current areas of	concern identified	l during the	workshop
sessions, and workshop participants and p	products.			

Workshop Photos



Lee Dillard-Adams facilitating one of three break-out groups during the January 31, 2018 workshop. Participants are identifying and mapping critical features, strengths, and vulnerabilities in Mendon.



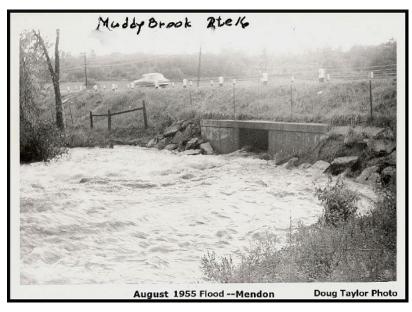
Mark Reil (Mendon Select Board member) and Stefanie Covino (as small-group facilitator) displaying a completed risk matrix for the blue break-out group during the second workshop session.

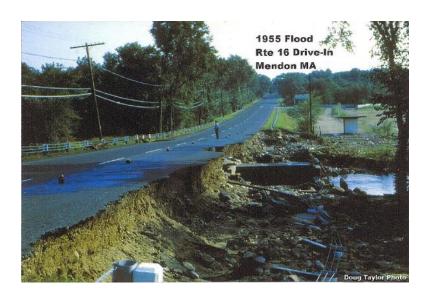


Ted Beauvais, Lead MVP Facilitator, guiding workshop participants through the whole-group voting process to identify top priority actions for Mendon.

Historic Photos







Current Photos



Mendon's roadways are heavily wooded, which can lead to power outages and block emergency vehicles when storms bring down woody debris.



Mendon's highway department must respond to ongoing beaver activity at sites like West River Pond outlet on Northbridge Street that pose threat of roadway flooding.



The Inman Hill communications tower does not have a backup generator to maintain operation during power outages. The Mendon Highway Department is located in a 'dead zone' for the tower's broadcast.



Lake Nipmuc is both a strength (recreation and beauty) and a vulnerability (impaired water quality, flooding of shoreline homes).

Appendix 5: PowerPoint Presentations from MVP Workshop

Workshop PowerPoint presentations: CRB and MVP Overview, Mendon Emergency Management Plan, Climate Change with Mendon Downscaled Data, Nature-based Solutions and LID (Please see separate attachment for Appendix 5.)

Appendix 6: Risk Matrices

These include the three breakout group risk matrices generated during the first and second workshop session, and the whole-group risk matrix that contains the priority actions voted on by the workshop participants at the end of the second session.



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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

				Top Priority Hazards	(tornado, floods, wildfir	e, hurricanes, earthquai	ke, drought, sea level i		
H-M-L priority for action over the S hort or L ong term (and U ngoing) V = Vulnerability S = Strength				· · · ·	Heat Waves &	Daniel Minis	AACLIC	Priority	
Features	Location	Ownership	V or S	Extreme Precipitation	Drought	Damaging Winds	Wildfire	H - M - L	Short Long Ongoing
Infrastructural	200002011	o	. 01 5					I.	<u>.</u>
EMERGENCY RESPONSE: RANK #1									
Emergency Shelters	Senior Ctr, Clough School	Municipal	V/S	Expand current ones and	establish new ones.			Н	0/L
Alert System	Town-wide	Municipal	V/S	Create comprehensive aler	t system			Н	S/0
Emergency Generators	Inman Hill	Municipal	V	Place one at communicati	ions tower and set up a re	peater at Inman Hill		Н	S
FLOOD CONTROL: RANK #3									
Drainage Culverts	Rt. 16@ Muddy Brook	State/Municipal	V	Coordinate with Mass DOT on Rt. 16 /Muddy Brook Crossing drainage and culverts					S
Beaver Dams	Hartford Ave W (Rock Meadow Brook), Northbridge St (West R. Pond Outlet), George St (Muddy Brook), Asylum St (Wigwam Brook)	Municipal &	٧	Monitor dams and secure funds for water flow devices or trapping.				н	0
Town Water Supply		Municipal	V	Improve town water infras	tructure			M/H	0
Societal									
LAND-USE PLANNING: RANK #2									
Low Impact Development, Open Space Residential Design Bylaws	Town-wide	Municipal	V/S	Implement existing Low In	Implement existing Low Impact Development and Open Space Residential Design tools				0
LID/OSRD Bylaws	Town-wide	Municipal	V/S	Educate community about need for these land-use bylaws				Н	0
Inter-departmental Coordination: Rank #4	Town-wide	Municipal	V	Schedule semi-annual inte	erdepartmental munipal m	eetings before town warr	ant	Н	S

