

More severe flooding occurrences in town will lead to more impactful changes in the levels and quality of groundwater. The United States Geological Survey National Groundwater Conditions web application measures groundwater levels by monthly percentiles as compared to historic levels at each particular site.⁵⁴ In Massachusetts, the quality of drinking water, including from groundwater sources, is assessed by measuring maximum containment levels (MMCLs) from a number of inorganic and organic chemical, radionuclide, and biological contaminants.⁵⁵ Shallow flooding caused by changes in groundwater system is measured with the same classification systems as other types of flooding.

PREVIOUS OCCURRENCES

In addition to the floodplains mapped by FEMA for the 100-year / 1% and 500-year / .2% annual chance floods, Millbury periodically experiences minor flooding at isolated locations due to drainage problems or problem culverts. Town staff have reported that flooding events have become more frequent in recent years. The following specific flooding locations (mapped in Appendix A) were identified by the Millbury Hazard Mitigation Planning Team:

- McCracken Road at multiple points
- Broadmeadow Ave & Knollwood Circle
- Upton Street
- Tiffany Circle & MacArthur DR
- Manor Road
- Railroad Ave
- Howe Ave
- Riverlin Street & Grafton Street
- Riverlin Street Bridge
- Providence Street
- Sullivan Place
- Rhodes Street & Fink Road
- Washington Street
- West Main Street
- Harris Ave
- Dolan Road & Davis Road
- Davis Road Stream

⁵⁴ Lee Stanish, "Introducing the National Groundwater Conditions web application," [Waterdata.usgs.gov](https://waterdata.usgs.gov), United States Geological Survey, accessed March 12, 2026, <https://waterdata.usgs.gov/blog/groundwater-levels-app/>.

⁵⁵ "Drinking Water Standards and Guidelines," [Mass.gov](https://www.mass.gov/guides/drinking-water-standards-and-guidelines), the Massachusetts Department of Environmental Protection, accessed March 12, 2026, <https://www.mass.gov/guides/drinking-water-standards-and-guidelines>.

- Appletree Drive
- Carleton Road
- Lincoln Ave
- Rogers Street & Forest Street
- Wastewater Treatment Plant
- Glover Road, Mill Street by Ramshorn Brook
- McGrath Road by Ramshorn Brook
- Undercut of properties along the Blackstone River

Most of the flood hazard areas listed here were identified due to known past occurrences in the respective areas. Many of those areas, such as along McCracken Road, Broadmeadow Ave, Upton Street, Railroad Ave, Riverlin to Millbury Ave were caused by improperly sized culverts and poor drainage of the site. Most notably, the town's old wastewater treatment plant suffers from drainage issues and was identified as a priority for flood mitigation by the town due to flooding concerns at that facility.

In the past 10 years, there have been a number of flooding events that have occurred in and around Millbury. The National Oceanic and Atmospheric Administration (NOAA)'s National Centers for Environmental Information (NCEI) database notes the following flood events as having occurred in Millbury since the previous planning process:⁵⁶

- 7/06/2019 – Flooding: A cold front advanced into a very moist air mass in place across Southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding. Several feet of street flooding were reported near the intersection of Routes 20 and 122A on the border of Worcester and Millbury.
- 8/07/2019 – Flood: A warm front moving across southern New England triggered severe thunderstorms with wind damage across western portions of southern New England from the mid-afternoon hours and through the evening. Another band of thunderstorms moved in from the southwest overnight, progressing to the coast before daybreak, causing some additional wind damage and some flooding.
- 6/28/2020 – Flash Flood: A mid-level short wave trough combined with an approaching cold front and a warm, humid environment to produce severe thunderstorms and flash flooding across MA and northern RI during the afternoon and evening hours. A Flash Flood Emergency occurred in the Norwood, MA area.
- 07/17/2021 – Flooding: There was heavy rain, flash flooding, rounds of severe

⁵⁶ "Storm Events Database Search Results for Worcester County, Massachusetts," NCEI.NOAA.gov, National Oceanic and Atmospheric Administration National Centers for Environmental Information, accessed June 4, 2025, https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=25%2CMASSACHUSETTS.

thunderstorms and even a weak tornado in Northern Connecticut. Rainfall totals ranged from 3.0 inches to 5.6 inches in Northern Connecticut and Western and Central Massachusetts.

- 09/02/2021 – Flooding: On Sept. 1, Tropical Depression caused one to three inches of rain in Northwest Massachusetts, but heavy amounts of 4.0 to 6.5 inches fell south of the Mass Pike. There was widespread street flooding and some flash flooding. In Millbury, a car was stuck in flood waters on Grafton Street.
- 09/11/2023 – Flooding: A deamplifying mid-level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in floodwaters, and several houses with flooded basements on first floors.
- 01/10/2024 – Flooding: A negatively tilted mid-level trough swung through New England while at the surface a low-pressure center passed directly over Southern New England. This inland runner brought warm air so that all precipitation fell as rain, along with strong winds. There was a good deal of tree damage from the winds and widespread river flooding with many rivers going into major flood stage. Coastal flooding was also a problem.

In addition, minor flooding related to changes in groundwater was identified as affecting the Town, as basement flooding has been experienced by town residents who responded to the survey. The 2023 ResilientMass Plan describes how flooding resulting from changes in groundwater can impact communities in Massachusetts.⁵⁷

PROBABILITY OF FUTURE EVENTS

Based upon previous data, there is a “Moderate” probability (a 10% to 40% chance) of localized flooding occurring in Millbury in the next year. Millbury’s location along the Blackstone River in addition to future developments located within or near potential flood hazard areas (such as Cobblestone Village).

IMPACT

The town faces a moderate impact from flooding, including flooding caused by changes in groundwater, with more than 10% of properties in the affected area of town likely to be damaged or destroyed by a 100-year / 1% annual chance flooding event. Based on the HAZUS analysis described below, a flood in Millbury is unlikely to destroy any buildings, but a 500-year / .2% annual chance flood event could displace residents and come with a significant economic cost.

HAZUS-MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The HAZUS software was used to model potential damage to the community from a 500-year / .2% annual chance flood event, assuming a 1 square mile data resolution.

⁵⁷ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,” pages 5.1-34-5.1-35.

Table 15: HAZUS Potential Damages to Millbury from .2% Annual Chance Flood Event

		.2% annual chance flood event
Building Characteristics		
Estimated total number of buildings in Millbury		4,184
Estimated total building replacement value (2024 \$)		\$2,258,727,000
Building Damages		
# of buildings sustaining minor damage (1-10%)		8
# of buildings sustaining moderate damage (11-40%)		27
# of buildings sustaining severe damage (41-50%)		1
# of buildings destroyed		0
Population Needs		
# of households displaced		591
# of people seeking public shelter		126
Value of Damages		
Total property damage (buildings and content)		\$ 68,260,000
Total losses due to business interruption		\$ 63,830,000
Total Economic loss		\$132,090,000

Though there are no recorded instances of a flood event of this size in Millbury, this presents a reasonable “worst case scenario” that would help planners and emergency personnel evaluate the impacts of flooding that might be more likely in the future as we enter a period of more intense and frequent storms. For more information on the HAZUS-MH software, go to <http://www.fema.gov/hazus-software>.

EXPOSURE

Certain features within Millbury’s infrastructure, society, and environment may face more exposure to flooding (including flooding caused by changes in groundwater), or be disproportionately impacted by it, relative to the rest of the community. Some of these features are documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- Low-lying areas, including but not limited to the FEMA 1% and .2% annual chance flood zones;
- Specific locations with undersized or outdated storm water infrastructure that cannot handle sudden surges in precipitation;
- Residents who may have trouble evacuating from their residences due to age, health concerns, or lack of a vehicle;
- Flood-prone municipal buildings and critical infrastructure that are subject to flooding and potential contamination from flood waters;

- Septic systems, especially in flood prone areas or locations with high water tables;
- Aquatic ecosystems, which may suffer from erosion, eutrophication, or sedimentation due to stormwater;
- The municipal financial burden of infrastructure maintenance and upgrades needed to address flooding;
- Highway department staff, who sometimes must unclog storm drains during extreme weather events. Due to limited staffing, highway department employees often have to go out alone, making safety a concern; and
- Sides of roadways, which may be eroded due to excessive rainfall. Lack of funding to make road repairs may compound this issue.

Specifically, the following critical infrastructure sites and routes identified in this plan were noted as being especially vulnerable to flooding by the local HMP planning team in Millbury and/or CMRPC's GIS analysis:

- The Town Hall/ Police HQ/ EOC
- Fire Station #2
- Senior Center
- Cell towers at 442 Southwest Cutoff, Canal Street
- The Sewer pumping station at Elm Court
- UMass Medical Group
- Rhodes to Recovery
- HUD Properties: Linden Apartments, Colonial Drive Apartments (located in repetitive loss area)
- Woodside Park Apartments,
- Paul Revere Village,
- Major Employers at Howe Ave
- Armory Village (Millbury's downtown district)
- The Blackstone Vally Bikeway
- The Pear Street and Providence Street WRTA Bus Stop
- Granger Lynch Corporation (Tier II)
- Pakachoag Acres Daycare
- Water Tank by Howe Pond
- The Town Wastewater Treatment Plant/ Sewer Pump Station
- National Grid – Providence Street Substation

- Bonsai American (Tier II)
- United County Industries/heat treat (Tier II)
- IBA Dairy Supplies
- Aquarion Water Treatment Plant
- South Main Street Bridge
- Cordis Mills
- JH Lynch and Sons (Tier II)
- S&D Spinning Mill

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 State Hazard Mitigation and Climate Adaptation Plan, climate change effects coupled with changes in development and population density can increase the risk of flooding from precipitation. As noted earlier in this plan, the Central Region is most likely to be impacted by extremes in precipitation in the following ways:

- Climate change is projected to increase the variability of precipitation events in any given year, including the potential for extreme precipitation events. Instances of inland flooding, river overflows, and pressure on dams may result; and
- Projected changes in precipitation patterns in all seasons, as well as higher frequency of extreme weather (including hurricanes and nor'easters), will change patterns of river flow and increase the frequency and severity of inland riverine flooding.
- According to the 2023 ResilientMass Plan, climate change is predicted to affect groundwater levels. Sea level rise, extreme temperature events, and changes in precipitation patterns will all affect groundwater conditions and may increase the risk in town of minor basement flooding.⁵⁸

In summary, climate change is likely to increase the extent and probability of future flood events in Millbury, which will make it more likely for multiple storms in a short duration to cause cumulative damage. These impacts can affect land use and development by causing people to no longer be able to develop in parts of town that flood frequently and causing the town's government to zone for increased stormwater resilience as well as promote measures such as new storm drains and rain gardens.

VULNERABILITY

Based on this analysis and the assessment of the Millbury Local HMP Planning Team, Millbury faces a hazard index rating of “2 – high risk” from flooding, including flooding from changes in groundwater. Conditions in Millbury demonstrate somewhat greater vulnerability to flooding than in most other Central Massachusetts communities. Previous NFIP claims are slightly higher than in most nearby towns with similar populations and levels of development, a relatively large number of parcels with structures are located within the 100-year flood zone, and the large number of critical facilities and tier II chemical users located within identified flood hazard areas as well as vulnerable populations make this hazard one of the greater threats to the town of Millbury. The

⁵⁸ Ibid.

local HMP planning team notes the following concerns:

- The town's old wastewater treatment plant in particular has seen numerous flooding events and has had to ship wastewater by truck out of the facility due to flooding concerns in the past.
- Fire Station #2 has had its driveway and lower parking lot flood, impacting access to the facility.
- Historic Structures such as the Singletary Mill Building were noted as being particularly vulnerable to flooding by the town.
- The South Main Street Bridge has been previously impacted by flooding.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to flooding, including flooding caused by changes in groundwater through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand upon its existing capabilities to mitigate and respond to flooding. The local HMP planning team identified the following strategies that could be used to reduce the threat of flooding in Millbury:

- Pursue funding to power-retrofit municipal structures to accept portable external power for a mobile generator that can power multiple municipal buildings (see strategy under "preparedness, coordination & response")
- Find funding to rebuild the failing Wheelock Avenue bridge that is currently failing and under temporary repairs
- Find funding to rebuild the failing Broad Meadow Bridge culvert incorporating nature-based solutions
- Pursue construction funding to rebuild the failing Bright Side Bridge
- Pursue funding for the Rhode Street Culvert Replacement
- Pursue culvert grants to rebuild the culvert on Mill Street
- Prioritize funding for physical improvements and maintenance at the Brierly Pond Dam Series.
- Encourage electric utility (National Grid) and water utility (Aquarion) to flood-proof their facilities to ensure these can still operate during a flood emergency.
- Assess green infrastructure opportunities for stormwater management in town and develop a list of specific priorities. Review town regulations and update them as necessary to support green infrastructure and low-impact development. Consider projects in areas that are prone to flooding.
- Work with homeowners to mitigate localized flooding caused by development.
- Implement flood prevention mechanisms for the sewer plant and wastewater treatment plants that run under Interstate 90. The upper Blackstone River drains nearby.
- Complete a town-wide dam assessment of all public, private, and beaver dams. In this assessment, focus on reducing the risk of flooding from dam failures during intense storm events and protecting ecosystems that provide flood storage and other resilience benefits.

4.4 SEVERE SNOWSTORMS / ICE STORMS / NOR'EASTERS

Severe winter storms can pose a significant risk to property and human life. Severe snowstorms and ice storms can involve rain, freezing rain, ice, snow, cold temperatures, and wind. Heavy snowfall and extreme cold can immobilize an entire region. Even areas that normally experience mild winters can be hit with a major snowstorm or extreme cold event. Winter storms can result in flooding, storm surges, closed highways, blocked roads, downed power lines, and hypothermia among residents. A northeast coastal storm, known as a nor'easter, is typically a large counterclockwise wind circulation around a low-pressure center; nor'easters often result in heavy snow, high winds, and rain.

LOCATION

The entire town of Millbury is equally susceptible to severe snowstorms, ice storms and nor'easters; this means that the location of occurrence of severe snowstorms in town is "large." Because these storms occur regionally, the entire town is equally vulnerable to them.

EXTENT

The Northeast Snowfall Impact Scale (NESIS) characterizes and ranks high-impact snowstorms in the Northeastern United States. These storms have large areas of 10-inch or greater snowfall accumulations. NESIS divides storms into five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus, NESIS gives an indication of a storm's societal impact.

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

Table 16: Northeast Snowfall Impact Scale Categories⁵⁹

Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

The Sperry-Piltz Ice Accumulation Index rates approaching ice storms based on the potential damage they are projected to cause, their projected footprint, and their predicted total ice accumulation.

⁵⁹ National Centers for Environmental Information, "The Northeast Snowfall Impact Scale (NESIS)," [Ncei.noaa.gov](https://www.ncei.noaa.gov/access/monitoring/rsi/nesis), National Oceanic and Atmospheric Association, accessed June 4, 2025, <https://www.ncei.noaa.gov/access/monitoring/rsi/nesis>.

Table 17: The Sperry-Piltz Ice Accumulation Index⁶⁰

Ice Index	Damage and Impact Descriptions
0	Minimal Risk of Damage to exposed utility systems; no alerts or advisories needed for crews, few outages
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

The Miller classification is a system used to classify nor'easters.⁶¹ The types of storm classification under the Miller classification are listed below.

Table 18: The Miller Classification for Nor'easters

Miller Classification	Description
Miller A / Storm Type A	Miller A, or Storm Type A, nor'easters form in the southeastern USA or along the Gulf of Mexico and intensify as they move north until turning east to the Atlantic Ocean. They are most impactful the mid-Atlantic region but can also lead to major snow events in New England if they are strong enough.
Miller B / Storm Type B	Miller B, or Type B, nor'easters form in the midwestern USA and move slightly southeast to the southern mid-Atlantic region until they combine with / transfer

⁶⁰ "What is the Sperry-Piltz Ice Accumulation Index?," Spia-index.com, SPIA Index, accessed March 12, 2026, <https://spia-index.com/>

⁶¹ Mike Priante, "The Miller Classification," Weatherworksinc.com, WeatherWorks, December 4, 2020, <https://weatherworksinc.com/news/Miller-A-vs-Miller-B>; "Mid-Atlantic Winter Storm Patterns," Glenallenweather.com, Glen Allen, VA Weather, accessed March 12, 2026, <https://glenallenweather.com/alink/18snow/stormtypes.htm>.

	energy to a storm originating along the coast in this region. This combined storm then travels north, impacting inland and coastal areas of the northeast USA with major snow events, before turning east to the Atlantic Ocean.
Miller C / Storm Type C	Miller C, or Type C, nor'easters are similar to Miller B nor'easters but are stronger and tend to be more impactful in the midwestern USA and southern New England.
Miller D / Storm Type D	Miller D, or Type D, nor'easters are similar to Miller B nor'easters but are weaker and tend to have more limited impacts in the southern mid-Atlantic region.
Miller E / Storm Type E	Miller E, or Type E, nor'easters are similar to Miller B nor'easters but form further to the south and tend to have a long band of area they are highly impactful in which stretches from the northern part of the inland southeastern states, through the mid-Atlantic region, and to inland New England.

The extent of damages broadly speaking in this category of natural hazard you can expect to see heavy snowfall, strong winds, freezing rain, and snow and ice accumulation. A nor'easter, being the worst type of winter storm event can be categorized under the NEISIS Scale and/or the Sperry-Piltz Ice Accumulation Index depending on what kind of wintery precipitation is to be expected, which is partially dependent on what Miller Classification the storm can be categorized into, and partially dependent on the specific weather conditions of the storm in question. Typically, the damage extent is lesser for a snowstorm, greater for an ice storm, and greatest for a nor'easter, which combines both snow and ice with high winds.

PREVIOUS OCCURRENCES

Based on data available from the National Oceanic and Atmospheric Administration, there are 88 high-impact snowstorms since 1956 that have affected the Northeast Corridor. Of these, approximately 37 storms resulted in at least 10 inches of snow fall in Millbury. These storms are listed in the table below:⁶²

Table 19: High-Impact Snowstorms with Snow Falls in Millbury of at least 10 inches since 1956

Start Date	NESIS Value	NESIS Category	NESIS Classification
12/21/2022	2.66	2	Significant
12/13/2022	8.52	4	Crippling
1/28/2022	1.73	1	Notable
1/4/2022	1.60	1	Notable
1/30/2021	4.93	3	Major

⁶² Ibid.

Start Date	NESIS Value	NESIS Category	NESIS Classification
12/14/2020	3.21	2	Significant
3/11/2018	3.16	2	Significant
1/3/2018	2.27	1	Notable
2/9/2017	1.87	1	Notable
3/12/2017	5.03	3	Major
2/8/2015	1.32	1	Notable
1/29/2015	5.42	3	Major
1/25/2015	2.62	2	Significant
3/4/2013	3.05	2	Significant
2/7/2013	4.35	3	Major
1/26/2011	2.17	1	Notable
1/9/2011	5.31	3	Major
12/24/2010	4.92	3	Major
12/18/2009	3.99	2	Significant
1/17/2009	1.32	1	Notable
2/12/2006	4.10	3	Major
1/21/2005	6.80	4	Crippling
2/15/2003	7.50	4	Crippling
3/31/1997	2.29	1	Notable
2/8/1994	5.39	3	Major
3/12/1993	13.2	5	Extreme
2/10/1983	6.25	4	Crippling
4/6/1982	3.35	2	Significant
2/5/1978	5.78	3	Major
1/19/1978	6.53	4	Crippling
2/18/1972	4.77	3	Major
2/22/1969	4.29	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.50	2	Significant
2/2/1961	7.06	4	Crippling
1/18/1961	4.04	3	Major
12/11/1960	4.53	3	Major
3/2/1960	8.77	4	Crippling
2/14/1958	6.25	4	Crippling
3/18/1956	1.87	1	Notable

Additionally, the NCEI database notes at least one instance of heavy snowfall in the Southern

Worcester County region, of which the Town of Millbury is part of:⁶³

- 3/3/2019 – Heavy Snow: A storm that developed over the southern states moved up the coast the night of the 3rd and passed offshore of Nantucket the morning of the 4th. The storm then moved off to the northeast. This brought heavy snow to much of Southern New England. The highest snowfall occurred from Northeast Connecticut to Boston Massachusetts. Ten to eighteen inches of snow fell in Southern Worcester County.
- 02/07/2021 – Heavy Snow: A storm system underwent rapid intensification near the Benchmark of 40N/70W as it tracked quickly northeastward. A particularly heavy snow band formed from northeast Connecticut to the Metro-West Boston area. During the afternoon, 3 to 4 inch per hour snowfall rates occurred in this band. It was a quick-hitting storm, starting around noon and ending in the early evening.
- 01/07/2024 – Heavy Snow: A strong storm moved up the east coast passing near the 70/40 benchmark brought heavy snow to southern New England beginning late Monday night and continuing on Sunday. The first round of heavy snow fell overnight followed by a lull in the snow and mixing with rain Sunday morning. Comma head snow then filled back into eastern MA and RI bringing moderate to heavy snow Sunday afternoon and evening. Snow amounts ranged from 2 to 18 inches.

The 2008 ice storm remains the most notable ice storm event in the town's recent memory. During that storm, the town faced widespread power outages for extended periods of time.

PROBABILITY OF FUTURE EVENTS

Based upon the availability of records for Worcester County, the likelihood that a severe snowstorm, ice storm or nor'easter will affect Millbury in any given year is "very high" (greater than 70 percent).

The 2023 ResilientMass Plan notes that, on average, Massachusetts experiences one to two nor'easters per year.⁶⁴ Between 2013 and 2022, there were 63 heavy snow days, 12 blizzard days, and two ice storm days in Massachusetts.

IMPACT

Millbury faces a "minor" impact, with less than 10% of total property in affected areas damaged, from snowstorms. The weight from multiple snowfall events can test the load ratings of building roofs and can potentially cause significant damage. Multiple freeze-thaw cycles can also create large amounts of ice and can lead to even heavier, even more dangerous roof loads.

Other impacts from snowstorms and ice storms include:

- Tree damage and fallen branches that cause utility line damage and roadway blockages;
- Disrupted power and phone service;

⁶³ "Storm Events Database Search Results for Worcester County, Massachusetts," NCEC.NOAA.gov, National Oceanic and Atmospheric Administration National Centers for Environmental Information, accessed June 5, 2025, https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28%29+Heavy+Snow&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2020&endDate_mm=06&endDate_dd=30&endDate_yyyy=2024&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS.

⁶⁴ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

- Unsafe roadways and increased traffic accidents;
- Infrastructure and other property also being at risk from severe winter storms and the associated flooding that can occur following heavy snow melt;
- Damage to telecommunications structures; and
- Reduced ability of emergency officials to respond promptly to medical emergencies and fires.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to winter storms, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- Elderly residents, who may have more difficulty clearing snow and walking on icy or snow-covered sidewalks. Elderly residents may also be more vulnerable to extremely low temperatures;
- Households with low or fixed incomes, who may be less able to afford sufficient heating or home improvements to improve energy efficiency and insulation;
- Renters, who may have less control over their living situation and indoor environment than homeowners;
- Public safety, utility, and highway department workers, who are tasked with responding to emergency calls, keeping the heat and power on, and keeping the streets clear during winter storms.

Specifically, the following critical infrastructure sites identified in this plan were noted as being especially vulnerable to winter storms by the local HMP planning team in Millbury and/or CMRPC's GIS analysis:

- The Town Hall/Police Station/EOC is an old school building with flat roof construction. This roof has had previous issues with leaks following snow events.
- The High School which serves as the town shelter Has a flat roof that requires shoveling during snow events.
- The Elementary Schools
- The DPW Salt Shed has been noted as being vulnerable to severe snowstorms and flooding events and needs to be replaced.
- The Highway and Sewer Department facilities both have flat roofs and are vulnerable to severe snow events.
- Senior Center
- The Old Fire Department building as well as other older municipal fire stations.
- Dorothy Manor, a daycare facility in town
- The local team also noted that Auburn Road and Stone Road experience snow drifts during

winter storms.

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, sea level rise, warming ocean temperatures, and changing atmospheric circulation patterns are likely to increase the frequency and severity of winter storms.⁶⁵ Warmer temperatures indicate that more precipitation will fall as rain rather than snow throughout the 21st century. The result of this will be fewer overall snowstorms; however, the snowstorms that do occur will likely be worse. Increased wintertime rain also creates a greater risk for wintery mix, sleet, and ice storms; in addition, it will cause hazardous roadway conditions, as temperature drops overnight will cause transportation infrastructure to ice over if mitigation measures are not put in place.

In summary, climate change is likely to increase the extent and probability of future snowstorm events in Millbury. This may have societal impacts; more frequent severe winter storms may change land use and development protocols, as more homes and community buildings may need to have greater sheltering infrastructure to prepare for heavy snowfall.

VULNERABILITY

Based on the above assessment, Millbury has a hazard index rating of “3 – Moderate risk” from snowstorms and ice storms. Snowstorms, ice storms, nor’easters, and other forms of winter precipitation are a frequent occurrence in Massachusetts, and they are expected to only become more frequent over time. Additionally, the expected increase in “wintery-mix” precipitation may lead to increased roadway hazards, as standing water freezing in overnight temperatures creates hazardous road conditions for travelers and responders. The municipal infrastructure in town is aging and in need of retrofits to mitigate future snow damage, especially at the DPW Salt Shed, but otherwise the town is well equipped to handle most snow events.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to severe snowstorms, ice storms, and Nor'easters through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. Given that Millbury, as well as other towns in the region, experience snowstorms frequently, local and state officials as well as emergency response personnel amply prepare for major snow events. However, there are numerous opportunities to expand upon the town’s existing capabilities to mitigate and respond to severe snowstorms, ice storms, and nor’easters. The local HMP planning team identified the following strategies that could be used to reduce the threat of snowstorms in Millbury:

- Pursue funding to replace the DPW Salt Shed. Specifically, it has a flat roof and there are snow load concerns. The rest of the building needs replacement to enhance the winter storm response.
- Create a town-wide microgrid by installing the following: solar canopy system(s) on municipal and/or school parking lots, brownfields, capped landfills, and closed fuel facilities, rooftop solar array(s) for municipal, public hospital, and/or public school building rooftops, and a battery storage substation which connects to the grid. These microgrids can increase the town’s resiliency to snowstorm, ice storm and nor’easter events.
- Enhance road information coordination as well as planning for snow removal.
- Improve and maintain emergency services for vulnerable populations such as seniors, which

⁶⁵ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

could require increasing emergency transportation options (rideshare options), diversifying communications, expanding planning, and ensuring reliable power.

- Pursue funding to replace the sewer and highway buildings. Both buildings are in need of replacement, and both play a critical role in natural hazard response. In addition, both buildings have flat roofs and lead to snow load concerns.

4.5 HURRICANES

Hurricanes begin as tropical storms that form over warm ocean waters in the Atlantic Ocean off the west coast of Africa or the Pacific Ocean. These storms form as heated and moist air is drawn up into the atmosphere. That air begins circulating clockwise or counterclockwise, depending on which hemisphere it is in. Tropical storms become hurricanes when their sustained winds exceed 74 miles per hour. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricane winds can reach speeds of up to 200 miles per hour and can grow to 500 miles in diameter. The official hurricane season starts on June 1st. In New England, hurricanes generally occur in August, September, and the first half of October due to the time required for the waters south of Long Island to warm enough to sustain hurricane activity this far north. Hurricanes in the region can result in flooding and wind damage to structures and above-ground utilities.⁶⁶

LOCATION

Because of this hazard's regional nature, all of Millbury is at risk from hurricanes, meaning the location of occurrence is "large." Ridgetops in town are more susceptible to wind damage. Areas susceptible to flooding are also likely to be affected by heavy rainfall from hurricanes.

EXTENT

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, is given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour, the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Hurricane Wind Scale, which rates hurricane wind intensity on a scale of 1 to 5, with 5 being the most intense.

Table 20: The Saffir-Simpson Scale⁶⁷

Category	Maximum Sustained Wind Speed
1	74–95 mph: very dangerous winds will produce some damage
2	96–110 mph: extremely dangerous winds will cause extensive damage
3	111–129 mph: devastating damage will occur
4	130–156 mph: catastrophic damage will occur
5	157 + mph: catastrophic damage will occur

⁶⁶ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

⁶⁷ National Hurricane Center and Central Pacific Hurricane Center, "Saffir-Simpson Hurricane Wind Scale," National Oceanic and Atmospheric Association, accessed June 4, 2025, <https://www.nhc.noaa.gov/aboutsshws.php>.

PREVIOUS OCCURRENCES

Hurricanes that have affected the region near Millbury are shown in the following table:

Table 21: Hurricanes Which Have Affected the Region Near Millbury

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Belle	1976	Tropical Storm
Gloria	1985	1
Henri	1985	Tropical Storm
Chris	1988	Minor Storm
Bob	1991	2
Beryl	1994	Tropical Storm
Bertha	1996	Tropical Storm
Floyd	1999	Tropical Storm
Gordon	2000	Minor Storm
Hermine	2004	Tropical Storm
Barry	2007	Minor Storm
Hanna	2008	Minor Storm
Irene	2011	Tropical Storm
Sandy	2012	Extratropical Storm, made landfall south of MA but still had impacts in the state
Andrea	2013	Minor Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Millbury and the surrounding region have historically been hit hard by hurricanes and tropical storms which resulted in widespread flooding. The local HMP team noted Hurricane Sandy downed trees, which blocked roadways and caused power outages throughout town that affected critical facilities and schools. This power outage lasted for several days. In addition to high winds, hurricane-caused flooding is also an issue for the town: USGS Circular #377, published in 1956, reports that water rushing at 18,800 CFS (cubic feet per second) flowed through the Blackstone River downstream of Millbury during Tropical Storm Diane, which followed only days after heavy rains from Tropical Storm Connie.⁶⁸

PROBABILITY OF FUTURE EVENTS

Millbury's inland location in Central Massachusetts approximately reduces the risk of extremely high winds that are associated with hurricanes, although the town can still experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a "low" probability (1% to 10% in any given year) of hurricanes in Millbury. However, climate change is projected to result in more severe weather, including increased occurrence of hurricanes and tropical storms. Because of this, the occurrence of hurricanes will likely increase in town in the future.

IMPACT

Descriptions of damage that could occur due to hurricanes of different storm categories of the Saffir-Simpson scale are shown below:

⁶⁸ "Geological Survey Circular 377: Floods of August 1955 in the Northeastern States," *United States Geological Survey Numbered Series Circular*, no. 377 (1956), <https://doi.org/10.3133/cir377>, page 10.

Table 22: The Saffir-Simpson Scale

Storm Category	Damage Level	Description of Damages	Wind Speed (MPH)
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. An example of a Category 1 hurricane is Hurricane Dolly (2008).	74-95
	Very dangerous winds will produce some damage		
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings. An example of a Category 2 hurricane is Hurricane Francis in 2004.	96-110
	Extremely dangerous winds will cause extensive damage		
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland. An example of a Category 3 hurricane is Hurricane Ivan (2004).	111-129
	Devastating damage will occur		
4	EXTREME	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland. An example of a Category 4 hurricane is Hurricane Charley (2004).	130-156
	Catastrophic damage will occur		
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	157+
	Catastrophic damage will occur		

HAZUS-MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The HAZUS software was used to model potential damage to Millbury from 1% and 0.2% hurricane events (storms that are 1% and 0.2% likely to happen each year, and roughly equivalent to Category 1 and Category 2 hurricanes, respectively). The damage caused by these hypothetical storms were modeled as if the storm track passed directly through the town, bringing the strongest winds and greatest damage potential.

Table 23: HAZUS Potential Damages to Millbury from 1% and .2% Annual Chance Hurricane Events

	1% storm (89 mph winds)	0.2% storm (102-105 mph winds)
Building Characteristics		
Estimated total number of buildings	4,184	
Estimated total building replacement value (2024 \$)	\$2,259,016,000	
Building Damages		
# of buildings sustaining minor damage	236	780
# of buildings sustaining moderate damage	24	152
# of buildings sustaining severe damage	1	14
# of buildings destroyed	0	12
Population Needs		
# of households displaced	3	32
# of people seeking public shelter	1	14
Debris		
Building debris generated (tons)	983	3,910
Tree debris generated (tons)	7,166	13,463
# of truckloads to clear building debris	39	157
Value of Damages		
Total property damage (buildings and content)	\$ 12,812,970	\$ 49,227,330
Total losses due to business interruption	\$1,034,530	\$ 5,930,300

Though there are no recorded instances of a hurricane equivalent to a 0.2% storm passing through Massachusetts, this model was included in this plan in order to present a reasonable “worst case scenario” that can help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as more intense and frequent storms become more common. For more information on the HAZUS-MH software, go to <http://www.fema.gov/hazus-software>.

Millbury faces a “Limited” impact from hurricanes, with greater than 10% of property in the affected area of town being damaged or destroyed in any given hurricane instance.

EXPOSURE

Certain features within Millbury’s infrastructure, society, and environment may face more exposure to hurricanes, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations

in Section 3. These features include:

- The electrical grid, which is vulnerable to outages from trees falling across power lines.
- Municipal buildings have been impacted by high winds in the past. Damage to these buildings could impact critical town functions and distract people from other essential emergency response and recovery activities; and
- Public safety, utility, and highway department workers, who are tasked with responding to emergency calls and keeping the streets clear during hurricanes.
- Much of the building stock in Millbury is older, and more susceptible to wind damages.

In addition to high winds, hurricanes can also bring heavy precipitation and cause flooding. The vulnerable features identified in the flooding section above also apply to hurricanes.

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, there are two major ways that climate change influences hurricanes and tropical storms:⁶⁹

- Warming oceans will provide more energy for hurricanes and tropical storms, which could lead to more intense or potentially damaging storms in the future, and larger storms could result in more storms that are likely to impact Massachusetts; and
- Warmer air can hold more water vapor and will enable greater precipitation rates during future storms.

In summary, climate change is likely to increase the frequency and extent of hurricanes in Millbury. The chief concern relating to hurricanes of the local HMP planning team in Millbury is expanded upon in the flooding section of this plan.

VULNERABILITY

Based on the above analysis, Millbury has a hazard index rating of “3 – medium risk” from hurricanes. The primary concern from hurricanes that was noted by the local planning team was primarily captured by the flooding section, however as climate change continues unabated stronger hurricanes could make their way further north and bring with them the traditional wind damage seen in southern states, which the town would be vulnerable to. High wind events are expounded on in the next section of this plan.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to hurricanes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities to expand upon the town’s existing capabilities to mitigate and respond to hurricanes. The local HMP planning team identified the following strategies that could be used to reduce the threat of hurricanes in Millbury:

- Implement flood prevention mechanisms for the sewer plant and wastewater treatment plants that run under Interstate 90. The upper Blackstone River drains nearby.
- Extend the water station pipes to the 207 Riverlin Transfer Station to address fire concerns. There is no running water at the transfer station, where 3,800 residents drop off

⁶⁹ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

waste. This will also ensure effective removal of debris in the event of a natural hazard event.

- Create a town-wide microgrid by installing the following: solar canopy system(s) on municipal and/or school parking lots, brownfields, capped landfills, and closed fuel facilities, rooftop solar array(s) for municipal, public hospital, and/or public school building rooftops, and a battery storage substation which connects to the grid. These microgrids can increase the town's resiliency to storm events.
- Encourage electric utility (National Grid) and water utility (Aquarion) to flood-proof their facilities to ensure these can still operate during a flood emergency.

4.6 SEVERE THUNDERSTORMS / WIND / TORNADOES

A thunderstorm is a storm with lightning and thunder produced by a cumulonimbus cloud; thunderstorms usually produce gusty winds as well as heavy rain and sometimes generate hail. Effective January 5, 2010, the National Weather Service (NWS) modified the hail size criterion to classify a thunderstorm as ‘severe’ when it produces damaging wind gusts in excess of 58 mph (50 knots), hail that is 1 inch in diameter or larger (quarter size), or a tornado.

Every thunderstorm has an updraft (rising air) and a downdraft (sinking air). Sometimes strong downdrafts, known as downbursts, can cause tremendous wind damage that is similar to that of a tornado. A small (less than 2.5-mile path) downburst is known as a “microburst”, and a larger downburst is called a “macro-burst.” An organized, fast-moving line of microbursts traveling across large areas is known as a “derecho” – these occasionally occur in Massachusetts. The strongest downburst ever recorded was a 175 miles per hour downburst in North Carolina. Downburst winds exceeding 100 mph have been measured in Massachusetts.⁷⁰

Wind is air in motion relative to the surface of the earth. For non-tropical events over land, the NWS issues a Wind Advisory (for sustained winds of 31 to 39 mph for at least 1 hour and for any gusts of 46 to 57 mph) or a High Wind Warning (for sustained winds 40+ mph and for any gusts 58+ mph). For non-tropical events over water, the NWS issues a small craft advisory (for sustained winds of 25 to 33 knots), a gale warning (for sustained winds of 34 to 47 knots), a storm warning (for sustained winds of 48 to 63 knots), or a hurricane force wind warning (for sustained winds of 64+ knots). For tropical systems, the NWS issues a tropical storm warning for any areas (inland or coastal) that are expecting sustained winds from 39 to 73 mph, and a hurricane warning is issued for any areas (inland or coastal) that are expecting sustained winds of 74 mph or greater. High winds are a hazard for the boating, shipping, and aviation industry sectors. They can also cause scattered power outages, downed trees and/or power lines, and damage to parts of structures like roofs and windows.

Tornadoes are swirling columns of air that typically form in the spring and summer during severe thunderstorm events. In a relatively short period of time and with little or no advance warning, a tornado can attain rotational wind speeds in excess of 250 miles per hour and can cause severe devastation along paths that range from a few dozen yards to over a mile in width. The path of a tornado can be unpredictable because tornadoes can stall or change direction abruptly. High wind speeds, hail, and debris generated by tornadoes can result in loss of life, downed trees and power lines, and damage to structures and other personal property. In Massachusetts, tornadoes have occurred most frequently in the Connecticut River Valley and in Western Worcester County, with Millbury approximately 40 miles east of the zone of most frequent past occurrences. These events have been grouped together in this analysis due to the similarities between them in that the primary cause of damage occurs from high winds, with lightning damage existing as a potential to occur, and have similar mitigation strategies to address them.

LOCATION

As per the 2023 ResilientMass Plan, the entire town is at risk of high winds, severe thunderstorms, and tornadoes. This plan identifies Millbury and the communities surrounding it as having a moderate frequency of tornado occurrence within the Massachusetts context. However, the actual area affected by thunderstorms, wind, or tornadoes in town is “small,” with less than 10 percent of the town generally affected. The Local Planning team has noted an area south of the Blackstone

⁷⁰ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan”

Shops that is more prone to straight line winds and high wind events. The extent and location of this high wind prone area has been indicated on the maps located in Appendix A of this plan.

EXTENT

An average thunderstorm is 15 miles across and lasts for 30 minutes; severe thunderstorms can be much larger and longer. Southern New England typically experiences 10 to 15 days per year with severe thunderstorms. Thunderstorms can cause hail, wind, lightning damage, and flooding.

High wind is linked to a number of other hazards, including hurricanes and winter storms, in addition to thunderstorms and tornadoes. High winds can cause damage to structures and trees and can also increase the risk of wildfire.

Tornadoes are measured using the Enhanced Fujita Scale, which is shown below with the following categories and corresponding descriptions of damage:

Table 24: Enhanced Fujita Scale Levels and Descriptions of Damage⁷¹

EF-Scale Number	Intensity Phrase	3-Second Gust (MPH)	Type of Damage Done
EF0	Gale	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damage to sign boards.
EF1	Moderate	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
EF2	Significant	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
EF3	Severe	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
EF4	Devastating	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

Table 25: Extent Scale for Hail⁷²

Hail Size (in.)	Object Analog Reported
.50	Marble, moth ball
.75	Penny
.88	Nickel
1.00	Quarter
1.25	Half Dollar
1.50	Walnut, ping pong

⁷¹ National Weather Service, "The Enhanced Fujita Scale (EF Scale)," [Weather.gov](https://www.weather.gov/oun/efscale), National Oceanic and Atmospheric Administration, accessed June 10, 2024, <https://www.weather.gov/oun/efscale>.

⁷² Storm Prediction Center, "Converting Traditional Hail Size Descriptions," [Spc.noaa.gov](https://www.spc.noaa.gov/misc/tables/hailsize.htm), National Oceanic and Atmospheric Administration, accessed June 10, 2024, <https://www.spc.noaa.gov/misc/tables/hailsize.htm>.

1.75	Golf ball
2.0	Hen egg
2.5	Tennis ball
2.75	Baseball
3.00	Tea cup
4.00	Grapefruit
4.50	Softball

PREVIOUS OCCURRENCES

Because thunderstorms and wind affect Millbury regularly, there is not a comprehensive record available of all thunderstorm and wind events which have affected the town. As per the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year.

In Worcester County, there have been several F1 tornadoes over the years. Tornadoes with a rating of 3 or above and tornadoes resulting in a death or injury, or significant property damage, are listed below.

- In 1953, an F4 tornado struck Worcester. The event resulted in at least 90 fatalities and more than 1,200 injuries. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton.
- In 1981 an F3 tornado struck Westminster, resulting in 3 injuries and very little reported property damage.
- In June 2011, an F3 tornado struck Massachusetts. Few deaths were reported, all in Hampden County. No deaths were reported in Worcester County.