Volunteers	Town-wide		S	Build larger network of willing, skilled volunteers	M/H	0	
Commercial Tax Base		Municipal & Private	V	Expand commercial tax base and Economic Develo	Н	L	
Environmental							
Beaver Dams (see "Infrastructure)							



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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.) **H-M-L** priority for action over the **S**hort or **L**ong term (and **Q**ngoing)

Priority $\underline{\mathbf{V}}$ = Vulnerability $\underline{\mathbf{S}}$ = Strength PRECIPITATION FIRE WIND HEAT/DROUGHT Short Long H - M - L **O**ngoing Features **Location Ownership V or S** Infrastructural Impervious Town/Private Reduce throughout town using \$400k grant once plan how best use while establishing needed sidewalks Electrical (above old, below new) Quisset Rd: connection for fire rd S (south??) Town V/S Bellingham Street M 0 Hartford Ave: future flood/beaver dams. DOT? Town Continue monitoring and removing beavers Stormwater System Town (P-board) S Adopt/implement - reduce impervious surface. LID - TM change and education Н S Muddy Brook Rt 16: sand filled culverts, flooding & erosion at drive-in State (Hwy Dept) Reach out & coordinate with Mass DOT (Milford Street) to provide shoulder work and manpower Н S crossing M Fire Towers: department & state funding decrease SW Tower Rd State (Forestry) V/S State budget - legislators, fund staff @ firetower/ conversation with forestry L/0 Road Salting: S. wg. chlorides, increased maintainence of concrete Willow Brook and Mill Pond Providence Road: critical infrastructure way Dam Town DPW Get funding & replace 2 stone culverts S/L Societal Everywhere, Town/Private Health: drinking water, water quality at Lake Nipmuc Work with BOH - test wells; Homeowner WQ: 140, gov, DEP tested municipal buildings "public", private M/H L/0 Nipmuck 3 throughout? V/S Change town and school committe regs to allow space for pets at shelters - conversation w/ schools M ς Sheltering Animals: increased use Town V/S Н S Communication: not eveyone has (911?) Reverse 911 Town Generator, communications tower and repeater antenna on Inman Hill to increase reception for highwa Town V/S Rural Character: narrow rds, street trees Prevent defoliation by gypsy moths S 2x/year interdepartment mtgs before town warrant; increase social media & create mgmt plan BOS Н S Interdepartmental Communication Town Mark Reil coordinate mtg; recrruit someone to update community website Fire and Police: have plans and supportive Boards Town Volunteers Town Use for stewardship to remove invasives **Environmental**

Invasives: bittersweet, p.ivy, Japanese knotweed, water chestnut	Nipmuc, Inman Pond, Zoo pond	Town/Private	v	Partner w/zoo on invasives program to educate community (zoo, muni. offices, school, volunteers)		M/H	0
				Continue BHC annual cleanup and add second semi-annual cleanup in Fall	nup and add second semi-annual cleanup in Fall		
Lake Nipmuc: affect septic & drinking, pesticides		Town	v	Educate residents/increase enforcement - fertilizers and geese key concerns		M/H	0
Forests: fire risk (prescribed burns, tradition, brush fires)	Providence St., throughout	Town/Private	V/S	Implement brush clearance procedures because brush burning may not be an op	tion		
Open Space: water runoff,			V/S	oritize current/future OS by benefits - flooding etc to reduce costs, consider climate change		Н	0
Drinking Water: public water supply/private well (water quality/quantity, arsenic, manganese, iron)			V/S	BOH establish water testing standards for homeowners on wells. Water tower a	ng standards for homeowners on wells. Water tower and cisterns old, impt.		
Groundwater Supply: protecting wetlands (Willow B)		Town/Private		Invasives, sediment, use of water for fires; need to dredge.		M/H	0
Willowbrook Pond			V/S	Hire out dredging to eliminate silt build up and invasives. (Use for local fire cont	rol; runoff)		
Beaver Dams	Bellingh.St, Hartf. Ave W, Northbr. Rd	Town/Private		Solve related flooding; DPW continue trapping as needed; Need Education & Town Mtg change (request)			



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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