Within the last 6 years, there has only been one small tornado that has affected communities near Milbury:

- August 19, 2021, Tornado (Webster), EF-0, light damage, no fatalities, no injuries

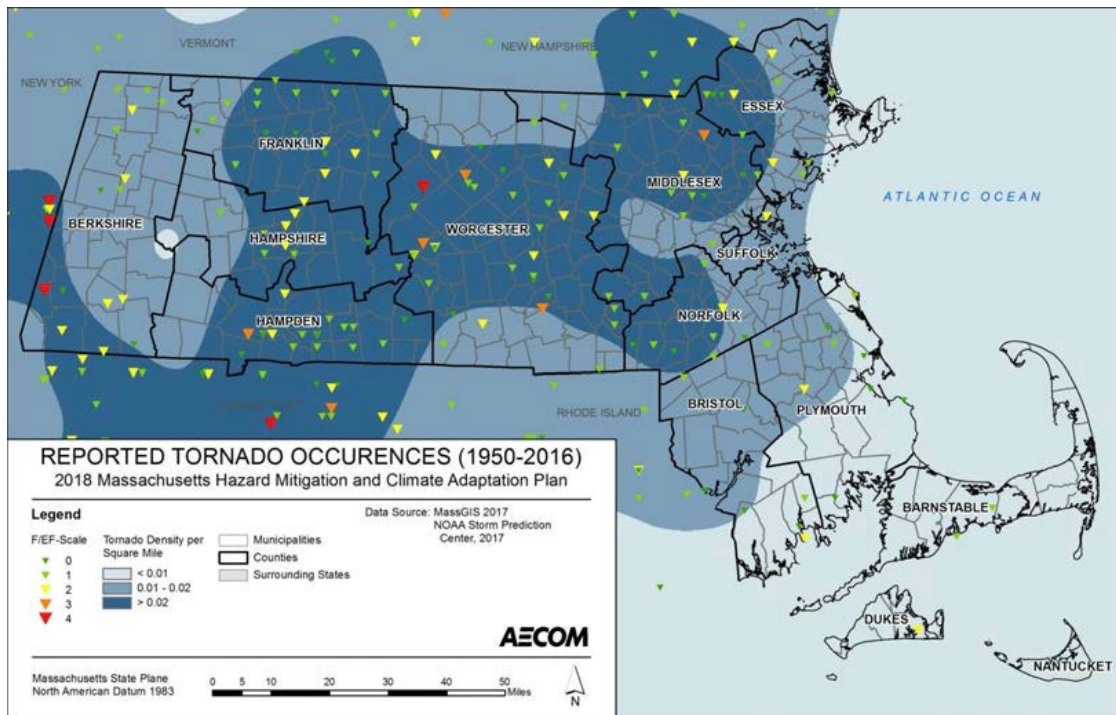


Figure 1: Density of Reported Tornadoes per Square Mile (1950-2016)⁷³

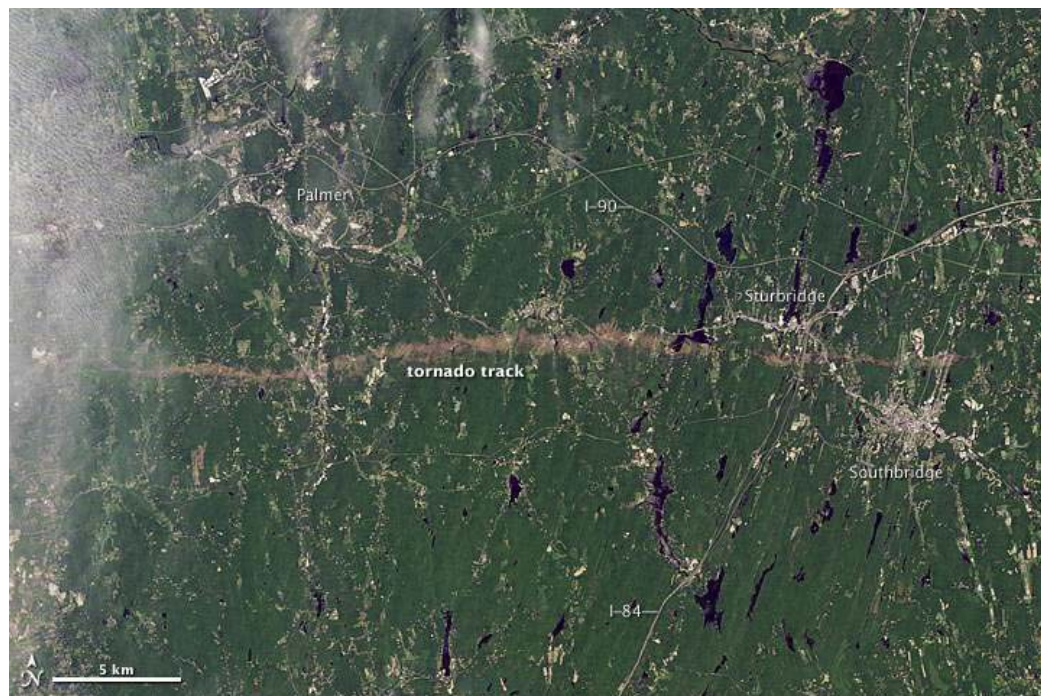


Image 3: Above - NASA released this image of part of the 39-mile-long tornado track through south-central Mass. The image was captured on June 5, 2011 by the Landsat 5 satellite.

⁷³ "Massachusetts State Hazard Mitigation and Climate Adaptation Plan," Mass.gov, Massachusetts Executive Office of Energy and Environmental Affairs and Massachusetts Emergency Management Agency, September 2018, <https://www.mass.gov/doc/state-hazard-mitigation-and-climate-adaptation-plan/download>.

Thunderstorm occurrences are more frequent in Massachusetts than tornadoes, but some strong thunderstorms have the potential to produce tornadoes. However, the type of storm that most commonly produces tornadoes is supercells: severe, long-lived thunderstorms. Approximately 20 percent of supercells produce tornadoes. In Millbury, there have been several severe thunderstorm/wind occurrences:⁷⁴

- 10/01/2010 – Strong Wind: Several waves of low pressure moved across Southern New England bringing unseasonably warm air into the area. This allowed for good mixing which brought strong winds from a strong low level jet to the surface. The Automated Surface Observing Station at Worcester Regional Airport (KORH) recorded sustained winds of 31 mph and a wind gust of 47 mph.
- 01/31/2013 – High Wind: A warm front moved northward across southern New England. This brought a period of mainly rain and warm temperatures. In addition, a strong low level jet (up to 80 kts) resulted in high winds across much of southern New England. There was some tree damage and downed power lines with winds gusting to 60 to 70 mph. An amateur radio operator in Milford recorded a wind gust to 64 mph on their home weather station. The Automated Surface Observation System at Worcester Regional Airport (KORH) recorded a wind gust to 55 mph.
- 02/25/2015 – High Wind: A storm moving north through the Great Lakes redeveloped along the Mid Atlantic coast on the 24th, then moved up the coast past Southern New England. This coastal storm brought damaging west-northwest winds to Massachusetts as it moved off through the Maritimes on the 25th.
- 08/23/2020 – Thunderstorm Wind: Diurnally driven thunderstorms brought wind damage, hail, and some flooding to mainly western and central Massachusetts. In Millbury, a tree was down on Cristo Ln.
- 11/01/2020 – Strong Wind: A line of heavy showers moved through in the evening hours, accompanied by a modest southerly low-level jet. Intensifying surface low pressure near the south coast of New England enhanced low level convergence. These gusty showers knocked down some trees and power lines. In Millbury, a tree was down on Park Hill Avenue at Weldon Drive
- 9/08/2023 – Thunderstorm Wind/Lightning: Southerly flow brought elevated dewpoints in the 70s to southern New England leading to a heat advisory. All the heat and humidity led to good instability which, along with forcing from a strong mid-level jet produced severe storms in Massachusetts and Connecticut and some flash flooding in Massachusetts. In Millbury, there were trees down on Riverlin St and there was a house fire on Stone Rd due to lightning.
- 02/28/2024 – High Wind: A strong cold front crossed southern New England on Wednesday night the 28th bringing soaking rains and strong wind gusts to southern New England followed by sharply falling temperatures. This cold frontal passage included a

⁷⁴ “Storm Events Database Search Results for Worcester County, Massachusetts,” NCDC.NOAA.gov, National Oceanic and Atmospheric Administration National Centers for Environmental Information, accessed June 5, 2025, https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2010&endDate_mm=12&endDate_dd=30&endDate_yyyy=2024&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS.

fine line stronger storms. Winds generally gusted 45 to 55 mph. The strongest gusts were 59 mph at the Worcester Airport ASOS (KORH) at 2:18 AM EST on the 29th and a gust to 55 mph at the Fitchburg Airport ASOS (KFIT) at 1:57 AM EST on the 29th.

- 8/15/2024 – Thunderstorm Wind: A round of afternoon thunderstorms associated with a cold front moved from north to south during the afternoon and evening bringing wind damage and severe hail to eastern Massachusetts. There was also localized flash flooding in Fall River. In Millbury, a tree was down on powerlines on Gould St.

Also, the local HMP planning team in town noted that lightning strikes have occurred in town primarily on residences. At the time of plan writing, the town does not have a lightning rod program.

PROBABILITY OF FUTURE EVENTS

According to the 2023 ResilientMass Plan, Massachusetts averages two to five tornadoes per year.⁷⁵ Only two tornadoes in the state (which occurred in 1953 and 2011) received disaster declarations. Massachusetts has experienced 12 EF0 to EF1 tornadoes since 2018; six EF0 tornadoes occurred in the state in 2021, and these 2021 EF0 tornadoes caused under \$50,000 in property damage. Because tornadoes are relatively rare in the Commonwealth, residents are less likely to be prepared for them in the Commonwealth than in other parts of the country. People who live in manufactured housing, such as mobile homes, are more at risk to tornadoes. Tornadoes can affect all sectors and populations, and their primary effect is damage from their high winds to structures and the environment. Any structure located in a tornado zone or path is at risk. Tornado activity may become more variable due to climate change, so predicting the likelihood of future tornado events in Millbury is difficult.

Based upon the available historical record, as well as Millbury's location in a moderate-density cluster of tornado activity for Massachusetts, there is a "very low" probability (less than 1% chance in any given year) of a tornado affecting the town, and a moderate (10% to 40% chance in any given year) probability of a severe thunderstorm and/or high winds affecting the town.

IMPACT

Overall, Millbury faces a "minor" impact from severe thunderstorms, with less than 10% of property in the affected area of town expected to be damaged in this type of hazard event. Millbury also faces a "limited" impact from severe winds and tornados, with between 10% and 25% of property in town expected to be damaged in these types of hazard events.

As indicated in the table above, the following likely impacts on the physical environment can result from tornadoes of different levels:

- EF0 - Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damage to sign boards.
- EF1 - The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving automobiles pushed off the roads; attached garages may be destroyed.
- EF2 - Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
- EF3 - Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.

⁷⁵ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

- EF4 - Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

The potential for local catastrophic damage is a factor in any tornado, severe thunderstorm, or wind event. In Millbury, a tornado that hits residential areas would leave much more damage than a tornado with a travel path that ran along the town's uplands, where there is less settlement. Most buildings in town have not been built to Zone 1 Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, and 55.8% of the town's 5,603 total housing units were constructed in 1979 or earlier (according to the 2022 American Community Survey 5-year estimates).⁷⁶ Some important town facilities are also vulnerable to strong winds and tornadoes in Millbury.

Millbury's median home value is \$415,600 (according to American Community Survey 2023 5-year estimates).⁷⁷ Utilizing the total value of all property in town, \$2,562,227,103⁷⁸ and an estimated 10 percent of damage to 5 percent of all structures, the estimated amount of damage from a tornado in town is \$12,811,135.52. The cost of repairing or replacing roads, bridges, utilities, and contents inside structures is not included in this estimate.

The impact on the population of Millbury is highly dependent on the track of the high winds, thunderstorms or tornadoes, and will vary based on the severity of the storm event with the greatest impact caused by tornadoes.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to severe thunderstorms/wind/tornadoes, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. Vulnerable features to severe thunderstorms/wind/tornadoes overlap with the features vulnerable to hurricanes and flooding described in the sections of this plan focusing on these other hazards. Millbury's older building stock makes it particularly vulnerable to high wind events.

POTENTIAL CLIMATE CHANGE EFFECTS

The 2023 ResilientMass Plan identifies that current climate models predict an increase in severe thunderstorms, which have the potential to produce tornadoes. However, it is unknown if tornado frequency will increase with climate change. Some studies suggest there will be a decrease in the number of tornado days, but an increase in the number of tornadoes per day.⁷⁹

Without a clear understanding of how climate change will impact tornadoes, the town is not able to determine exactly how this hazard will impact population patterns and land use needs for the town of Millbury. However, if climate change does increase the likelihood of tornado occurrence, the town may have to incorporate additional emergency shelters into development and land use.

⁷⁶ "DP04: Selected Housing Characteristics," Data.Census.gov, United States Census Bureau, accessed June 5, 2025, <https://data.census.gov/table?q=DP04&q=060XX00US2502741340>

⁷⁷ Ibid.

⁷⁸ Data Analytics and Research Bureau, "Assessed Values by Class," Dlsgateway.dor.state.ma.us, Massachusetts Department of Revenue, June 5, 2025, <https://dlsgateway.dor.state.ma.us/reports/rdPage.aspx?rdReport=PropertyTaxInformation.AssessedValuesbyClass.assessedvaluesbyclass&tlassessedvalues-PageNr=4&rdDataCache=400584956&rdShowModes=&rdSort=&rdNewPageNr=True1&rdRequestForwarding=Form>.

⁷⁹ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," page 5.1-56.

VULNERABILITY

Based on the above assessment, Millbury has a hazard index rating of “2 – high risk” from severe thunderstorms and winds, and a “3 – Moderate risk” from tornadoes. Millbury has older housing stock and older building stock in general that may or may not be up to code for wind speeds and its location in proximity to past tornado events (such as the Worcester tornado of 1953) means that despite the low frequency of tornado events, should one occur in town it has the potential to substantially damage many of the structures.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to severe thunderstorms, wind, and tornadoes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand upon its existing capabilities to mitigate and respond to severe thunderstorms, wind, and tornadoes. The local HMP planning team identified the following strategies that could be used to reduce the threat of severe thunderstorms and tornadoes in Millbury:

- Pursue funding to power-retrofit municipal structures to accept portable external power for a mobile generator that can power multiple municipal buildings (see strategy under “preparedness, coordination & response”)
- Pursue funding to replace the sewer and highway buildings. Both buildings are in need of replacement, and both play a critical role in natural hazard response. In addition, both buildings have flat roofs and lead to snow load concerns.
- Create a town-wide microgrid by installing the following: solar canopy system(s) on municipal and/or school parking lots, brownfields, capped landfills, and closed fuel facilities, rooftop solar array(s) for municipal, public hospital, and/or public school building rooftops, and a battery storage substation which connects to the grid. These microgrids can increase the town’s resiliency to storm events.
- Establish a town program to buy lightning rods on an as-needed basis.
- Conduct an education program surrounding NPDES MS4 permit to supplement pollution prevention efforts; educate on storm drain safety/clearance and related topics.
- Participate in a regional debris management plan to enhance coordination regarding post-disaster debris cleanup

4.7 WILDFIRES

Wildfires are typically larger fires involving full-sized trees as well as meadows and scrublands. Brush fires are uncontrolled fires that occur in meadows and scrublands and that do not involve full-sized trees. Typical causes of wildfires and brush fires are lightning strikes, human carelessness, and arson. Relative humidity and wind are two weather-related factors that influence fire danger. Relative humidity refers to “the ratio of the amount of moisture in the air to the amount of moisture necessary to saturate the air at the same temperature and pressure.”⁸⁰ When relative moisture drops, light fuels like grasses become drier and burn more easily.⁸¹

FEMA has classifications for three different types of wildfires:

- Surface fires are the most common type of wildfire, with the surface burning slowly along the floor of a forest, killing or damaging trees.
- Ground fires burn on or below the forest floor and are usually started by lightning.
- Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions.

Potential effects of wildfires include damage to structures and other human infrastructure as well as impacts on natural resources. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly, and people with respiratory and cardiovascular diseases.

LOCATION

Approximately 74.4% of total land area in Worcester County is deciduous forest, evergreen forest, forested wetland, scrub/shrub land, scrub/shrub wetland, or grassland.⁸² Much of this region of Massachusetts, including the Millbury area, has a high risk of wildfire. In Millbury, approximately 46% of land is deciduous forest, approximately 7% of land is evergreen forest, approximately 8% of land is forested wetland, approximately 1% of land is scrub/shrub land, and approximately 4% of land is grassland.⁸³ Millbury is developed in a moderate to high-density suburban pattern, with few uninterrupted tracts of forest present. Although the substantial tree cover in town does present some risk for wildfires and brush fires, the total amount of the town that could be affected by a wildfire is categorized as “small,” or less than 10 percent of its total area.

The water distribution system in town is under private ownership, and the distribution is managed by the water company Aquarion. This distribution system covers roughly 70% of the town. The remaining residents who are on private well water are primarily in the area of West Millbury. The town’s water distribution provider sources its water primarily from wellfields and is able to supply water but is nearing capacity with the current sources according to the local hazard mitigation planning team.

⁸⁰ “Understanding Fire Danger,” Nps.gov, United States National Park Service, August 17, 2023, <https://www.nps.gov/articles/understanding-fire-danger.htm>.

⁸¹ Ibid.

⁸² Massachusetts Bureau of Geographic Information, “MassGIS Data: 2016 Land Cover/Land Use,” Mass.gov, Massachusetts Executive Office of Technology Services and Security, May 2019, <https://www.mass.gov/info-details/massgis-data-2016-land-coverland-use>.

⁸³ Ibid.

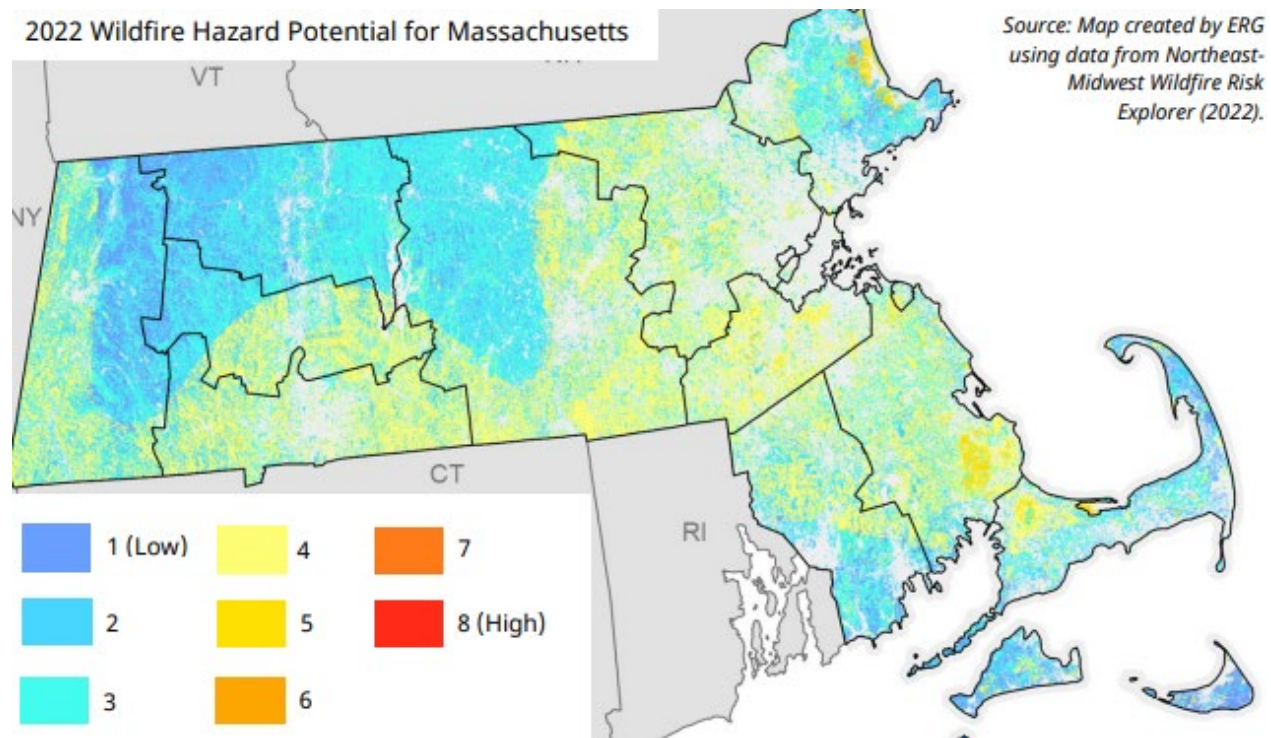


Figure 2: Wildfire Risk Areas for the Commonwealth of Massachusetts.⁸⁴

EXTENT

Wildfires can cause widespread damage. They can spread very rapidly, depending on local wind speeds, and can be very difficult to get under control. Wildfires can last from several hours up to several days.

In Millbury, approximately 66% of the town's total land area is deciduous forest, evergreen forest, forested wetland, scrub/shrub land, or grassland. These areas are at risk of fire and are spread evenly throughout the community, with developed areas, rivers, and major transportation corridors (such as Route 140 and the Grafton-Upton Railroad) breaking up the forest. In drought conditions, a brushfire or wildfire would be a matter of concern in town.

The National Fire Danger Rating system illustrates the potential extent of wildfires, should they occur under the different fire danger conditions:

Table 26: The National Fire Danger Rating System

Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L) Color Code: Green	Fires not easily started	Fire starts are unlikely. Weather and fuel conditions will lead to slow fire spread, low intensity, and relatively easy control with light mop up. Controlled burns can usually be executed with reasonable safety.

⁸⁴ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

Rating	Basic Description	Detailed Description
CLASS 2: Moderate Danger (M) Color Code: Blue	Fires start easily and spread at a moderate rate	Some wildfires may be expected. Expect moderate flame length and rate of spread. Control is usually not difficult and light to moderate mop up can be expected. Although controlled burning can be done without creating a hazard, routine caution should be taken.
CLASS 3: High Danger (H) Color Code: Yellow	Fires start easily and spread at a rapid rate	Wildfires are likely. Fires in heavy, continuous fuel, such as mature grassland, weed fields, and forest litter, will be difficult to control under windy conditions. Control through direct attack may be difficult but possible, and mop up will be required. Outdoor burning should be restricted to early morning and late evening hours.
CLASS 4: Very High Danger (VH) Color Code: Orange	Fires start very easily and spread at a very fast rate	Fires start easily from all causes and may spread faster than suppression resources can travel. Flame lengths will be long with high intensity, making control very difficult. Both suppression and mop up will require an extended and very thorough effort. Outdoor burning is not recommended.
CLASS 5: Extreme (E) Color Code: Red	Fire situation is explosive and can result in extensive property damage	Fires will start and spread rapidly. Every fire start has the potential to become large. Expect extreme, erratic fire behavior. NO OUTDOOR BURNING SHOULD TAKE PLACE IN AREAS WITH EXTREME FIRE DANGER.

Beyond the direct hazards that wildfires pose, wildfires pose the indirect hazard of air quality reduction from smoke particulates. Smoke particulates are measured, along with other particulates that affect air quality, by the EPA's Air Quality Index.⁸⁵ For each pollutant, an AQI value of 100 generally corresponds to an ambient air concentration that equals the level of the short-term national ambient air quality standard for the protection of public health. AQI values at or below 100 are generally thought of as satisfactory. When AQI values rise above 100, air quality is unhealthy – at first for certain sensitive groups of people, then for everyone as AQI values get higher. The EPA establishes an AQI for five major air pollutants regulated by the Clean Air Act. Each of these pollutants have a national air quality standard set by EPA to protect public health, and these pollutants are ground-level ozone; particle pollution (also known as particulate matter, including PM_{2.5} and PM₁₀); carbon monoxide; sulfur dioxide; and nitrogen dioxide.

The AQI is divided into six categories. Each category corresponds to a different level of health concern. Each category also has a specific color. The color makes it easy for people to quickly determine whether air quality is reaching unhealthy levels in their communities.

⁸⁵ "Air Quality Index (AQI) Basics," Airnow.gov, United States Environmental Protection Agency, accessed June 4, 2025, <https://www.airnow.gov/aqi/aqi-basics/>.

Table 27: AQI Basics for Ozone and Particle Pollution

Daily AQI Color	Levels of Concern	Values of Index	Description of Air Quality
Green	Good	0 to 50	Air quality is satisfactory, and air pollution poses little or no risk.
Yellow	Moderate	51 to 100	Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.
Orange	Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Red	Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Purple	Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Maroon	Hazardous	301 and higher	Health warning of emergency conditions: everyone is more likely to be affected.

PREVIOUS OCCURRENCES

Millbury has a full-time Fire Department providing 24/7 coverage and is part of the Massachusetts Fire District 7 Mutual Aid Association. Millbury has experienced 122 wildfires / brush fires between 2011-2020; however, each of these fires were quite small, and altogether they consumed 47.25 acres of brush/wildland.⁸⁶

During a critical drought which occurred across most of Massachusetts in late 2024 and was ongoing at the time of the writing of this plan, at least 638 wildfires which in combination burned at least 3,413 acres occurred in the state.⁸⁷

PROBABILITY OF FUTURE EVENTS

The 2023 ResilientMass Plan notes that climate-change driven changes in the intensity and frequency of precipitation and thunderstorms, prolonged drought conditions, and rising

⁸⁶ "Wildfire Data," Cmrpc-my.sharepoint.com, Massachusetts Fire Incident Reporting System, accessed June 4, 2025, https://cmrpc-my.sharepoint.com/:x:/g/personal/ssullivan_cmrpc_org/EXYxV4S-WZNPf3QEa7LN5IBMr1Cknd1lyZ3Drx01ZJ7VQ?e=UxkafK

⁸⁷ Massachusetts Emergency Management Agency, "Massachusetts Emergency Management Agency Situational Awareness Statement # 24: Statewide Wildfire Operations," (issue brief), Boston, Massachusetts, November 21, 2024.

temperatures are expected to increase the frequency and severity of wildfires.⁸⁸ In drought conditions, forest types that are not typically prone to wildfires will become more likely to burn. Globally, wildfires are projected to increase worldwide by 14% by 2030, 30% by 2050, and 50% by 2100.

Changes in weather patterns driven by climate change can intensify fires which in turn heighten the effects of climate change. By mid-century, mean summer temperatures in the Blackstone River Basin are projected to increase by 3.6° F to 8.1° F due to climate change.⁸⁹ Rising temperatures coupled with variable precipitation could exacerbate summer drought and could encourage more high-elevation wildfires. These wildfires release stores of carbon that contribute to the buildup of greenhouse gases and therefore further exacerbate climate change.

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

The Millbury HMP Planning Team found it difficult to predict the likelihood of wildfires in a probabilistic manner because of the number of variables involved, including fuel availability, weather and climate conditions, and human activity. These variables all factor into wildfire occurrences. However, based on regular previous occurrences of minor brush fires in town, the local HMP planning team determined the probability of future damaging wildfire events to be “moderate” (10% to 40% percent probability in the next year).

IMPACT

While a large wildfire could in theory damage much of the landmass of Millbury, most forested areas are sparsely developed, which means that fires in the most wildfire-prone areas of town are less likely to cause damage to property. For this reason, the town faces a “minor” impact from wildfires, with damage to less than 10% of property in the affected area of town likely to occur in the case of a wildfire hazard event.

Both wildfires and brush fires can consume homes, other buildings, and/or agricultural resources. Wildfires and brush fires impact:

- Benefits that people receive from the environment, such as food/water and the regulation of floods and drought;
- Local heritage, through the destruction of natural features;
- The economy, due to damage to property and income from land following a wildfire;
- The overall destruction of property, loss of life, and/or injuries.

Utilizing the total value of all property, \$2,562,227,103,⁹⁰ and an estimated 5 percent of damage to 1 percent of all structures, the estimated amount of damage from a wildfire in town is \$1,281,113.55. The cost of repairing or replacing roads, bridges, utilities, and contents inside structures is not included in this estimate.

The Wildland Urban Interface (WUI) is defined as the area where houses meet or intermingle with

⁸⁸ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan”

⁸⁹ ResilientMass Plan Maps and Data Center, “Climate Change Projections Dashboard,” Resilientma-mapcenter-mass-eoea.hub.arcgis.com, ResilientMass Plan, accessed July 1, 2024, <https://resilientma-mapcenter-mass-eoea.hub.arcgis.com/#ClimateDashboard>.

⁹⁰ Data Analytics and Research Bureau, “Assessed Values by Class”

undeveloped wildland vegetation; the WUI represents a large percentage of land use within Worcester County as a whole.⁹¹

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to wildfires/brush fires, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- People who are sensitive to smoke, including children, the elderly, and individuals with health conditions. Air pollution from wildfires is a public health concern, as it leads to smoke inhalation which can be severe. Smoke can exacerbate respiratory conditions like asthma and can carry toxic chemicals and particulate matter. In 2021, wildfire smoke from western states and Canada extended across the continental US and forced the Massachusetts Department of Environmental Protection to issue an air quality alert;⁹² and
- First responders, especially the town's firefighters.

Specifically, the following critical infrastructure routes identified in this plan were noted as being especially vulnerable to wildfires / brush fires by CMPRC's GIS analysis:

- Cross Street
- The Local Planning team expressed concerns regarding conservation land on Colton Road as well as near Brierly Road. As the forest regimes have changed there this has led to significant die off of vegetation, creating hazardous fuel loads in that area.
- Stowe Meadows
- Davidson Sanctuary
- Clearview Conservation Area
- The Martha Deering Wildlife Management Area
- Undeveloped properties along Route 146
- The woodland around the Grafton Upton Railroad and MBTA track, though the local planning team notes that brush management in that area has been sufficient to prevent stray sparks from railroad operations from setting fires there.

As previously described in the 2021 example above, wildfires do not have to take place within town to affect the town. In March through July of 2023, historic wildfires in Canada sent smoke across a broad swath of New England, peaking in June of that year. In Worcester County, these fires reduced air quality throughout the months of May and June. The AQI for Worcester County peaked at 148 – Unhealthy for Sensitive Groups for fine particulate matter (PM2.5) – on June 6th,

⁹¹ Volker C. Radeloff et al., "The 1990-2020 wildland-urban interface of the conterminous United States - geospatial data," FS.USDA.gov, Forest Service Research Data Archive, 2023, https://www.fs.usda.gov/rds/archive/products/RDS-2015-0012-4/_metadata_RDS-2015-0012-4.html.

⁹² Kat J. McAlpine (2021, July 27). "Wildfire Smoke in New England Is 'Pretty Severe from Public Health Perspective'," BU.edu, The Brink: Pioneering Research from Boston University, July 27, 2021, <https://www.bu.edu/articles/2021/wildfire-smoke-in-new-england/>.

POTENTIAL CLIMATE CHANGE EFFECTS

The effects of climate change will impact future wildfires, as is noted in the “Probability of Future Events” section above. According to the 2023 ResilientMass Plan, precipitation changes, prolonged drought, rising temperatures, and increased frequency of lightning are expected to contribute to increased frequency and severity of wildfire.⁹⁴ As droughts become more frequent and severe, forest types that do not usually burn and are not fire adapted will be more likely to burn. Wildfires are projected to increase worldwide by 14% by 2030, 30% by 2050, and 50% by 2100.

Seasonal drought exacerbated by climate change may also make it more difficult to ensure a reliable water source for firefighting.

In summary, climate change is likely to increase the frequency and extent of wildfires in Millbury. This increase in wildfire events may lead to changes in land use, such as the town no longer being able to develop near dense forest. Additionally, if wildfires and brush fires worsen significantly, residents may desire to move away from dense forest, shifting populations from more rural areas to cities or downtown communities. The future air quality risks to Millbury from wildfires are hard to predict with any certainty and represent a threat to the broader region; town officials could consider including air purifying equipment as a needed aspect of shelter planning in the future.

VULNERABILITY

Based on the above assessment, Millbury has a hazard risk index of “4 – low risk” from wildfires. However, this risk assessment is highly dependent on short term weather patterns like wind, lightning, and rainfall, which are impossible for the town to predict with certainty. Sustained drought conditions could put Millbury at risk to a greater frequency and ferocity of wildfires, and wildfires outside of Millbury could reduce air quality to dangerous levels in town.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to wildfires and brush fires through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand upon its existing capabilities to mitigate and respond to wildfires and brush fires. The local HMP planning team identified the following strategies that could be used to reduce the threat of wildfires / brush fires in Millbury:

- Extend the water station pipes to the 207 Riverlin Transfer Station to address fire concerns. There is no running water at the transfer station, where 3,800 residents drop off waste. This will also ensure effective removal of debris in the event of a natural hazard event.
- Create a town-wide microgrid by installing the following: solar canopy system(s) on municipal and/or school parking lots, brownfields, capped landfills, and closed fuel facilities, rooftop solar array(s) for municipal, public hospital, and/or public school building rooftops, and a battery storage substation which connects to the grid. These microgrids can increase the town’s resiliency to storm events.
- Install sprinklers at municipal facilities to enhance fire protection.

⁹³ “Pre-Generated Data Files,” Aqs.epa.gov, United States Environmental Protection Agency, October 26, 2023, https://aqs.epa.gov/aqsweb/airdata/download_files.html.

⁹⁴ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan”

4.8 EARTHQUAKES

An earthquake is a sudden, rapid shaking of the ground caused by the breaking and shifting of rock beneath the Earth's surface. Earthquakes can occur suddenly and without warning at any time of the year. Ground shaking from earthquakes can rupture gas mains and disrupt other utility services, damage buildings, bridges, and roads, and trigger other hazardous events such as avalanches, flash floods (which can be caused by dam failure), and fires. Unreinforced masonry buildings, buildings with foundations that rest on filled land or unconsolidated and unstable soil, and mobile homes not tied to their foundations are especially vulnerable during an earthquake.

LOCATION

Because of the regional nature of the hazard, the entire Town of Millbury is susceptible to earthquakes. This makes the location of occurrence for this hazard "large."

EXTENT

Earthquake magnitude and intensity are two measures of the overall extent of earthquakes in a given area. Magnitude is defined as the energy produced by an earthquake, and intensity is defined as an earthquake's level of effect on the Earth's physical environment, nature, people, and structures.

The magnitude of an earthquake can be measured using the Richter Scale, which measures the energy of an earthquake by determining the size of the greatest vibrations recorded on a seismogram. On this scale, one step up in magnitude (from 5.0 to 6.0, for example) indicates an increase in energy of an earthquake of more than 30 times. Earthquakes are also commonly measured using the moment magnitude scale, which provides similar measurements to the Richter scale but more accurately measures earthquakes with magnitudes greater than 8.⁹⁵

Table 28: Richter Scale Magnitudes and Effects

Magnitude	Effects
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

⁹⁵ "How Do We Measure Earthquake Magnitude? Michigan Technological University," MTU.edu, Michigan Tech, accessed June 10, 2024, <https://www.mtu.edu/geo/community/seismology/learn/earthquake-measure/>.

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

Table 29: Modified Mercalli Intensity Scale for and Effects⁹⁶

Scale	Intensity	Description of Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs.	
II	Feeble	Some people feel it.	< 4.2
III	Slight	Felt by people resting; like a truck rumbling by.	
IV	Moderate	Felt by people walking.	
V	Slightly Strong	Sleepers awake; church bells ring.	< 4.8
VI	Strong	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	Ruinous	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

⁹⁶ Earthquake Hazards Program, "The Modified Mercalli Intensity Scale," USGS.gov, United States Geologic Survey, accessed June 10, 2024, https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale?qt-science_center_objects=0#qt-science_center_objects.

PREVIOUS OCCURRENCES

The last recorded earthquake to cause major damage in New England occurred in 1755,⁹⁷ though seismologists state that another serious earthquake occurrence in the region in the future is possible. There are five seismological faults in Massachusetts, but there is no discernible pattern of previous earthquakes along these fault lines. Additionally, earthquakes that are based in more seismologically active regions like parts of Canada may also impact Massachusetts.⁹⁸ Earthquakes occur without warning and may be followed by aftershocks. Figure 3 below shows the locations of earthquakes that have occurred across the New England region and beyond from January 1975 through October 2017.

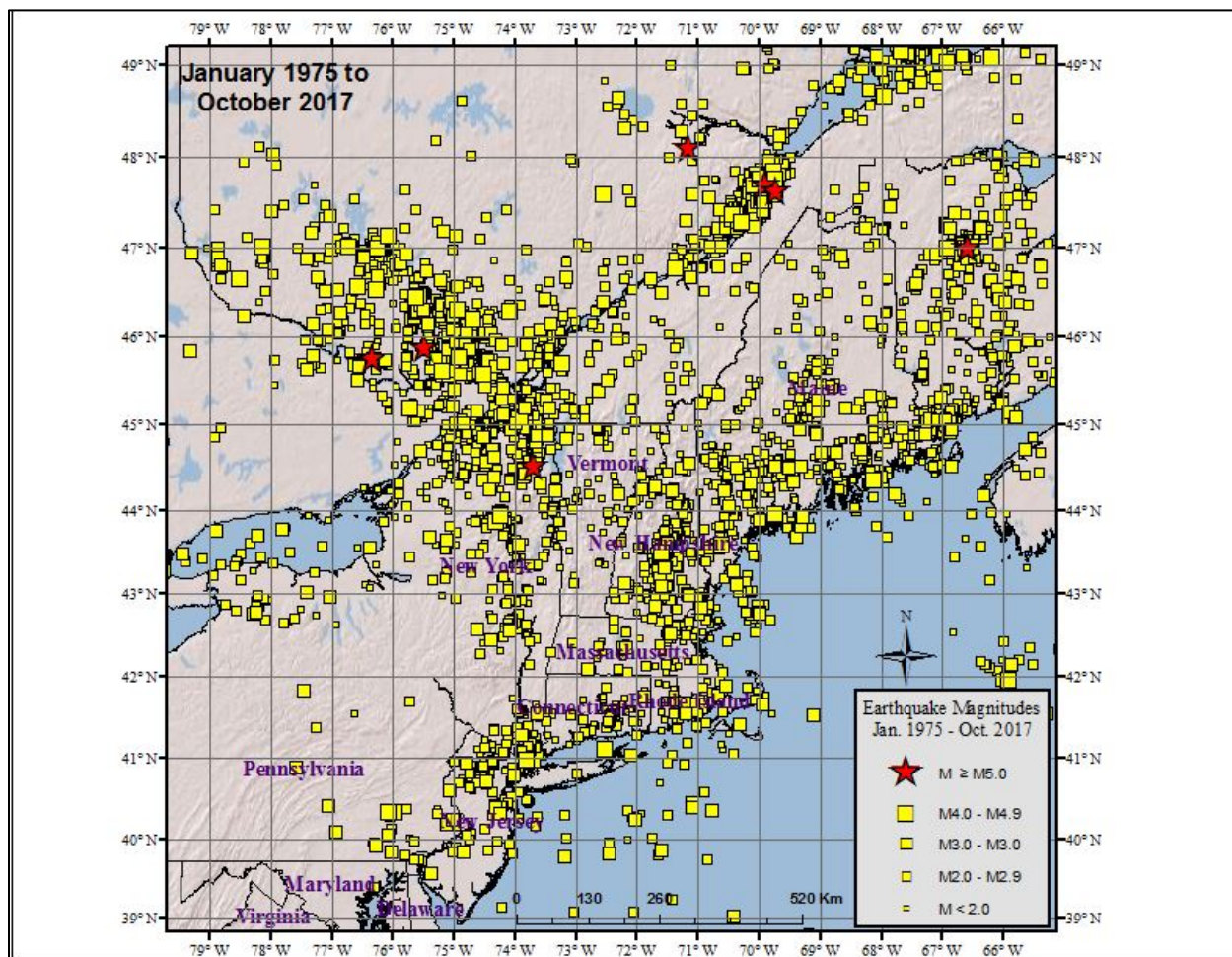


Figure 3: Map of Earthquakes of the Northeastern US and Southeastern Canada 1975 to 2017.⁹⁹

The local hazard mitigation planning team reports that no earthquakes have recently been felt in Millbury. To determine whether earthquakes have occurred recently near Millbury, earthquake data over the past six years for all Massachusetts cities and towns gathered by the Weston

⁹⁷ Northeast States Emergency Consortium and John E. Ebel, PhD. Boston College, Weston Observatory, "Massachusetts Earthquakes," NESEC.org, Northeast States Emergency Consortium, accessed June 4, 2025, <http://nsec.org/massachusetts-earthquakes/>.

⁹⁸ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

⁹⁹ "New York Earthquakes," NESEC.org, Northeast States Emergency Consortium, accessed June 4, 2025, <https://nsec.org/new-york-earthquakes/>.

Observatory at Boston College was reviewed.

The Weston Observatory utilizes two scales to track the magnitude of earthquakes. One of these scales is the Nuttli magnitude (Mn) for North America east of the Rocky Mountains. Weston Observatory also utilizes the Coda Duration magnitude (Mc) scale, which is based on the duration of shaking at a particular station. The Coda Duration magnitude can quickly estimate the magnitude of an earthquake before its exact location is known.

The following earthquakes with a magnitude of over 2.0 on either the Nuttli magnitude or Coda Duration magnitude scales have been recorded at the Weston Observatory since 2018:

- 12/21/2018 – 3 km WSW of Gardner, 2.1/2.1 [Mn*/Mc**]
- 12/23/2018 – 4 km SW of Gardner, 2.1/2.3
- 1/28/2019 – 4 km WSW of Gardner, 2.1/2.3
- 8/21/2019 – 2 km SSE of Wareham, 1.7/2.4
- 12/3/2019 – 4 km SSE of Plymouth, 1.6/2.2
- 11/8/2020 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/2020 – 12 km WSW of New Bedford, 1.7/2.6
- 07/25/2021 – 5.0km W OF PEABODY 1.4/2.5 [Mn*/Mc**]
- 01/01/2022 – 13.0km N OF ROCKPORT 2.3/3.0
- 03/04/2022 - 5.0km WSW OF ORANGE 2.2/2.7
- 11/10/2022 – 12.0km NW OF NANTUCKET 2.6/3.0
- 11/13/2023 – 208.0km E OF CHATHAM 2.8/3.3
- 12/26/2023 – 52.0km ENE OF ROCKPORT 2.2/2.8
- 03/11/2024 – 6.0KM E OF LAWRENCE 1.1/2.1

*Mn is the Nuttli Magnitude (see below)

**Mc is the Coda Duration Magnitude (see below)

Each of these earthquakes are minor. Additionally, earthquakes with a magnitude of about 2.0 or less are usually called "microearthquakes" and are generally only recorded locally.¹⁰⁰

PROBABILITY OF FUTURE EVENTS

The 2023 ResilientMass Plan notes that "The probability of a magnitude 5.0 or greater earthquake centered in New England in a 10-year period is about 10–15%."¹⁰¹ Additionally, this plan notes that while Massachusetts is not near any tectonic plate boundaries, it is still susceptible to earthquakes on the North American Plate. Earthquakes elsewhere could also have secondary effects on the state and the region, such as potentially disrupting supply chains.

Based upon existing records, there is "very low" frequency (less than 1 percent probability in any

¹⁰⁰ New England Seismic Network, "NESN Recent Earthquakes," Aki.bc.edu, Weston Observatory at Boston College, accessed June 4, 2025, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl.

¹⁰¹ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," page 5.1-42.

given year) of damaging earthquakes in Millbury.

IMPACT

Massachusetts introduced earthquake design requirements into its state building code in 1975 and improved its state building code for seismic resilience in the 1980s. However, these specifications apply only to new buildings or to extensively modified existing buildings. Buildings, bridges, water supply lines, and electrical power lines and facilities built before the 1980s may not be designed to withstand the forces of an earthquake. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, and 66% of the town's 5,603 total housing units, according to 2023 American Community Survey 5-year estimates, were constructed in 1979 or earlier.¹⁰² Seismic standards in Massachusetts were upgraded with the 1997 revision of the state building code. Due to its fairly old housing stock, Millbury faces a "limited" impact from earthquakes, with damage to more than 10% of property in town likely to occur in the event of an earthquake due to the extreme rarity of damaging events.