H-M-L priority for action over the Short or Long term (and Ungoing)

| Priority | Tim

Priority Time $\underline{\mathbf{V}}$ = Vulnerability $\underline{\mathbf{S}}$ = Strength HEAT WAVES/ FLOODING STORMS/WIND DROUGHT/ FIRE Short Long COLD SNAPS H - M - L **O**ngoing Features **Location Ownership V or S** Infrastructural Lack of Alternative Power when Electricity Out (Current: **Evaluate Microgrids and Alternative Sources** М electric grid, oil, pellet stoves, propane Buy More Generators for Schools and Municipal Bldgs Н S Work with National Grid to keep power lines clear Rt 16/Milford St; 3 Bridges Bellingham St.; Small Culverts State: Town (FLOODING) Evaluate Land Use for Additional Flood Storage Using Hazard Mitigation Grant M 0 Willow Brook Culverts on Providence Rd. (FLOODING) Upgrade to Larger Culverts on a Schedule Using Hazard Mitigation Grant Н 0 Private & Water Supply Contract with (DROUGHT/FIRE) Evaluate Additional Cistern for Fire Control M S Hopedale (DROUGHT) Water Board Continue Looking into Development of a Municipal Well M S Evaluate Inteconnection of Public Water Systems (Rt. 16/140) M S Public Info about Wells M S Senior Ctr/ V/S Evaluate Other Municipal Bldgs. (library +) Н Inadequate Shelter Town Clough School Obtain Funding for Architectural Design of Senior Center Expansion as Red Cross - Certified Shelter Н Assess Clough School's Capablility/Needs as Shelter (has no climate control) Н Н Create Regional Shelter System Rt. 16,Bates St, Roads Used by Nonresidents (Cut through town) State/Town Evaluate Better Traffic Mgmt Plan to reduce traffic and prevent accidents M/M 0/L George St Increase Police Enforcement Town and Municipal Buildings/Regional Schools V/S Building new fire station Town-wide Regional w/Upton 4 Major Gas Pipelines w/2 pump stations TG&E Algonquin V need to map

Limited Manpower for Town and Community	Town		V	Increase Regionalization of	services			Н	L
·				Improve Commercial Tax B	ase			Н	L
Aging Community; Elders (only pocket of lower income)	Dispersed Concentrations	State (Housing Devp)	V/S	(ALL HAZARDS) Develop No	(ALL HAZARDS) Develop Neighbor to Neighbor Programs			Н	S
				Obtain Funding for Addition	aal Outroach in Emarganci	0.5		Н	S
				Develop More Clustered Aff			wnsize housing	Н	0
Lack of Commercial Zones/ Resistance to Comm. Developme	Rt. 140/16	Town	V/S						
Health Care Mostly Outside Town			v	Consider adding medical blo	dg (not require high water	or sewer demand)			
High Volunteerism	Individual/gp		S	Expand Existing: Neighbot t	to Neighbor; Senior Servic	es Provided by Middle/Hi	igh School Students; Seni	M	0
Many Civic, Sport, and Scout Groups	Multiple Orgs	Private (some 501c3)	S/V					M	0
Church-Based Groups (Unitarian, Baptist, Catholic, Menonite	Throughout	Private	S					M	0
Commercial Development Lagged Residential				Expand beyond Rt 16/Rt 140; Discuss budget shortage, tax imbalances and high property taxes					
Bylaws Good with Room for Improvement	Town-wide	Municipal	S/V	Put in Subdivision Regulation	ons; Reinforce LID/OSRD (Guidelines; Give Density B	onus for Compliant Plans,		
				Strengthen Conservation By	ev/Implement Master Plar	1			
Town Run like Family rather than Municipality			V/S	Need to consistently/profes	ssionally implement existin	ng good bylaws (stop favo	ring some entitites) in kee	eping with vi	sion
Senior Center (Hub of Activity)			s						
Higher Income for Blackstone Valley past 30 Years			V/S	Fiind ways to be more comp	petitive for state grants vs	lower income communitie	es		
			V/S	Address residents' resistanc	ce to affordable housing ("	not in my backyard" ment	ality)		
Environmental									
Water Supply (Wells/groundwater) (Dependent on electricity)	Town(Cape Rd/Rt 16)	Town/private	V/S	(DROUGHTS) Implement m	ore LID; Retain Open Space	e; Reinf. subdivision bylav	v; Give density bonus for	M	0
Existing Open Space (town is largest landowner)	Throughout	Town	S	Retain space				M	
Lake Nipmuc		Town Beach/ Private Shore	V/S	(DROUGHT/FLOOD) Pinpoi	nt ecoli problem areas; sev	wer the shoreline; strengt	hen wetland bylaw	Н	S
				Encourage LNWA to educat	e lake residents			М	0