HAZUS-MH (multiple-hazards) is a computer program developed by FEMA which estimates losses due to a variety of natural hazards. The HAZUS earthquake module allows users to define an earthquake magnitude and model the potential damage caused by that earthquake as if its epicenter is at the geographic center of the study area. For the purposes of this plan, a magnitude 5.0 earthquake was selected for analysis. Historically, major earthquakes are rare in New England, although a magnitude 5 earthquake occurred in the region in 1963.

**Table 30: HAZUS Potential Damages from a Magnitude 5.0 Earthquake
with an Epicenter in Millbury**

HAZUS Potential Damages	Magnitude 5.0
Building Characteristics	
Estimated total number of buildings	4,184
Estimated total building replacement value (2024 \$)	\$2,259,000,000
Building Damages	
# of buildings sustaining slight damage	1,251
# of buildings sustaining moderate damage	629
# of buildings sustaining extensive damage	146
# of buildings completely damaged	34
Population Needs	
# of households displaced	100
# of people seeking public shelter	43
Debris	
Building debris generated (tons)	50,000

¹⁰² "DP04: Selected Housing Characteristics," Data.Census.gov

# of truckloads to clear debris (@ 25 tons/truck)	2,000
Value of Damages (dollars)	
Total property damage	\$301,226,000
Total losses due to business interruption	\$53,134,000

For more information on the HAZUS-MH software, go to www.fema.gov/hazus-software.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to earthquakes, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3.0 These features include:

- Older buildings constructed prior to the first edition of the Massachusetts State Building Code.

POTENTIAL CLIMATE CHANGE EFFECTS

The 2023 ResilientMass Plan identifies no climate change effects that pertain to earthquake hazards.¹⁰³

VULNERABILITY

Based on the above analysis, Millbury has a hazard index rating of "5 – lowest risk" from earthquakes.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to earthquakes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand its existing capabilities to mitigate and respond to earthquakes. The local HMP planning team identified the following strategies that could be used to reduce the threat of earthquakes in Millbury:

- Participate in a regional debris management plan to enhance coordination regarding post-disaster debris cleanup
- Inventory unreinforced masonry and brick buildings in town that may be vulnerable to earthquakes. Conduct a study which identifies ways that these buildings can meet the Massachusetts State Building Code's seismic standards.

¹⁰³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

4.9 DAM FAILURE

Dams and their associated impoundments provide many benefits, such as water supply, recreation, hydroelectric power generation, and flood control, to communities. However, dams also pose a risk to lives and property in cases in which they fail. Dam failure is not a common occurrence, but dams do represent a potentially disastrous hazard.

When a dam fails, the potential energy of the stored water behind the dam is released rapidly. Some dam failures occur when floodwaters overtop and erode the material components of the dam. Other dam failures are caused by foundation defects, inadequate maintenance, internal erosion caused by seepage, and other specific causes.¹⁰⁴ Dam failures may be influenced by storm floodwaters, but most dam failures are caused by structural, mechanical, or hydraulic failures.¹⁰⁵ Dam breaches can lead to catastrophic consequences; they cause water to rush in a torrent downstream, flooding an area engineers refer to as an “inundation area.” The number of casualties and the amount of property damage resulting from a dam failure will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Many dams in Massachusetts were built during the 19th century without the benefit of modern engineering design and construction oversight. Dams of this age are more vulnerable to failing because of structural problems caused by their age and/or lack of proper maintenance, as well as due to structural damage caused by an earthquake or flooding. The Massachusetts Department of Conservation and Recreation (DCR) Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00).¹⁰⁶ Dams that are in excess of 6 feet in height (regardless of storage capacity) and that have more than 15 acre-feet of storage capacity (regardless of height) are under DCR regulation. Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the Commonwealth of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

LOCATION

According to the Massachusetts Office of Dam Safety, there are 20 dams in Millbury. Of these dams, two are ranked as high hazard and six are ranked as significant hazard. Also included is Slaughterhouse Pond dam which is located near the border of Millbury and Sutton. This dam does not appear on the Office of Dam Safety database, and its location could not be independently verified. Dams in Millbury are listed below and are mapped in Appendix A.

¹⁰⁴ Association of State Dam Safety Officials. (n.d.). Dam Failures and Incidents. Association of State Dam Safety Officials. Retrieved December 29, 2021, from <https://damsafety.org/dam-failures>

¹⁰⁵ “Living with Dams: Know Your Risks (FEMA P-956),” Federal Emergency Management Agency, February 2013, page 9, https://www.fema.gov/sites/default/files/2020-08/fema_living-with-dams_p-956.pdf.

¹⁰⁶ “Section 44: Definitions applicable to Secs. 44 to 48B,” MAlegislature.gov, The 193rd General Court of the Commonwealth of Massachusetts, accessed September 17, 2024, <https://malegislature.gov/Laws/GeneralLaws/PartIII/TitleIV/Chapter253/Section44>; “302 CMR 10.00: Dam safety,” Mass.gov, The Commonwealth of Massachusetts, Massachusetts Court System, February 10, 2017, <https://www.mass.gov/regulations/302-CMR-1000-dam-safety#:~:text=302%20CMR%2010.00%20provides%20regulatory%20guidelines%20for%20the,public%20review%20of%20the%20performance%20of%20a%20dam>.

Table 31: Dams within Millbury

National ID	Dam Name	Owner	Regulatory Authority	Hazard Code	Notes
MA00142	Mayo Mill Pond #1 Dam	Private	Non-Jurisdictional - Other	N/A	
MA00143	Brierly Pond Dam	Unknown	Office of Dam Safety	Significant Hazard	Ownership Structure is Unclear, as the dam rests under a state road. The Local Planning Team indicates it is in poor condition. This dam used to provide recreation for the town in the form of a town beach, however; water quality has degraded to the point where it cannot be used anymore. This dam does not have an Emergency Action Plan (EAP).
MA00144	Singletary Pond Dam	Town of Millbury	Office of Dam Safety	Significant Hazard	The Local Planning Team indicates that this dam would impact both Millbury and Sutton, and the EAP for this dam shows an inundation zone contained within Millbury. ¹⁰⁷ The town has had ownership of the dam in the past; however, the ownership is now being contested. This dam has a water control shed that is in a state of disrepair and has caused minor flooding in the past (FL-20 on the Map in Appendix A)

¹⁰⁷

National ID	Dam Name	Owner	Regulatory Authority	Hazard Code	Notes
MA00145	Ramshorn Pond Dam	Town of Millbury	Office of Dam Safety	High Hazard	This dam has been rebuilt within the past 10 years and is maintained by the town. This dam does have a EAP revised in 2023.
MA00146	Dorothy Pond Dam	Town of Millbury	Office of Dam Safety	Significant Hazard	This dam has a EAP dated to 2023.
MA02579	Howe Pond Dam	Private	Non-Jurisdictional - Other	N/A	
MA02580	Howe Reservoir Dam	Private	Non-Jurisdictional - Other	N/A	
MA02828	Millbury Dam	Private	Office of Dam Safety	Low Hazard	This dam is not required to have an EAP.
MA02830	Bucks Pond Dam	Private	Office of Dam Safety	Significant Hazard	This dam has an EAP dated to 2019
MA02831	Farm Pond Dam	Private	Office of Dam Safety	Low Hazard	This dam is not required to have an EAP.
MA02832	Holbrook Mill Pond Dam	Private	Office of Dam Safety	Significant Hazard	This dam does not have an EAP.
MA02833	Cesyl Pond Dam	Private	Non-Jurisdictional - Other	N/A	
MA02834	Mayo Mill Pond #2 Dam	Private	Non-Jurisdictional - Other	N/A	
MA02835	Mill Pond Dam	Unknown	Non-Jurisdictional - Other	N/A	Unclear Ownership
MA02836	Small Current Pond Dam	Town of Millbury	Office of Dam Safety	Significant Hazard	This dam does not have an EAP.
MA02837	Blanchard Pond Dam	Private	Non-Jurisdictional - Other	N/A	
MA02838	Savary Pond Dam	Private	Non-Jurisdictional - Other	N/A	
MA02839	Meadow Pond Dam	Private	Office of Dam Safety	Significant Hazard	This dam does not have an EAP.
MA02840	Simpson Pond Dam	Private	Non-Jurisdictional - Other	N/A	

National ID	Dam Name	Owner	Regulatory Authority	Hazard Code	Notes
MA02829	Woolshop Pond Dam	Private	Office of Dam Safety	Low Hazard	This dam is not required to have an EAP.
N/A	Slaughterhouse Pond Dam	Unknown	Unknown	Unknown	This dam does not appear on the Office of Dam Safety Database but was indicated to be in Sutton and would affect the town.

Inundation areas for these dams cover less than 10% of Millbury, or a “small” portion of its area.

EXTENT

As stated in the introduction to this dam failure section, dam or levee breaches often lead to catastrophic consequences; water released by a breach ultimately rushes in a torrent downstream, flooding an area engineers refer to as an “inundation area.” The number of casualties and the amount of property damage which a dam failure causes will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Dams in Massachusetts are assessed according to their risk to life and property. The state has three hazard classifications for dams:

- **High Hazard:** Dams located where failure or improper operation will likely cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads.
- **Significant Hazard:** Dams located where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways, or railroads or cause interruption of use or service of relatively important facilities.
- **Low Hazard:** Dams located where failure or improper operation may cause minimal property damage to others; Loss of life is not expected.

Some dams do not have a hazard rating.

Millbury’s dam hazards are to some extent known, however there are several significant hazard dams where there is no emergency action plan (EAP) in place. (MA00143) Brierly Pond Dam, (MA02832) Holbrook Mill Pond Dam, (MA02836) Small Current Pond Dam, and (MA02839) Meadow Pond Dam are all lacking in emergency action plans despite their significant hazard status. Where these plans do exist inundation mapping has been performed in both fair weather and wet weather conditions to provide a reasonable estimate of the extent of the damages from a dam failure event. EAP’s were obtained from the Massachusetts Office of Dam Safety for (MA00144) Singletary Pond Dam, (MA00145) Ramshorn Pond Dam, (MA00146) Dorothy Pond Dam, and (MA02830) Bucks Pond Dam.

PREVIOUS OCCURRENCES

To date, there have not been any unintentional dam breaches of note in Millbury. However, Millbury, like many other towns in the region, hosts many dams with varying ownership structures and states of condition. This has led to deferred maintenance on several of the dams, such as (MA00143) Brierly Pond Dam Series, where the ownership is in question because the dam is the foundation for a state route. Within the past decade, The town has begun performing extensive repairs and redesigns of town owned dams: (MA00145) Ramshorn Pond Dam, one of the high hazard dams in town, was in poor condition due to seepage of water underneath the dam structure¹⁰⁸. Subsequently, the town developed a redesign and implemented the design, leaving the dam in a satisfactory condition.

PROBABILITY OF FUTURE EVENTS

The probability of future dam failure events in Millbury is “very low,” with a less than 1 percent chance of a dam in town failing in any given year.

IMPACT

The town faces a “limited impact” from the failure of dams with, with 10% to 25% of property in the affected area of town likely to see damage in the case of a dam failure event.

It is not possible to estimate the property loss impacts of dam failure quantitatively given the large number of variables involved in failure events. Qualitative losses from the failure of an individual dam could be significant but would likely be geographically limited to portions of the dam’s inundation zone. The geographic areas included in dam inundation zones may change with future improvements to dam breach modeling software, which are being developed and are currently in early trial stages, such as the DSS-WISE™ (Decision Support System for Water Infrastructural Security) program.¹⁰⁹

Impacts from hypothetical dam breaches modeled in EAPs for (MA00144) Singletary Pond Dam, (MA00145) Ramshorn Pond Dam, (MA00146) Dorothy Pond Dam, and (MA02830) Bucks Pond Dam are included below.

¹⁰⁸ https://www.millburyma.gov/sites/g/files/vyhlf4706/f/uploads/ramshornschematic_0.pdf

¹⁰⁹ “About DSS-WISE™ Web,” Dsswiseweb.ncche.olemiss.edu, University of Mississippi, accessed June 10, 2024, <https://dsswiseweb.ncche.olemiss.edu/userpages/about.php>.

Table 32: High Hazard Potential Dam Impacts and Exposures in Millbury

ID	Dam Name	Hazard Code	EAP Date	Inspected Condition	Dam Specs (Size, Normal Storage in Approximate Acre-Feet)	Summary of Impacts
MA00144	Singletary Pond Dam	Significant Hazard	August 2023	Fair – last inspected August 4, 2016	Large – 2,310 acre-feet	During wet weather conditions, Millbury Fire Department Station 2 expected to be inundated by a failure of Singletary Pond Dam. Mill Pond Dam overtopped 0.2 mi. downstream, Brierly Pond Dam overtopped 0.7 mi. downstream, Mayo Mill Pond #1 Dam overtopped 0.9 mi. downstream, Holbrook Mill Pond Dam overtopped 1.2 mi. downstream. Several road and rail crossings may be overtopped in the event of a dam failure, including State Highway Route 146 approximately 1.6 miles downstream, a Providence & Worcester Railroad line approximately 1.9 miles downstream, and State Highway Route 122A (Providence Street) approximately 2.4 miles downstream. Impacts to other roadways and privately-owned buildings are expected as well.

ID	Dam Name	Hazard Code	EAP Date	Inspected Condition	Dam Specs (Size, Normal Storage in Approximate Acre-Feet)	Summary of Impacts
MA00145	Ramshorn Pond Dam	High Hazard	August 2023	Good – Last Inspected April 28, 2018	Large – 1,600 acre-feet	During wet weather conditions, the breach wave would overtop Savary Pond Dam (MA02838) approximately 0.8 miles downstream, Rich's Mill Dam (Unknown ID) approximately 2.0 miles downstream, Pondville Pond Dam (MA00197) approximately 3.9 miles downstream, and Auburn Pond Dam (MA00147) approximately 4.9 miles downstream. Several road and rail crossings may be overtopped in the event of a dam failure, including Highway Route 20 approximately 3.9 miles downstream, a Providence & Worcester Railroad line approximately 4.3 miles downstream, and State Highway Route 12 approximately 5.1 miles downstream. The Auburn Fire Department and Auburn High School will likely be inundated by a failure of Ramshorn Pond Dam. Impacts to other roadways and privately owned buildings are expected as well.

ID	Dam Name	Hazard Code	EAP Date	Inspected Condition	Dam Specs (Size, Normal Storage in Approximate Acre-Feet)	Summary of Impacts
MA00146	Dorothy Pond Dam	Significant Hazard	August 2023	Fair – Last Inspected August 4, 2016	Large – 714 acre-feet	A failure of Dorothy Pond Dam would release a breach wave through the Dorothy Brook channel and floodplain, traveling through portions of Millbury, Sutton, and Grafton. The breach wave could overtop both the Bucks Pond Dam (MA02830) approximately 0.8 miles downstream and the Woolshop Pond Dam (MA02829) approximately 1.3 miles downstream. During a wet weather failure, the breach wave could also overtop Pleasant Falls Mill Pond Dam (MA02890) approximately 2.9 miles downstream and the Blackstone River Dam (MA00578) approximately 4.1 miles downstream. Several road crossings may be overtopped in the event of a dam failure, including Colton Road approximately 0.3 miles downstream and Grafton Street approximately 1.4 miles downstream. During a wet weather failure, Depot Street, approximately 3.6 miles downstream and Pleasant Street, approximately 4.9 miles may be overtopped. Impacts to other roadways and privately-owned buildings are expected as well.

ID	Dam Name	Hazard Code	EAP Date	Inspected Condition	Dam Specs (Size, Normal Storage in Approximate Acre-Feet)	Summary of Impacts
MA02830	Bucks Pond Dam	High Hazard	October 2019	Unknown	Small—22 acre-feet ¹¹⁰	During wet weather conditions, local roads, Woolshops Pond Dam, commercial and residential buildings. A Buck Brother's office building existing immediately downstream of the dam and a Buck Brother's manufacturing facility is located approximately 350 feet downstream of the dam.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to dam failures, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- Structures located within the inundation areas of significant and high hazard Dams;
- Downstream waterway infrastructure; and
- Poorly maintained or inspected dam infrastructure held in public or private hands.

According to existing EAPs Millbury's Fire Station 2 is vulnerable to Dam Failures, as well as roadways, railways and existing dam infrastructure identified in the impact section of the risk assessment.

POTENTIAL CLIMATE CHANGE EFFECTS

Intensified and more frequent flooding caused by climate change can increase dam failure risk. Flooding can cause dam failure through overtopping, which occurs when floodwaters flowing into a dammed body of water exceeds the spillway capacity of the dam and cause water to flow over the top of the dam. If the water flowing over the dam erodes the dam, then a dam failure can occur. Therefore, the risk of dam failure may be indirectly impacted by climate change through intensified flooding.

VULNERABILITY

Based on a mostly qualitative assessment, Millbury has a hazard index rating of "3 – moderate" from dam failure. While there are High and Significant Hazard Dams in town, the town is taking

¹¹⁰ Normal Storage is 4 Acre feet, 22 feet is Maximum storage capacity

proactive steps to address the deficiencies at these dams, and none of the identified dams with EAP's are in worse than fair condition. However there are still dams in town who do not have an emergency action plan in place and this must be addressed to reduce the risk that dams pose.

The town is interested in incorporating more information on High Hazard Potential Dams in future iterations of this plan. This information would include the location and size of populations at risk, potential impacts to institutions and critical infrastructure/facilities/lifelines, inundation maps, emergency action plans, floodplain management plans, data or summaries provided by dam breach modeling software such as HEC-RAS, DSS-WISE HCOM, DSS-WISE Lite, and FLO-2D, and/or more detailed studies. However, at the time of the writing of this plan, this information was not available to the town, and the town has elected to not include a High Hazard Potential Dam Appendix to this initial iteration of the plan update.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to dam failure through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand its existing capabilities to mitigate and respond to dam failures. The local HMP planning team identified the following strategies that could be used to reduce the threat of Dam Failure in Millbury:

- Prioritize funding for physical improvements and maintenance at the Brierly Pond Dam Series.
- Identify dam ownership for dams in town and enforce maintenance and regulations of dams.
- Complete a town-wide dam assessment of all public, private, and beaver dams. In this assessment, focus on reducing the risk of flooding from dam failures during intense storm events and protecting ecosystems that provide flood storage and other resilience benefits

4.10 DROUGHT, INCLUDING CHANGES IN GROUNDWATER

Drought, including changes in groundwater, is a normal and recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. Drought is a lack of precipitation over an extended period of time which results in a prolonged water shortage for some activity, group, or environmental sector. The direct impacts of droughts include reduced crop yields; reduced rangeland and forest productivity; increased fire hazards; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat. Drought impacts can have far-reaching effects throughout the region and even the country.

LOCATION

Because of this hazard's regional nature, a drought (including reduced groundwater levels) would likely impact the entire community, meaning the location of occurrence within Millbury of this hazard is "large."

EXTENT

The National Drought Mitigation Center records information on historical drought occurrences. Unfortunately, drought data are only available at the state and county levels and not at the local level. The National Drought Mitigation Center categorizes drought severity on a D0-D4 scale as is shown below.

Table 33: National Drought Mitigation Center D0-D4 Scale¹¹¹

Classification	Category	Description
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures; streams, reservoirs, or wells low, some water shortages developing or imminent; voluntary water-use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

PREVIOUS OCCURRENCES

In Massachusetts, five statewide extreme droughts have occurred since 1930. These historic major droughts range in severity and in length, lasting from three to nine years. During many of these droughts, water supply systems around the state were found to be inadequate; At the times of these droughts, water was piped into urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The Millbury area has been spared the most severe impacts in

¹¹¹ "Drought Classification," Droughtmonitor.unl.edu, National Drought Mitigation Center, University of Nebraska-Lincoln, accessed June 10, 2024, <https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx>.

each case according to the information for Massachusetts included in USGS Water Supply Paper #2375.¹¹²

The following table shows peak drought severity data in Massachusetts from the National Drought Mitigation Center for each year since 2000:

Table 34: Peak Drought Severity Data in Massachusetts Per Year Since 2000¹¹³

Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 100% of the state
2003	No drought
2004	D0 conditions in 48% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 69% of the state
2009	D0 conditions in 45% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state
2013	D1 conditions in 60% of the state
2014	D1 conditions in 54% of the state
2015	D1 conditions in 58% of the state
2016	D3 conditions in 52% of the state
2017	D3 conditions in 9% of the state
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023	D1 conditions in 0.4% of the state
2024	D3 conditions in 47% of the state

The following table shows peak drought severity data in Worcester County from the National

¹¹² Richard W. Paulson et al., "National Water Summary 1988-89 – Hydrologic Events and Floods and Droughts," *United States Geological Survey Numbered Series Water Supply Paper*, no. 2375 (1991), <https://doi.org/10.3133/wsp2375>, page 329.

¹¹³ "Statistics by Threshold," Droughtmonitor.unl.edu, National Drought Mitigation Center, University of Nebraska-Lincoln, accessed June 5, 2025, <https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx>.

Drought Mitigation Center for each year since 2018:

Table 35: Peak Drought Severity Data in Worcester County Per Year Since 2018¹¹⁴

Year	Maximum Severity
2018	D1 conditions in 33% of Worcester County
2019	D0 conditions in 100% of Worcester County
2020	D3 conditions in 14% of Worcester County
2021	D1 conditions in 51% of Worcester County
2022	D3 conditions in 53% of Worcester County
2023	D0 conditions in 74% of Worcester County
2024	D3 conditions in 51% of Worcester County

The local HMP planning team in Millbury noted that the years of 2017 through 2019 were an especially severe drought years for the town. The Fall of 2024 was also a particularly severe drought season for the region.

In the Fall of 2024, the Town of Millbury and large portions of Massachusetts were in critical drought conditions; all regions of the state except for the Cape and Islands saw a rainfall deficit of 8 to 11 inches.¹¹⁵

PROBABILITY OF FUTURE EVENTS

In Millbury, as in the rest of the state, the probability of extreme and exceptional droughts and reductions in groundwater availability is “low” (a 1% to 10% chance in the next year). Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, Central Massachusetts may be slightly more vulnerable than parts of eastern Massachusetts to severe drought conditions.¹¹⁶ However, many factors such as water supply sources, population, economic factors (i.e., if an area has an agriculture-based economy), and infrastructure may affect the severity and length of a drought event in different parts of the state.

The long-term risk of drought, including extreme and exceptional drought and reduced groundwater levels, may increase in Millbury due to climate change influences. Specifically, climate change may cause an increase in consecutive dry days over time.

IMPACT

The specific impacts of historical droughts in Massachusetts are categorized by the National Drought Mitigation Center in Table 35 below:

¹¹⁴ Ibid.

¹¹⁵ “Drought Management in Massachusetts,” Mass.gov, Massachusetts Executive Office of Energy and Environmental Affairs Drought Management Task Force, June 5, 2025, <https://www.mass.gov/guides/drought-management-in-massachusetts>.

¹¹⁶ “Massachusetts Drought Management Plan,” Mass.gov, Massachusetts Executive Office of Energy and Environmental Affairs and Massachusetts Emergency Management Agency, December 2023, <https://www.mass.gov/doc/massachusetts-drought-management-plan/download>.

Table 36: Historic Impacts of Drought in Massachusetts¹¹⁷

Category	Historically observed impacts
D0	Crop growth is stunted; planting is delayed
	Fire danger is elevated; spring fire season starts early
	Lawns brown early; gardens begin to wilt
	Surface water levels decline
D1	Irrigation use increases; hay and grain yields are lower than normal
	Honey production declines
	Wildfires and ground fires increase
	Trees and landscaping are stressed; fish are stressed
	Voluntary water conservation is requested; reservoir and lake levels are below normal capacity
D2	Specialty crops are impacted in both yield and fruit size
	Producers begin feeding cattle; hay prices are high
	Warnings are issued on outdoor burns; air quality is poor
	Golf courses conserve water
	Trees are brittle and susceptible to insects
	Fish kills occur; wildlife move to farms for food
	Water quality is poor; groundwater is declining; irrigation ponds are dry; outdoor water restrictions are implemented
D3	Crop loss is widespread; Christmas tree farms are stressed; dairy farmers are struggling financially
	Well drillers and bulk water haulers see increased business
	Water recreation and hunting are modified; wildlife disease outbreak is observed
	Extremely reduced flow to ceased flow of water is observed; river temperatures are warm; wells are running dry; people are digging more and deeper wells

The 2023 ResilientMass plan notes that while drought is a naturally occurring climate phenomenon, its impacts can be exacerbated by human behavior. The volume and rate of groundwater withdrawn from underground aquifers can have an impact on the amount of water that flows through surface water bodies; therefore, high rates of groundwater withdraw can negatively impact aquatic ecosystems. Additionally, more impervious surface coverage, and some forms of stormwater infrastructure, can prevent the natural infiltration of precipitation into groundwater and can therefore exacerbate drought.¹¹⁸

Reduced groundwater levels caused by drought can cause public water suppliers to have difficulty in meeting users' demands while also maintaining enough water pressure in their systems to facilitate fire suppression and water quality needs. Decreased firefighting capabilities due to low water availability during drought can increase the community's vulnerability to wildfires and fires caused by lightning strikes. Reduced groundwater levels can also lead to remaining well water having

¹¹⁷ "State Impacts," Droughtmonitor.unl.edu, National Drought Mitigation Center, University of Nebraska-Lincoln, accessed June 5, 2025, <https://droughtmonitor.unl.edu/DmData/StateImpacts.aspx>.

¹¹⁸ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

sediment (due to intense pumping into bedrock or the overburden aquifer being needed) and/or pollutants such as nitrates and heavy metals in it, and communities may need to consider drilling deeper wells or re-siting wells to areas less affected by drought if sedimentation and/or contamination occurs.

Specific drought (including reduced groundwater availability) impacts in Millbury may vary among and between customers of the town's water system and private well users. While the impact of a drought can be assessed as "minor" overall, with very little damage to property (damage to less than 10% of property in the area affected by the hazard), injuries, or loss of life likely to occur in town, drought impacts may be higher in the parts of town that are not located within the town's water service area.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to drought, or be disproportionately impacted by it, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- Residences or businesses with shallow wells;
- Wild plants and animals, including trees; and
- Vegetation, which may become more vulnerable to wildfire due to prolonged drought.

Higher water bills or the cost of re-drilling private wells due to drought impacts could also negatively affect local residents. As stated earlier, the water distribution system is managed by the water company Aquarion. This distribution system covers roughly 70% of the town. The remaining residents who are on private well water are primarily in the area of West Millbury and are at greater risk to reduced availability of groundwater due to drought. The town's water distribution provider sources its water primarily from wellfields and reservoirs and is able to supply water, but it is nearing capacity with the current sources according to the local hazard mitigation planning team. Subsequently, Aquarion has begun purchasing water from Worcester Water, who is also nearing capacity as a water provider. This means that Millbury may be at greater risk to drought as a downstream customer, and its residents are at financial risk due to the increased cost of buying water from a private company that must also buy its own water and has a fiduciary responsibility to its shareholders to pass as many of those costs onto their customers.

In addition, other factors like PFAS contamination of water sources could compound drought-related water supply challenges. Millbury has already experienced PFAS contamination, as it has had to inactivate one of its wells in 2019 due to PFAS. The town is intending to address PFAS contamination by constructing enhanced water treatment facilities. Reductions in groundwater can cause concentration of PFAS and other chemicals in the remaining available groundwater.

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, there are two major ways that drought can be influenced by climate change:¹¹⁹

- The frequency and extent of droughts are projected to increase in summer and fall as higher temperatures result in more evaporation, snow melts earlier in the year, and precipitation

¹¹⁹ Ibid.

becoming less frequent yet more extreme when it does occur.

- Rising temperatures and changes in precipitation patterns will reduce snowpack and hasten snowmelt and therefore can exacerbate drought. The process of reduced snowmelt can result in less snowmelt recharge of groundwater, less snowmelt feeding stream flows, and less snowmelt available as an agricultural water source.

In summary, climate change is likely to increase the frequency and extent of drought in Massachusetts. Droughts that are worsened by climate change can have numerous community-wide implications in Millbury. Due to the impacts of drought on crop yield, land use designated for farming could be altered or reduced. The town may also have to plan for changes in its drinking water system to account for drought conditions (including a reduction in available groundwater), as the current town water system is noted to be “nearing capacity” by the local HMP planning team; it is primarily fed through the privatized water system that draws from wells and reservoirs, with about 30% of the town on private well water as the alternative. Residents ranked concerns related to water quality/quantity degradation highly in the community survey for this plan. In addition, drought is predicted to worsen significantly in other parts of the country, particularly in the southwestern United States, and it is possible that this could result in people from other parts of the country moving to the northeast, including to Millbury.

VULNERABILITY

Based on the above assessment, Millbury has a hazard index rating of “3 – moderate risk” from drought. Minimal or no loss of or damage to property, injuries, or loss of life is expected from drought in town. However, within the lifespan of this plan the town may see worsening drought conditions that could increase the cost of water to town residents, and reductions in available groundwater would have leave a significant minority of town residents with less available water.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to drought, including drought induced reductions in groundwater availability, through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the town to expand its existing capabilities to mitigate and respond to drought. The local HMP planning team identified the following strategies that could be used to reduce the threat of drought in Millbury:

- Install central air conditioning in the town’s schools, including the schools which act as emergency shelters, to protect children, older adults, people with disabilities, and other vulnerable populations from the impacts of increasing heat.
- Conduct a public education outreach program about the benefits of sprinklers in structures and the importance of having them at private-owned and municipal-owned structures.
- Support local public health initiatives and evaluate the management of public health related concerns.
- Develop a town water plan that examines all options the town can take to secure water resources for the town (including water conservation planning for residents, water acquisition planning for the town, and possible municipalization of town water resources)

4.11 EXTREME TEMPERATURES

The 2023 ResilientMass Plan states that there are no universal definitions of “extreme heat,” “extreme cold,” or “extreme temperatures”; these terms are relative terms whose meaning depends on the normal average temperatures and climatic highs and lows in a region. Extreme heat in Massachusetts is typically defined as a period of three or more consecutive days with temperatures above 90 °F.¹²⁰ Extreme heat may also refer to any prolonged period of especially hot weather (which is called a heat wave) which is often accompanied by high humidity. Extreme cold, like extreme heat, is a dangerous situation that can result in health emergencies for susceptible people. People without shelter, who are stranded, or who live in homes that are poorly insulated or are without heat and/or air conditioning are especially at risk to extreme temperatures.

For Massachusetts, extreme temperatures can be defined as those that are far outside the normal range. Normal temperatures within the period ranging from 1991-2020 for the Worcester Regional Airport (near Millbury) are:

**Table 33: Normal Temperatures in the Period Between 1991-2020
Worcester Regional Airport¹²¹**

	July (Hottest Month)	January (Coldest Month)
Average High (°F)	79.8°	32.3°
Average Low (°F)	61.7°	17.1°

The National Weather Service’s (NWS’s) specific criteria for issuing extreme heat and extreme cold watches, warnings, and advisories are described in the Extent section below.

LOCATION

Extreme temperatures are typically uniform across Millbury during a given extreme temperature event, due to the town’s lack of extreme elevations, urban areas, and coastal areas. Therefore, this hazard has a “large” geographic coverage in town.

EXTENT

NWS uses the heat index scale to categorize extremely hot temperatures. This scale combines relative humidity with actual air temperature to determine the risk to humans. The NWS issues an Excessive Heat Advisory if the heat index is forecast to reach 95°F-99°F for 2 or more hours over 2 consecutive days, or 100°F-104°F for 2 or more hours over 1 day. The NWS issues an Excessive Heat Warning when the daytime heat index is forecasted to be 105°F for 2 or more hours. The NWS defines a Heat Wave as 3 or more days of greater than or equal to 90°F temperatures. The following chart indicates the relationship between heat index and relative humidity:

¹²⁰ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,” pages 5.2-1-5.2-2.

¹²¹ These temperature estimates are based on data recorded at a weather station in Woonsocket, Rhode Island. “U.S. Climate Normals Quick Access,” ncei.noaa.gov, National Oceanic and Atmospheric Administration National Centers for Environmental Information, accessed September 25, 2024, <https://www.ncei.noaa.gov/access/us-climate-normals/>.

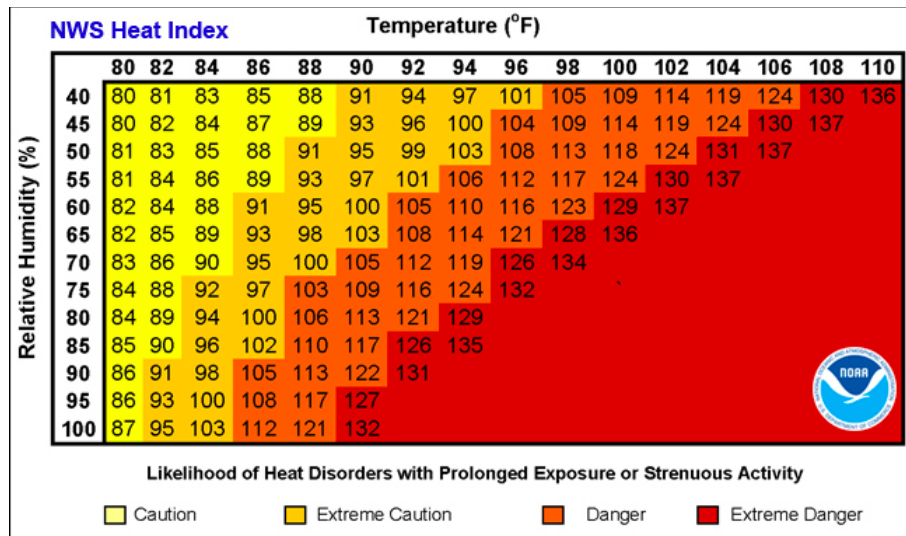


Figure 4: Heat Index¹²²

Extreme heat causes more fatalities in the United States than all other weather-related natural hazards combined.¹²³ Extreme heat can be the underlying cause of death or can worsen other medical conditions like heart disease, hypertension, alcohol poisoning, and drug overdoses.¹²⁴ The heat-related mortality rate is higher among males and people aged 65 years and older.¹²⁵

Table 34: Heat Effects on the Body lists the effects of extreme heat on the body at different levels of the heat index. It is important to note that while temperatures exceeding 100°F are unusual for Central Massachusetts, high humidity is very common during the summer and can drive the heat index in the region to dangerous levels / temperatures above 100°F.

Table 34: Heat Effects on the Body¹²⁶

Classification	Heat Index	Effect on Body
Caution	80°-90°F	Fatigue possible with prolonged exposure and/or physical activity.
Extreme Caution	90°-103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°-124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F+	Heat strokes highly likely.

Other impacts of high temperatures include drought, wildfire, and the formation of ground-level

¹²² National Weather Service, "What is the heat index?," Weather.gov, National Oceanic and Atmospheric Administration, accessed September 16, 2024, <https://www.weather.gov/ama/heatindex>.

¹²³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,"

¹²⁴ Ambarish Vaidyanathan et al., "Heat-Related Deaths—United States, 2004–2018," *Morbidity and Mortality Weekly Report* 69, no. 24 (2020): 729-734. <https://doi.org/10.15585/mmwr.mm6924a1>.

¹²⁵ Ibid.

¹²⁶ National Weather Service, "What is the heat index?," Weather.gov, National Oceanic and Atmospheric Administration, accessed June 10, 2024, <https://www.weather.gov/ama/heatindex>.

ozone.¹²⁷ Prolonged heat can cause power use to spike and in turn can overload the electrical grid, causing outages.¹²⁸ Extreme heat and cold can both negatively impact transportation infrastructure; Railroad tracks are a particular concern because metal rails can kink in high temperatures.¹²⁹

The 2023 ResilientMass Plan notes that the extent (severity or magnitude) of extreme cold temperatures is generally measured through the Wind Chill Temperature Index.¹³⁰ The wind chill temperature is the temperature that people and animals feel when outside; it is based on the rate of heat loss from exposed skin due to the effects of wind and cold.¹³¹ In Massachusetts, the National Weather Service (NWS) Norton Forecast Office issues a wind chill warning when the Wind Chill Temperature Index, based on sustained wind, is –25°F or lower for at least three hours. The NWS Wind Chill Chart below shows three shaded areas of combinations of wind and temperature conditions in which there is frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops.

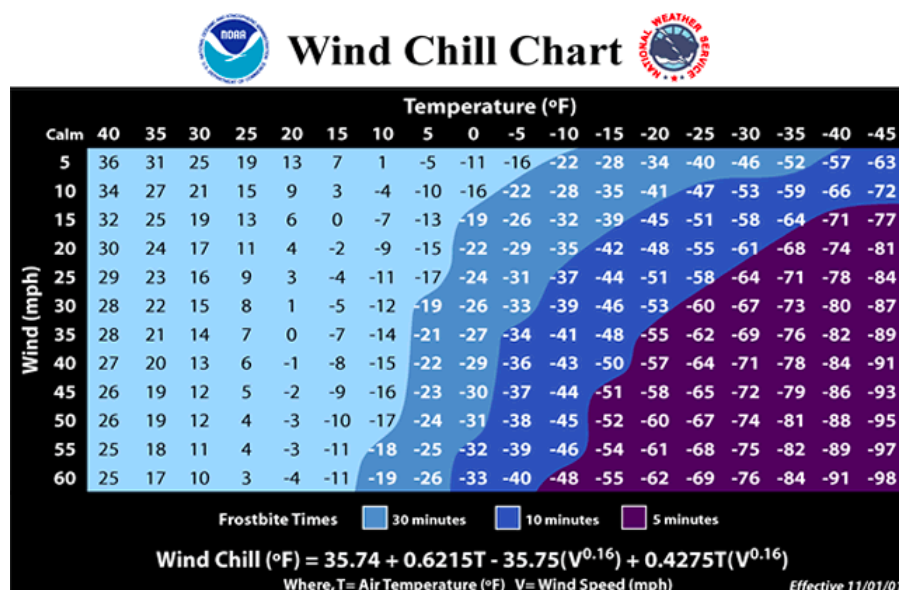


Figure 5: NWS Wind Chill Temperature (WCT) index.¹³²

Cold temperatures are often combined with winter storms. People may experience the loss of heat and power in their homes and workplaces due to storm damage, which could further subject them to the cold.¹³³ Carbon monoxide poisoning is another risk during cold weather, especially when households lack adequate power or heat.¹³⁴

PREVIOUS OCCURRENCES

¹²⁷ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,"

¹²⁸ Ibid.

¹²⁹ Ibid.

¹³⁰ Ibid.

¹³¹ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-1-5.2-3.

¹³² National Weather Service, "Understanding Wind Chill," Weather.gov, National Oceanic and Atmospheric Administration, accessed September 16, 2024, <https://www.weather.gov/safety/cold-wind-chill-chart>.

¹³³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-1-5.2-3.

¹³⁴ Ibid.

There is not a comprehensive data source that lists instances when the National Weather Service has issued extreme heat or cold warnings or advisories in Worcester County.

According to the 2023 Resilient Mass Plan, there have been 118 warm weather events (heat and excessive heat events) in the state between 1995 and 2022.¹³⁵ 2010–2022 had seven of the 10 warmest summers on record in the state.

2012 and 2013 were notably hot summers in Massachusetts¹³⁶ In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the heat index reached 100°F.¹³⁷

The hottest two summers on record in the Commonwealth were 2020 and 2022.¹³⁸ August 2022 was the hottest August ever recorded in the Commonwealth, with temperatures more than 6°F greater than the 20th century average. In August 2022, Boston experienced at least 17 days above 90 degrees, including two six-day heat waves.

Statewide, there were 33 extreme cold weather events between 1994 and 2018. The NOAA storm Events database lists the following Extreme Cold / Wind Chill Events as having occurred in Southern Worcester County since the last Millbury HMP was developed in 2019:¹³⁹

- 01/06/2018: Strong west winds trailed the January 4 winter storm. These winds drew bitterly cold arctic air over Massachusetts. The combination of strong wind and low temperatures created a dangerous wind chill, with readings reaching 25 degrees below zero or colder in a couple of locations during the early mornings of January 6 and 7.
- 01/21/2019: Strong west to northwest winds trailing the January 20th storm drew cold air across Southern New England on January 21st and caused wind chill values of 25 below zero or colder in Central and Western Massachusetts. The wind diminished during the afternoon and evening of January 21st allowing wind chill values to become less extreme, in the teens below zero.

Inland portions of Massachusetts are more subject to extreme temperatures because they lack the moderating effect of the Atlantic Ocean. However, more densely developed urban and suburban areas are more likely to be impacted by heat waves than rural areas.

PROBABILITY OF FUTURE EVENTS

The probability of future extreme heat or extreme cold events occurring in Millbury is considered "moderate," or between 10% and 40% in the next year.

IMPACT

The impact of extreme heat or cold in Millbury is considered "minor," with no property damage and a limited effect on humans anticipated in the case of extreme temperature events.

¹³⁵ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-7-5.2-8.

¹³⁶ Ibid.

¹³⁷ Ibid.

¹³⁸ Ibid.

¹³⁹ "Storm Events Database Search Results for Worcester County, Massachusetts," NCDNC.NOAA.gov, National Oceanic and Atmospheric Administration National Centers for Environmental Information, June 12, 2025, https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2018&endDate_mm=12&endDate_dd=31&endDate_yyyy=2024&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&tatefips=25%2CMASSACHUSETTS.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to extreme temperatures, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- Children and elderly residents, who are more vulnerable to the effects of extremely hot or cold conditions;
- Low-income residents who are unable to afford adequate cooling or heating;
- Renters who may have few home improvement options for mitigating extreme heat and cold;
- People who work outdoors such as construction or farm workers;
- The utility grid, which could be vulnerable to outages due to surges in power use during extreme temperatures. Power outages during extremely hot or cold days could cause further problems for people who rely on air conditioners or electric heaters; and
- Certain forms of agriculture which may be negatively affected by extreme temperatures, especially extreme heat.

The local hazard mitigation planning team noted that there were a few locations in town that had issues with extreme temperatures:

- The Town High School (and Town Shelter) experienced a freeze that burst pipes and caused damage.
- The relatively urbanized downtown has few shade spots and experiences extreme heat
- The Blackstone Valley Shopping Plaza experiences high heat and has few shade spots

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, climate change is already causing more high heat days and fewer extreme cold events in Massachusetts and beyond.¹⁴⁰ Climate change is also shifting the average temperature in Massachusetts to higher temperatures, leading to longer warm seasons as well as shifts to growing seasons, habitat and vegetation ecosystems, and migratory patterns. Rising temperatures will also cause warming seas, a degradation in air quality, impacts on people's health, and an increased demand for energy and government services. The secondary climate change effects of extreme temperatures include increased severity of wildfires, droughts, and flooding as well as encroachment by invasive species. According to the 2023 ResilientMass Plan:¹⁴¹

- By 2050, average annual temperatures are expected to increase between 5.9° and 7.9°F. This is a drastically shortened timeline from the 2018 state hazard mitigation plan, where increases of this magnitude were not expected until the end of the century.
- By 2100, annual average temperatures are expected to increase by between 10.0° and 12.9°F compared to the 1971-2000 baseline.