Construction-based increase in Impervious sufaces		v	(FLOODING) Address loss of							
Ledge (radon source) Prevalent										
Mendon Drive-In (9 acres)/ Zoo (300 acres)	Private, State, and Municipal	V/S	Retain open space value bu	etain open space value but deal with increased traffic and road salt treatment that degrades enviro. M/H 0						
Very Light Industry		S/V	Economic Development Co	conomic Development Committee consider solar farms, Community Preservation Act, Green communit						



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Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

H-M-L priority for action over the Short or Long term (and Ongoing)

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

H-M-L priority for action over the S nort or L ong term (and U ngoing)						Priority	Time		
¥ = Vulnerability S = Strength				Extreme Cold	Droughts and Heat Waves	Extreme Precipitaiton	Damaging Winds	H-M-L	Short Long Ongoing
Features	Location	Ownership	V or S			_			<u>o</u> ngoing
Infrastructural									
Communication Systems: facebook, web, reverse 911, texts	Town-wide	Municipal	V/S	Create "Alert Now" call sys	tem for all residents; consid	ler filters for specific gro	ups (seniors, town water	Н	0
				Survey citizens re: various	current alert systems			Н	S
				Need to boost service to co	over 'holes' that cause lost m	nessages		L	L
Power Infrastructure: generators, solar facilities	Clough School, planned police station, highway barn	Municipal, Private	v	Determine capability of Clo	ough generator (water only?	?)		Н	S
				Ask solar facility operators	s how they can assist			L	S
				Survey residents for privat	te generators/public outrea	ch (inform of basic)		Н	S
				Ask Agrekko (Cape Road) a	and Caterpillar (Milford) if o	can use their generators i	n emergency		
				Ask if town can purchase in	n bulk & sell discount to res	idents		L	L/0
Shelters: senior center, Clough school, recreation center	Providence St., 10 North Ave., Sunrise Apts	Municipal, State	V/S	Expand current capacity (3	30 beds)			Н	0
				Shelter planning				Н	L/0
				Ask Imperial Ballroom (Mr	. Mehan) if it can serve as sl	helter		Н	S
				Survey and map basements	s esp. around Lake Nipmuck	x (tornadoes)		M	S
Evacuation Routes: Rt. 16, Rt. 140, 30 k/day outsiders use these roads	10wn-wide (140, Hartford Ave, Main/16, Main/Maple, 16/Hartford	State/Municipal	V/S(140)	S(140) Develop ability to change light patterns during evacuation			Н	L	
				Reconfigure worst 3 inters	sections for emergency traff	ic flow		Н	L
				Need road signs directing	residents to shelters			L	S
				Rt 16- needs better state m	naintenance (esp. flooding b	y marina) (Rt 140 better	condition)		

Water Supplies (drinking/fire) & Stormwater Mgmt	Town-wide, Clough School, Nipmuc (fire)	Private wells, limited municipal H2O	V/S	BOH continue to ID septic/cesspool/tight tanks or Lake Nipmuc	M	S
				ID water sources for fire fighting (droughts); ask other towns re:purchasing water rights/deals	Н	0
				Promote water harvesting with underground tanks	M/S	0
				Mass DOT needs to upgrade RT 16 stormwater system		
				Identify ownership of dams (all are private in Mendon)		
Imperial Ballroom: Act as shelter?	Nipmuc Drive	Private	S	Explore using as shelter		
Mendon Drive-In			S			
Societal		•			•	•
Elderly	Sunrise Apts - Blackstone St.	State	V/S	Educate seniors about emergency response plans (shelters)	Н	0
				Establish wider network of "certified" volunteers to help seniors	Н	0
Younger Homeowners	Town-wide	Private	v	Reach out to build into volunteer network; education/outreach programs.	М	0
Isolated Seniors	Town-wide	Private	v	Elder Care Drill (dry run)	Н	0
				Need to engage them (esp. tie into communication network)	Н	0
Strong Volunteer Base (Lions Club/Sports Orgs/Rotary/Brothers of the Brush)	Town-wide	Public/private	S	Need to create and distribute contact list	Н	0
				Need to build sufficient numbers who can pitch in for emergencies	М	0
				Hold yearly town-wide volunteer appreciation day	М	S
Food Pantry/Local Food Source	Senior Ctr. Food Bank	Municipal	V/S	Need to establish additional sources of food for emergencies (no grocery stores)		
Fuel and Drinking Water Distribution		Municipal	V	Education/outreach to residents (how to prepare ahead)	Н	0
				Volunteer or secure funding for publication outreach specialist	Н	0
				Contract with (entity) for fuel assistance	Н	0
Environmental						
Beaver Dams	Lake Nipmuc outlet, George Street, Asylum St west side., (Hartford Ave?)	Town, private	V	Monitoring population size and activity	Н	0
				Budget for trapping	Н	0
Wooded Roadways			V/S	Proactive forstry practices (diversity of age/species). Line roadways with hardy trees	Н	0
				Expand proactive tree pruning to prevent wind-related problems		

Lake Nipmuc	Rt. 16	Private, public beach	V/S	Monitor outflow; find out who controls dam by outlet (if exists still)					
				D source & solution for wq issues: beach trench/storm drain off Taft Ave, near marina					
				Educate homeowners (runoff, dogwaste, fertilizer)					
Muddy Brook (trib to Mill River)		Town (CR)		Determine if supply for other towns' water supply?					
Priority Habitat		municipal, land	S	Maintain					
				Plan for restoration when storm damage occurs.					

<u>Appendix 7: Summaries of Presentations Given on Climate Change Projections and Nature-Based Solutions</u>

One-Page Summary of Climate Change Projections

Accelerated Warming Expected - More Hot Days Fewer Freezing Days - More Heavy Storms

- The climate has already changed:
 - o Average annual temperatures up 2.9°F since 1895
 - Growing Season 11 days longer since 1950
 - The heaviest 1% of storms producing 55% more precipitation since 1958
- Projections to 2069 could mean that Mendon could experience:
 - o 5.3°F increase in average annual temperatures
 - o 20 additional days above 90°F
 - o 33 fewer days below 32°F
 - o 23% more days with 2 inches or more precipitation
- Even small changes can have big impacts: during the last ice age about 18,000 years ago, when the Northern United States was covered with sheets of ice 3,000 feet thick, global average temperatures were only 9°F cooler than they are today.
- The current and projected trajectory of many changes in climate are clear.
- Remember that long-term change doesn't rule out shorter-term variability there will still be major winter storms and cold snaps even as the overall climate warms.
- Winter energy use and demand is projected to drop 11-24% by the 2050's.
- But Summer cooling demand is projected to increase 59-151% by the 2050's.
- An example of possible impacts is the freezing of buried water lines due to less snow cover providing insulation and the risk of cold snaps remaining about the same causing the ground to freeze deeper.
- Another example of a possible impact is increasing algal blooms in lakes and ponds from stronger storms causing more runoff that carries more nutrients into water. bodies that are warmer and can grow more algae that reduces oxygen in the water when the algae die and decompose – causing fish kills.
- By 2100 there may be 5% more annual precipitation, but increases are expected in the
 winter and spring, with winters receiving 5% to 20% more. The fall and summer are less
 certain, but there is significant indication that precipitation may decline during those
 seasons with more extended droughts possible.
- The past 100-year 24-hour design storm in Worcester was 6.5 inches, that is now approximately the 40-year design storm. Severe storms are projected to increase resulting in what used to be the 500-year storm becoming the 100-year storm.

One-Page Summary of Nature-Based Solutions

Nature-Based Solutions *use* natural systems, *mimic* natural processes, or *work in tandem with* traditional approaches to address natural hazards like flooding, erosion, drought and heat. Incorporating nature-based solutions in local planning, zoning, regulations, and built projects can help communities reduce their exposure to these impacts, resulting in reduced costs, economic enhancement, improved public safety and more resilient communities. Green Infrastructure: A network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life.

- LID is a category of Green Infrastructure (GI):
 - Works with nature
 - Manages stormwater as close to the source as possible
 - Preserves natural landscape (or creates natural features)
 - Treats rain as a resource rather than a waste product

Economic Benefits of Open Space (OS) in Massachusetts include \$10 billion annually in outdoor recreation consumer spending; \$739 million in state and local tax revenue; and 90,000 jobs with \$3.5 billion in annual wages and salaries.

In addition, agriculture, forestry, commercial fishing, and related activities generate \$13 billion in output and 147,000 MA Jobs.

Overall, conservation projects return \$4:\$1 spent

Open Space Residential Development can include:

- Require planning as contiguous area that is clearly linked to OS and master plan
- Offer density bonus and require Low Impact Design with increased minimum OS requirement
- Allow flexibility in OS requirement to allow space for both sewer and drinking water and integrated onsite stormwater management and recharge

Stormwater/LID Bylaws and Subdivision Rules/Regs can include:

- Flexible dimensional standards (lot size, setbacks, frontage)
- Limited clearing and grading and common drives for residential units
- Allow permeable paving/sidewalks where appropriate

Reduce parking requirements and encourage curb cuts & bioswales