According to the 2022 Massachusetts Climate Change assessment, by 2030, the summer mean

¹⁴⁰ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

¹⁴¹ Ibid.

temperature could increase by 3.6°F from the period between 1950 and 2013, worsening stress on electric transmission and utility distribution infrastructure.¹⁴²

In summary, climate change is likely to increase the frequency and duration of extreme heat events in Massachusetts. Changes to average annual temperatures will also impact Millbury. Seasonal temperatures will shift, with spring and summer temperatures extending through more of the year.¹⁴³ Winters may also be milder than historical norms.¹⁴⁴ Changes to average temperatures could have an impact on the agricultural industry and the natural environment. Farmers may need to shift their practices to account for new climate conditions, and certain specific plants and animals may need to migrate to new ranges to find suitable habitat.¹⁴⁵

To respond to changes in temperatures due to climate change, Millbury residents and businesses may have to alter work patterns during extreme heat days and events to reduce workplace injuries in vulnerable jobs such as construction trades and agricultural labor. The town may have to plan to offer more cooling stations for residents, particularly for vulnerable populations such as the elderly and low-income residents. Millbury may also have to account for an increase in people moving to town and/or visiting town to seek refuge from extreme heat in other parts of the country.¹⁴⁶

VULNERABILITY

Millbury's vulnerability to extreme heat and cold is considered to be, "4 – low risk." The town has operated heating and cooling shelters and continues to do so at their municipal building and other town facilities. Its local ecology, with forested areas covering approximately 66% of the town, and its location along the Blackstone River also provide natural evaporation and transpiration-related cooling effects to the town.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to extreme temperatures through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the town has numerous opportunities to expand upon its existing capabilities to mitigate and respond to extreme temperatures. The local HMP planning team identified the following strategies that could be used to reduce the threat of extreme temperatures in Millbury:

- Install central air conditioning in the town's schools, including the schools which act as emergency shelters, to protect children, older adults, people with disabilities, and other vulnerable populations from the impacts of increasing heat.
- Develop and provide annual outreach information to employers and employees on the dangers of exposure to extreme heat and strategies for minimizing the risks posed by such exposure.
- Support local public health initiatives and evaluate the management of public health related concerns.

¹⁴² "2022 Massachusetts Climate Change Assessment," page RS30.

¹⁴³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

¹⁴⁶ Ibid.

4.1.2 INVASIVE SPECIES

An invasive species, as defined by the Invasive Species Advisory Committee (ISAC) of the U.S. Department of the Interior, is “a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”¹⁴⁷ Invasive species are not the same as native pest species, such as beavers and deer. The State of Massachusetts, being heavily forested with relatively new growth forests, as well as having a great deal of its water sourced from open reservoirs, is vulnerable to the threat of both land and aquatic invasive species. Invasive species can damage and disrupt existing ecosystems by outcompeting the native flora and fauna. Many invasive aquatic species harm water quality, and many land-borne invasive species increase the risk of wildfires. The effects of invasives are species-dependent, and a challenge for invasive species management is that many municipalities are affected by some invasive species but not others.

LOCATION

Several invasive species affect broad regions of Massachusetts. The Emerald Ash Borer (*Agrilus planipennis*) has been detected in every city and town within the Central Massachusetts Region.¹⁴⁸ However, invasives and their effects can also be species-dependent and localized, so invasive species hazards can also bear a resemblance to other more localized hazards such as localized flooding. Millbury, with its many streams and wetland areas and location along the Blackstone River, is vulnerable to intrusion from both land-based and aquatic invasive flora and fauna. Greater than 50% of the town is vulnerable to invasives, so this hazard has a “large” geographic coverage in town.

EXTENT

It is difficult for local officials to understand the extent of the impact that invasive species have on their communities. Factors that lead to a dearth of knowledge about the extent of impacts of invasive species include the unpredictable nature of invasives, the lack of verified data clearinghouses about invasive species, and the lack of resources and capacity for local conservation officials to track invasives. Often, it is not until the damage caused by invasives is apparent that local officials discover the true extent of the hazard. Still, there are some resources available to the local hazard mitigation planning team. This plan utilizes the Massachusetts Department of Agriculture’s Invasive Pest Dashboard;¹⁴⁹ the Center for Invasive Species and Ecosystem Health’s Early Detection and Distribution Mapping System (EDDMapS) hosted by the University of Georgia;¹⁵⁰ and the Forest Ecosystem Monitoring Cooperative’s Northeastern Forest Health Atlas.¹⁵¹

¹⁴⁷ Definitions Subcommittee of the Invasive Species Advisory Committee (ISAC). “Invasive Species Definition Clarification and Guidance,” Doi.gov, United States Department of the Interior, April 27, 2006, https://www.doi.gov/sites/doi.gov/files/uploads/isac_definitions_white_paper_rev.pdf.

¹⁴⁸ “ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,” page 5.1-48.

¹⁴⁹ “MDAR Invasive Pest Dashboard,” Experience.arcgis.com, Massachusetts Department of Agricultural Resources, accessed June 10, 2024, <https://experience.arcgis.com/experience/a25afa4466a54313b21dd45abc34b62d/page/Page-2/?views=Town-by-Town>.

¹⁵⁰ “My EDDMapS,” EDDMapS.org, Center for Invasive Species and Ecosystem Health, accessed June 10, 2024, <https://www.eddmaps.org/tools/query/index.cfm?observationDateStart=06/03/2017&observationDateEnd=06/03/2024&eradicationstatus=1,2&country=926&state=92625000&fipscode=92625027>.

¹⁵¹ “Northeastern Forest Health Atlas,” UVM.edu, Forest Ecosystem Monitoring Cooperative, accessed June 10, 2024, <https://www.uvm.edu/femc/forest-health-atlas>.

In Worcester County from 2017 to 2024, according to EDDMapS analysis of verified invasive species reporting, there have been 378 records of locations with invasive species. Also, 353 distinct sightings of invasive species ranging from plants to insects have been left unchecked, 2 invasive species are being treated, and a total of 47 acres are considered to be infested with invasive species.¹⁵²

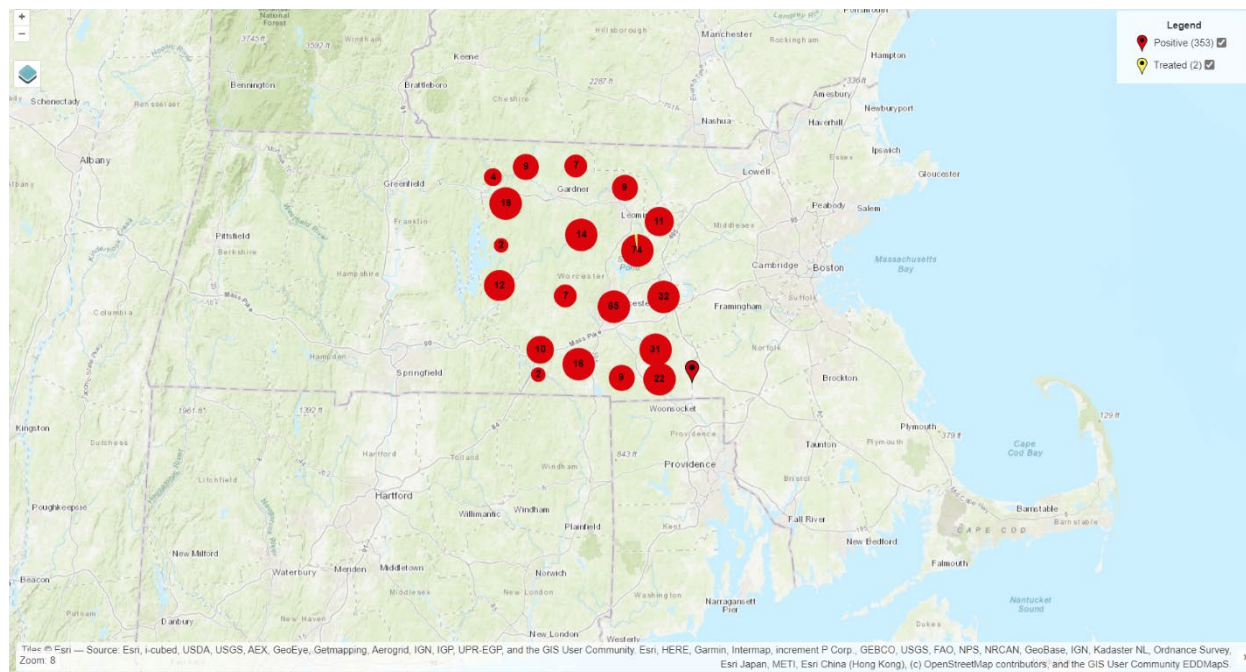


Figure 6: EDDMapS Analysis of Worcester County Invasives 2017-2024

The Massachusetts Department of Agriculture's Invasive Pests Dashboard notes that, in Millbury, Beech Leaf Disease was detected in 2024, and Emerald Ash Borer was detected in 2021. The town is also currently suffering from a Spotted Lanternfly Infestation that has spread from nearby towns. Moreover, nearby towns suffer from infestations of Asian Longhorn Beetle and Mile-A-Minute Vine. At the time of writing of this plan, the entire state of Massachusetts is under a U.S. Department of Agriculture quarantine to restrict the spread of the Box Tree Moth.¹⁵³ Also, during writing of this plan, West Nile Virus carrying mosquitoes were detected in neighboring Worcester.¹⁵⁴

A lack of reporting on invasives may mean that the extent of invasives in Millbury is far greater than these databases report. The local hazard mitigation planning team has noted the following invasives intrusion in town:

- Invasive Phragmites and Japanese Knotweed has been sighted growing along the banks of the Blackstone River throughout town. These invasives have also been spotted along other waterways and water bodies in town such as Dorothy Brook, Ramshorn Pond, and Davis Sanctuary.

¹⁵²"My EDDMapS," EDDMapS.org.

¹⁵³ "MDAR Invasive Pest Dashboard: Emerald Ash Borer (*Agrilus planipennis*)," Experience.arcgis.com, Massachusetts Department of Agricultural Resources, July 31, 2025
https://experience.arcgis.com/experience/a25afa4466a54313b21dd45abc34b62d/page/Page-2/?views=Emerald-Ash-Borer#data_s=id%3AdataSource_3-17f4202b73c-layer-3%3A87.

¹⁵⁴ <https://www.worcesterma.gov/announcements/west-nile-virus-detected-mosquito-sample-spraying-scheduled>

Beyond invasives, other nuisance species that can cause public health impacts have been noted to be affecting the town according to the local hazard mitigation planning team:

- The town is currently under an Eastern Equine Encephalitis Quarantine, spread by mosquitos. The town is part of Central Mass Mosquito Control and does spraying by resident request.
- Water rats coming up from the Blackstone River have also been noted, with many complaints coming from the Environmental Justice Population area in town.
- Like many other towns in the Central Massachusetts Region, beavers are a perennial complaint of residents.

PREVIOUS OCCURRENCES

According to the Northeast Forest Health Atlas, in the past 20 years of reporting, Massachusetts has experienced tree damage (including defoliation and mortality events) to 43,127,411 acres of forests from a variety of invasive pests; alarmingly, the greatest proportion of this damage has occurred in the past 3 years.¹⁵⁵

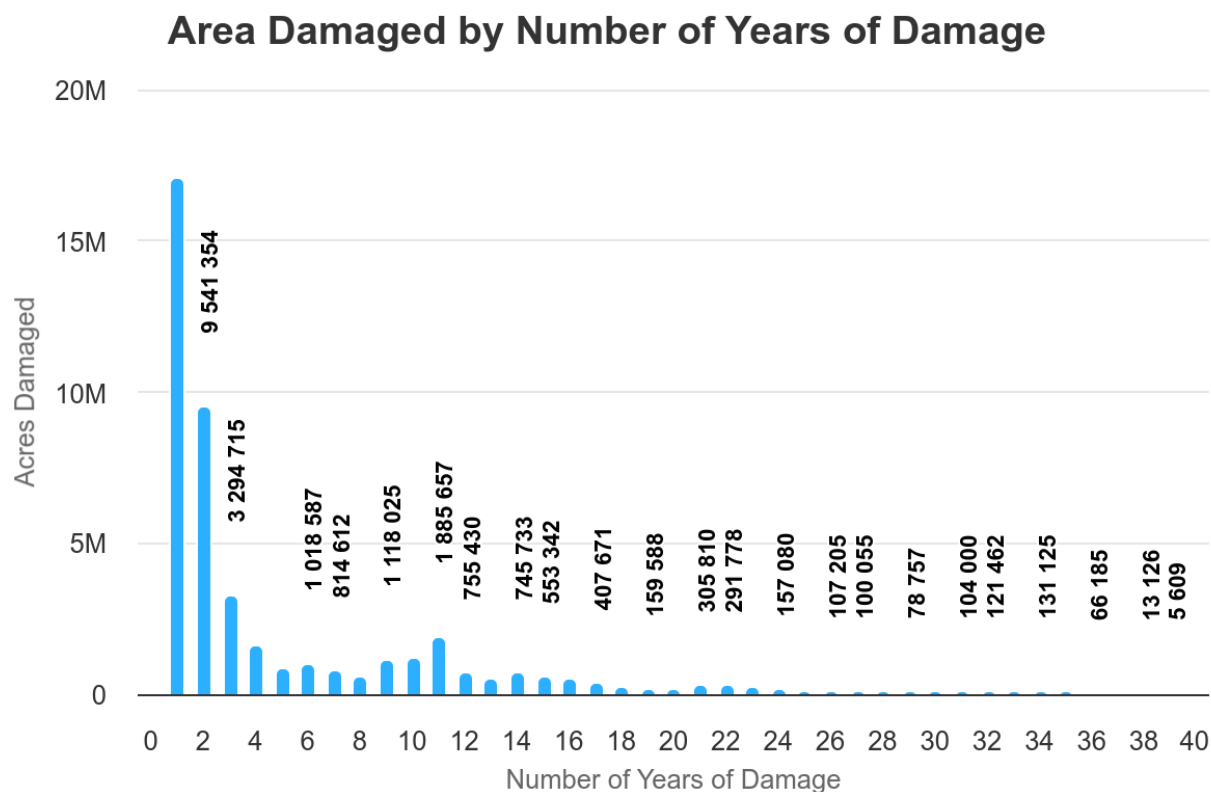


Figure 7: Area Damaged by Spongy Moth, Forest Tent Caterpillar, and Winter Moth from 1979 to 2019

In Worcester County, the vast majority of these invasive pest tree damage events occurred in the southern part of the county, and in particular the south-east of the county where Millbury is located. Significant damage events have also occurred in the west and southwest of the county (near the

¹⁵⁵ "Northeastern Forest Health Atlas - Defoliation: Years of Damage," UVM.edu, Forest Ecosystem Monitoring Cooperative, accessed June 10, 2024, <https://www.uvm.edu/femc/forest-health-atlas?premade=All Defo>.

border with Hampshire and Hamden Counties). In addition, localized defoliation events have occurred around the Town of Barre, the Tatnuck neighborhood of Worcester, and other communities. Tree mortality correlated with invasive species has been concentrated in the southern half of Worcester County.¹⁵⁶ In 2008, an outbreak of Asian long-horned beetles in Worcester destroyed nearly 30,000 trees.¹⁵⁷

Millbury has experienced invasives-related defoliation events from 1998 through 2020, with significant mortality events occurring in 2018, 2019, and 2020. Based on trends identified in the Atlas, there is no reason to assume that invasive forest species hazards have lessened in more recent years.

PROBABILITY OF FUTURE EVENTS

The 2023 ResilientMass Plan notes that increased globalization of trade has created new paths for invasive species to spread.¹⁵⁸ Climate change is also an aggravating factor in the spread of invasives, as natural ecosystems become strained by increased temperatures and shifting precipitation patterns. Climate change therefore creates more opportunities for invasives to disrupt an already fragile ecology. Based on the previously identified occurrences and trends, the probability of an invasive species occurring in Millbury is very high, with a 70-100% probability of occurrence in the next year.

IMPACT

Specific impacts of invasive species in Millbury may vary, depending on the type of invasive, the habitat that it is supplanting within the native ecosystem, and other factors. Invasive species' direct impact on the natural ecology has many notable secondary impacts. The 2023 ResilientMass plan identifies that invasive species can introduce new diseases to a region¹⁵⁹ (such as the 2005 Chikungunya Epidemic, spread in part by a viral mutation that allowed for the virus to be more commonly present in the *Aedes albopictus* mosquito, an invasive subspecies).¹⁶⁰ Invasives are also one of the costliest natural hazards in terms of control efforts, costing the United States and estimated \$21 billion per year.¹⁶¹ As there is a lack of reliable information about the extent of invasive species within Millbury, we can only estimate a "limited" impact on the town from invasive species, with between 10% and 25% of property in the areas affected by this hazard being damaged or destroyed.

EXPOSURE

Certain features within Millbury's infrastructure, society, and environment may face more exposure to invasive species, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. These features include:

- People with compromised immune systems or preexisting health conditions, children under the age of five, and people over 65 years old who might be particularly vulnerable to new

¹⁵⁶ Ibid.

¹⁵⁷ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

¹⁵⁸ Ibid.

¹⁵⁹ Ibid.

¹⁶⁰ Konstantin A. Tsetsarkin et al., "A single mutation in chikungunya virus affects vector specificity and epidemic potential," *PLOS Pathogens* 3, no. 12 (December 7, 2007): e201, <https://doi.org/10.1371/journal.ppat.0030201>.

¹⁶¹ Kerry Sheridan, "Invasive species cost the US \$21 billion per year, study finds," WUSF.org, WUSF Public Media, January 4, 2022, <https://www.wusf.org/local-state/2022-01-04/invasive-species-cost-the-us-21-billion-per-year-study-finds>.

diseases or aggravated health problems caused by invasives;

- Roadways: Japanese Knotweed, an invasive known to cause streambank destabilization, can contribute to flood damages and can affect sightlines along roadways, potentially causing roadway hazards;
- Local government: Invasive species may pose a management cost burden that exceeds local financial capacity, especially for departments tasked with their management and for departments tasked with the maintenance of facilities that are impacted by invasives;
- The local ecology: Invasive species can also change the local ecology to make it more fire prone, either by damaging the native plants or by being prone to fire themselves.

Specifically, the following critical infrastructure routes identified in this plan were noted as being especially vulnerable to invasive species by CMPRC's GIS analysis:

- The neighborhoods along the Blackstone River, including the Town Hall in downtown Millbury.
- Ramshorn Pond Dam

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, climate change is predicted to increase the spread of invasive species and expand their range.¹⁶² Fragile ecosystems, if left unmanaged, will suffer the worst effects of invasive species. Native flora and fauna species could be supplanted by invasive species that outperform or outright damage them. Most invasive species introductions are caused by human activity, either accidental or intentional.

Both changes in precipitation patterns and temperature may increase the chance of successful invasion of ecosystems by non-native species.

1. Precipitation

- a. Elevated atmospheric CO₂ concentrations could reduce the ability of ecosystems to recover from climate shocks; this can create an opportunity for invasive species, which can often rapidly establish themselves following a disturbance, to successfully propagate.

2. Temperature

- a. Climate-driven temperature changes exacerbate the impacts of invasive species by altering ecosystem conditions in ways that enhance their ability to reproduce, spread, and in some cases outcompete native species.
- b. As warmer temperatures place stress on native cold-weather species in the region, invasive species accustomed to higher temperatures can easily fill native species' niches and therefore expand their habitat ranges northward.

Secondary hazard impacts from invasive species include increased temperatures, damage to agricultural crops, and increased wildfire risk; as described in previous sections, all these hazard impacts have associated potential societal implications through population shifts and changes in land use and development.

¹⁶² "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

VULNERABILITY

Based on the above assessment, Millbury has a hazard index rating of “3 – moderate risk” from invasive species.

MITIGATION STRATEGIES

The Town of Millbury is currently able to effectively respond to invasive species through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, there are numerous opportunities for the Town to expand upon its existing capabilities to mitigate and respond to invasive species. The local HMP planning team identified the following strategies that could be used to reduce the threat of invasive species in Millbury:

- Educate residents about invasive species management using existing and new resources. Explore establishing a regionalized education and abatement program for invasive species management.
- Support local public health initiatives and evaluate the management of public health concerns related to invasive species.

4.13 OTHER HAZARDS

In addition to the hazards identified in previous sections, the Millbury Hazard Mitigation Planning Team reviewed the other hazards listed in the Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP). Hazards from the SHMCAP deemed irrelevant to Millbury due to the town's location are coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, and tsunamis. Coastal hazards, coastal erosion, sea level rise, and tsunamis are recognized to affect coastal jurisdictions in Massachusetts and other New England states, but have been deemed irrelevant to Millbury due to the town being around 40 miles from the nearest coastline.

LANDSLIDES

One other hazard discussed in the SHMCAP that can affect Millbury is landslides. Landslides occur in all U.S. states and territories. During a landslide, masses of rock, earth, or debris move down a slope. Landslides may be small or large, slow or rapid. They are generally activated by:

- Storms,
- Earthquakes,
- Volcanic eruptions,
- Fires,
- Alternate freezing and thawing, and/or
- Steepening of slopes caused by natural erosion or human modification.

Debris and mud flows (landslides) are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry." They can flow rapidly, striking with little or no warning at avalanche speeds. They also can travel several miles from their source, growing in size as they pick up trees, boulders, cars, and other materials.

There are no documented previous occurrences of significant landslides in Millbury. The town is relatively flat with the location of the Blackstone Shops being a notable exception to this. Also, rivers in town are slow moving, frequently dammed, and/or are lined with ripraps, which can minimize landslide risk. Roadways in town are not generally built close to river channels, which reduces undercutting risk of stormwater-induced bank erosion. Should a landslide occur in town in the future, the type and degree of impact would be highly localized. Vulnerabilities in town to landslides could include damage to structures, damage to transportation and other infrastructure, and localized road closures, though CMRPC's data review noted no specific concerns. The local HMP planning team did note that the outer bank of the Blackstone River where it curves south is eroding. This hazard is captured in the flooding section of the plan.

Millbury, like most communities in the CMRPC region, has few areas with susceptibility to landslides according to the 2023 ResilientMass Plan.¹⁶³ Landslides are therefore considered low frequency events that may occur once per 50 to 100 years (a 1% to 2% chance of occurring per year).

CHANGES IN GROUNDWATER

Another hazard of concern that affects Millbury is changes in groundwater. This hazard was identified primarily through the community survey for this plan. Common concerns among town

¹⁶³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.1-50-5.1-51.

residents who responded to the survey included basement flooding, as well as concerns regarding wells drying up in the future. While the 2023 ResilientMass Plan notes changes in groundwater as a specific hazard, whereas this plan identifies it as being a secondary effect of drought and flooding.¹⁶⁴ Millbury is no more or less vulnerable than many of the surrounding towns: its municipal water system is charged primarily by wellfields and reservoirs, but extra water can be procured from Worcester Water. 70% of residents in town use municipal water, with other residents relying on their own private wells. The local HMP planning team in town identified wells drying up as a concern, and the town's municipal water system is currently nearing capacity. The details of the town's specific vulnerabilities to changes in groundwater are included in both the drought and flooding sections of this plan.

According to the 2023 ResilientMass Plan, climate change is predicted to affect groundwater availability. Sea level rise, extreme temperature events, changes in precipitation patterns, and the increased frequency and duration of drought conditions will all reduce the amount of available groundwater to the town.¹⁶⁵

¹⁶⁴ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.1-34-5.1-35.

¹⁶⁵ Ibid.

5.0 EXISTING PROTECTION

Sections 5.0 and 5.1 help meet the following FEMA local mitigation plan requirements:

- A4. “Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information?” (Requirement 44 CFR § 201.6(b)(3));
- B2. “Does the plan include a summary of the jurisdiction’s vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods?” (Requirement 44 CFR § 201.6(c)(2)(ii));
- C1. “Does the plan document each participant’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?” (Requirement 44 CFR § 201.6(c)(3)); and
- C2. “Does the plan address each jurisdiction’s participation in the NFIP and continued compliance with NFIP requirements, as appropriate?” (Requirement 44 CFR § 201.6(c)(3)(ii))

The Town of Millbury currently makes use of most available locally controlled tools, including zoning regulations, planning, and physical improvements, to help mitigate the consequences of natural hazards. The town does not participate in any federal programs such as StormReady certification or Firewise community certification, but it does utilize CodeRed for emergency notifications, though the town is currently phasing out CodeRed for Reverse911. The town plans to research the utility of public awareness and education programs as a result of this planning process.

Millbury has most of the no-cost or low-cost hazard mitigation capabilities in place. These include land use, zoning, and subdivision regulations as well as an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in floodplains, tree maintenance, and other practices. Millbury also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director/Fire Chief, a professionally run Department of Public Works, a Building Commissioner, and a Tree Warden. Millbury has several plans relevant to hazard mitigation in place, including a Comprehensive Emergency Management Plan (2024), an Open Space and Recreation Plan (2020), a Master Plan (2019), an ADA Self-Evaluation and Transition Plan (2023), a Watershed-Based Plan (2019), a Municipal Vulnerability Preparedness (MVP) Summary of Findings (2018), and a Housing Production Plan (2025). Not only does Millbury have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions, and Committees as well as in other volunteer positions. The town has opted into a fire protection mutual aid agreement through MEMA and the town’s DPW will provide assistance to neighboring towns. Millbury is also an active member of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no cost local planning assistance provided by the professional planning staff at CMRPC as is needed.

The table below describes existing hazard mitigation protections in Millbury. It includes a brief description of each activity, a subjective evaluation of each activity’s effectiveness, and a description of any recommendations for improvement for each activity.

5.1 EXISTING PROTECTION MATRIX

Table 35: Existing Protection Matrix

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP)	The NFIP provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws, and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Millbury has participated in the National Flood Insurance program since July 2nd, 1979. As of July 2nd, 2024, there are approximately 14 homeowners in town with flood insurance policies.¹⁶⁶ There is one repetitive loss property in Millbury that has been anonymized as it is a private residence. Millbury's Zoning Enforcement Officer has been designated as the town's FEMA Floodplain Administrator who implements the addressed commitments and requirements of the NFIP in town, and the town monitors building activity within the flood plain to ensure compliance with provisions of state building code. Millbury has adopted the Flood Insurance Rate Map (FIRM)¹⁶⁷ dated from June 21st, 2023, and this is	Effective Millbury should seek to limit development in the 100-year flood zone. The town should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Millbury should also educate its residents about NFIP. The town is working on improving its process for carrying out the substantial improvement / substantial damage provisions of floodplain regulations, along with substantial damage claims. In the future, the town will collaborate with Flood Hazard Management Program staff at the state level to ensure a post- disaster plan is put in place to employ SI/SD provisions.

¹⁶⁶ "Community Overview: Millbury, Town of," NFIP Community Information System, accessed June 24, 2025.

¹⁶⁷ " https://www.millburyma.gov/sites/g/files/vyhlf4706/f/uploads/zoning_bylaws_11-15-2022_combined_1-8-2025.pdf

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP) (cont.)		noted in Section 36 of Millbury's Zoning Bylaw. The town's Flood Hazard District, described in this same Zoning Bylaw, includes all special flood hazard areas (SFHAs) designated as Zone A and AE in town and regulates and permits development within these areas. Millbury currently administers the substantial improvement/substantial damage (SI/SD) provisions of its floodplain management regulations in compliance with the NFIP (CFR Title 44, Parts 59 through 65) and Massachusetts State Building Code (780 CMR).	The town should also enhance its participation in NFIP training offered by the state and/or FEMA that addresses flood hazard planning and management.

Existing Measure	Description	Action	Effectiveness & Recommendations
Floodplain Zoning District Bylaw	This bylaw requires all development to be in compliance with state building code requirements for construction in floodplains.	Millbury regulates development in FEMA mapped floodplains as part of its zoning bylaw, specifically Chapter 123, Section 19.	Effective The town should review the bylaw to ensure that it complies with the most up-to-date FEMA floodplain maps.
Stormwater Management Bylaw	The Millbury Planning Board, Conservation Commission, and DPW review projects for consistency with MA DEP standards. This helps ensure adequate on-site retention and recharge and reduces the burden on the NPDES MS4 permitted stormwater system.	Millbury has enacted and enforced a stormwater management bylaw that is compliant with MS4 standards as part of Millbury General Bylaws.	Very effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Local Open Space and Recreation Plan	This local plan identifies significant natural resources to ensure their protection. Following Massachusetts Department of Conservation and Recreation guidance for the development of OSRPs, this document does not focus on specific hazards.	Millbury's Open Space and Recreation Plan received final approval by the Massachusetts Division of Conservation Services in 2020 and will expire in 2027.	Effective The town regularly refers to the OSRP's recommendations and seeks to continue to integrate hazard mitigation activities as allowable.
Americans with Disabilities Act (ADA) Self-Evaluation and Transition Plan	This local plan identifies areas on ADA non-compliance for municipal-owned facilities and provides model policies and procedures for compliance. While this document does not specifically address hazard mitigation, implementation of the plan's recommendations could promote effective emergency response in town.	Millbury's ADA plan was finalized in 2023. It includes public transportation, public accommodations and services, telecommunications, and employment.	Effective The town regularly refers to the ADA plan's model procedures and policies. Ensuring ADA compliance at town facilities will help to improve emergency response, as the components the plan addresses are also relevant for hazard mitigation.

Existing Measure	Description	Action	Effectiveness & Recommendations
NPDES MS4 Compliance Program	This program includes the upgrade of municipal sewer systems and system inputs to reduce or eliminate CSOs (combined sewer overflows) and illicit connections to comply with NPDES (National Pollutant Discharge Elimination System) requirements.	Millbury has implemented a stormwater program following the Stormwater Management Plan to ensure compliance with NPDES requirements, and the town regularly updates the section of their website for this program. Recent actions which the town has taken include the development of a Lake and Pond Phosphorus Control Plan, performing public education and outreach on stormwater pollutants and bacteria on the town website and through flyers and other educational materials that are posted at town hall, developing a Catch Basin Cleaning Optimization Plan, and completing Phase I and II mapping updates. ¹⁶⁸	Very effective No changes recommended
Development of Local Wetlands Protection Bylaw and Regulations	The town follows the state's Wetlands Protection Act and considers local regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to wetland alteration and preservation of capacity and quality.	While the town does not have local wetlands protection bylaws or regulations, the town follows the state's Wetlands Protection Act and stormwater regulations.	Somewhat effective The town should consider the development of local regulations specific to Millbury to enhance protection of the town's wetlands.

¹⁶⁸ https://www.millburyma.gov/sites/g/files/vyhlf4706/f/uploads/millbury_ma_-_year_4_ms4_annual_report_-_signed.pdf

Existing Measure	Description	Action	Effectiveness & Recommendations
Street Sweeping	The town sweeps streets twice per year to increase stormwater management capacity. The town ensures debris is captured and disposed properly.	Millbury performs catch basin cleaning once per year and street sweeping twice per year. Engineering consultants provide the town with catch basin investigations and reports as part of MS4 compliance.	Somewhat effective Millbury should consider upgrading to electronic GIS maps to aid in cleaning and preventative maintenance, which is a mitigation strategy.
Tree Trimming and Roadside Mowing	The town completes maintenance of trees to reduce the likelihood of vegetative debris problems during and after storm events.	Millbury conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and the clearing of dead branches) takes place as needed. The town also coordinates with National Grid annually.	Effective Millbury should enhance tree trimming throughout town to protect utility wires and should enhance coordination with its electrical utility to foster a more systematic tree trimming program.
Drainage Maintenance, Replacements and Upgrades	The town maintains a list of culverts and the status of their condition in order to obtain funding for upgrades.	The town consistently reviews and updates the culvert inventory list, which helps the town to prioritize projects. This systematic approach enhances effectiveness in culvert replacement. Millbury performs catch basin cleaning once per year and street sweeping twice per year. Engineering consultants provide the town with catch basin investigations and reports as part of MS4 compliance.	Effective The systematic approach allows the town to prioritize projects and obtain and spend funding in an efficient and effective manner. However, the town could use electronic maps instead of paper maps to maximize effectiveness (see mitigation strategies). The town should also incorporate nature-based solutions when fixing problem culverts.

Existing Measure	Description	Action	Effectiveness & Recommendations
CodeRED system/Reverse 911 system Blackboard (schools)	CodeRed and Reverse 911 are emergency warning systems that send voicemail/text/email alerts to residents (text/email alerts are optional).	Millbury Emergency Management officials are able to alert residents through CodeRed when information is received that a natural or man-made disaster is impending. The town is phasing out CodeRED for Reverse 911 at the time of this plan for a unified system. The Millbury Schools use Blackboard as a means of communication between the schools and families.	Somewhat effective The town should implement training and community outreach on use of the new system to greater unification in emergency communications at the local and state levels (MEMA and the Mass. State Police).
Disaster Mitigation Considerations in Zoning Bylaw Activities	The town integrates disaster mitigation concerns into subdivision, site plan review, 40B reviews, and other zoning reviews.	Millbury considers the impacts of downstream flooding caused by new projects. The town also reviews bylaw language that will help reduce the amount of impervious coverage and increase opportunities for recharge and retention of stormwater.	Very Effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Shelter and Emergency Resources Inventories	The town, in coordination with the state and the American Red Cross, review and update the shelter and emergency resources inventory annually.	Millbury should continue to coordinate with the state and the American Red Cross to update these inventories.	Very Effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Master Plan	The Master Plan inventories town resources and can help in future town decision-making efforts over a 10-to-20-year period. It includes both short-term, incremental and long-term, more aspirational goals and objectives for the community.	The Millbury Master Plan was completed in 2019.	Effective The town should continue to incorporate hazard mitigation into plan recommendations and incorporate mitigation into any future plans.
Municipal Vulnerability Preparedness (MVP) Plan	This plan is a guide for climate resiliency implementation projects in town. It includes a vulnerability assessment and an action-oriented resiliency plan. This plan makes the town eligible for MVP Action Grant funding.	The Millbury MVP Summary of Findings was completed in 2018.	Effective The town should continue to incorporate hazard mitigation into plan recommendations and incorporate mitigation into any future plans.
State Building Code	Compliance with the state building code means that buildings in town meet the minimum established requirements for structural strength, sanitation, and efficiency and are safe for regular use as well as during hazard events and other emergency situations.	The Millbury Planning Board, Zoning Board of Appeals, and Building Inspector work to implement compliance with the state building code. The new update to the state building code (the 10th Edition of the Base Building Code (Massachusetts Amendments)) became effective on October 11th, 2024.	Very Effective No changes recommended

6.0 STATUS OF MITIGATION MEASURES FROM 2019 PLAN

Section 6.0 helps meet the following FEMA local mitigation plan requirements:

- E2. “Was the plan revised to reflect changes in priorities and progress in local mitigation efforts?” (Requirement 44 CFR § 201.6(d)(3))

During this hazard mitigation plan update process, the local HMP team in Millbury provided updates on the status of mitigation measures from the town’s 2019 Hazard Mitigation Plan. Certain measures were incomplete as of 2025 and were deemed as still being relevant; these relevant measures were re-incorporated in the 2026 Hazard Mitigation Plan action strategy if they are anticipated to be effective. The changes in the town’s priorities from the 2019 plan to this plan are noted in the bolded passages from the “2026 Notes” column in the table below. These changes in community priorities have resulted from reassessments of specific hazards-related challenges described in the 2019 plan.

Table 36: Status of Mitigation Measures from 2019 Plan

Structure & Infrastructure Strategies			
2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Pursue funding to purchase and install generator at the senior center	No movement on this action yet	The town is seeking funds for a) a portable generator for municipal facilities, to be set up at the library and brought to the senior center and other facilities as needed and b) a power retrofit for these buildings. The town could lend it to other communities to make it a regional asset. Both will be included as separate mitigation strategies.	YES
Find funding to rebuild Wheelock Avenue Bridge that is currently failing and under temporary repairs	In Progress	The engineering design and permitting process are both. The town is seeking funding for construction activities at the time of this plan.	YES

2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Find funding to rebuild failing Broad Meadow bridge culvert. Temporary repairs have been made	In Progress	While the state has implemented emergency repairs, the town is seeking funding for a comprehensive upgrade. The town should incorporate nature-based solutions in the final project design.	YES
Pursue funding to replace failing Bright Side Bridge. Engineering soil study is currently being conducted.	In Progress	The soil study, engineering design, and permitting process are all complete. The town is seeking funding for construction activities.	YES
Continue to pursue funding for Brown Pond bridge replacement. Bridge is currently in failure. Soil study and engineering study will go out to bid by the end of 2019	No movement on this action yet	The town seeks to implement a culvert replacement for the Rhode Street Bridge, as this dam is privately owned.	YES
Continue to pursue culvert grants to repair/replace culvert on West Main Street near Manner Road. Culvert is in failure and under temporary fix.	In Progress	This culvert is located near Mill Street instead of Manner Road. The design is complete; the town is seeking funds for construction.	YES
Encourage electric utilities and water utilities to flood-proof their vulnerable facilities.	In Progress	This will be moved to the preparedness and coordination section because the town seeks to engage all relevant stakeholders regarding vulnerable facilities.	YES

2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continue to work with the state to make improvements to Brierly Pond Dam. Dam is currently owned by the state.	No movement on this action yet	The Brierly Pond Dike and the Brierly Pond Dam is a dam series that needs upgrades, as both are in failure. The town seeks to make improvements to the whole system.	YES

Preparedness, Coordination & Response Action Strategies			
2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continually make improvements on vegetative debris management programs to reduce debris and thereby mitigate risk of stormwater flooding, riverine flooding, winter storm damage, etc., such as through the Central Massachusetts Mosquito Project.	Ongoing	As this strategy is ongoing, the town is adding a debris/waste management education outreach program as a mitigation strategy. Milbury is still part of the Central Massachusetts Mosquito Project.	NO
Work with the state to ensure dams are well maintained and funding sources are available to repair and maintain the dams.	No movement on this action yet	The town is adding in a new mitigation strategy: the identification of dam ownership and enforcing regulations and maintenance.	YES
Continue to clean all stormwater structures and catch basins during the same time as street sweeping. Once in Fall and twice both in Spring and Summer	Ongoing	This is now an existing protection measure, as the town consistently cleans all stormwater structures and conducts street sweeping.	NO
Continue to sweep streets 5 times per year in accordance with MS5. Once in the fall and twice in the spring and summer	Ongoing	This is now an existing protection measure. The town conducts street sweeping twice per year in accordance with MS4.	NO

Education & Awareness Strategies			
2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continue communication/coordination between federal, state, regional, county, municipal, private, and non-profit agencies in the area of hazard mitigation.	Ongoing	This coordination is ongoing, so the town is replacing this strategy with a municipal staff internal training regarding hazard mitigation and emergency response.	NO
Continue good working relationship with the utility companies to improve mitigation of threats, and improve communication during events; ensure satellite spaces within each community for temporary emergency headquarters. National Grid has a space dedicated to storm management in the Police Station	Ongoing	The town has an established working relationship with the utility companies that improve the mitigation of threats. This is now an existing protection measure	NO
Continue to gain membership town wide for use of CodeRED, See Click Fix and social media posts	Ongoing	The town is adding a new mitigation strategy of looking into broader communication programs, including Reverse 911.	NO
Continue to educate all segments of the community in order to combat complacency and foster individual responsibility for mitigating disaster impacts. Promote "Think Blue" videos and See Click Fix Department of Public Works work order program	Ongoing	The town is adding an education strategy regarding natural hazards outreach and preparedness. Resources such as ready.gov and other state and local resources will be promoted.	NO

2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continually promote use of full range of federal and state resources related to disaster mitigation such as educational materials, training, and National Weather Service forecasts	Ongoing	Federal and state resources related to hazard mitigation are promoted on the town website and other outlets such as social media.	NO
Continue efforts to develop a means for sharing information on a regional basis about successful hazard mitigation planning and programs. Create a feedback loop to improve pre-disaster planning by establishing a former post-disaster assessment process. Continue to attend MEMA EMD meetings and National Grid meetings	Ongoing	The town seeks to develop this strategy within a 1-year timeline rather than have it be a continual effort.	YES

Local Plan & Regulation Strategies			
2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continue to identify and prioritize capital/structural mitigation projects that are cost-effective and technically feasible (stormwater drainage, dam repairs, vegetative debris management, etc.)	Ongoing	The town seeks to identify and prioritize cost-effective capital/structural mitigation projects within a 1-year timeline and then on an ongoing basis after that. In addition, the town can incorporate HMP maintenance meetings on an annual basis.	YES
Continue to encourage the adoption of underground utility requirements in local subdivision regulations, and retrofitting of existing infrastructure; revise regulations to reduce inundation of flood-prone areas	No movement on this action yet	The towns can adopt underground utility requirements in local subdivision regulations, retrofit of existing infrastructure, and revision of regulations to reduce inundation of floodplain areas within a 1–2-year timeline.	YES
Continually integrate disaster mitigation concerns into subdivision, site plan review, 40B reviews, and other zoning reviews. In particular, require the consideration of downstream flooding impacts caused by new projects. Work on model bylaw language to reduce the amount of impervious coverage and increase opportunities for recharge and retention of stormwater.	Ongoing	This is now an existing protection measure. The town updated stormwater bylaws in 2020. The updates tie into the MS4 requirements.	NO

2019 Task	2026 Status	2026 Notes	Include in 2026 Plan?
Continually incorporate disaster mitigation concerns into the MEPA review process.	Ongoing	The town consistently utilizes the MEPA review process.	NO
Continually update inventory of shelter/emergency resources. Identify what services are available at the different shelters (e.g. food preparation, potable water, heat, showers, etc.) and whether the location of different shelters will be impacted by different hazards (i.e. whether flooding will make the shelter inaccessible to some residents). This would help ensure that suitable shelters are available for different types of natural hazards.	Ongoing	The town, in partnership with the state and American Red Cross, review the shelter inventory and emergency resources annually.	NO

7.0 MITIGATION STRATEGY

The Millbury Hazard Mitigation Planning team developed a list of mitigation strategies (both new and previously identified by local officials) and prioritized them using the criteria described below. This list of factors is broadly derived from FEMA's STAPLE+E feasibility criteria.

7.1 PRIORITY AND IMPACT

Section 7.1 helps meet the following FEMA local mitigation plan requirements:

- C5. “Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction?” (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

Real world considerations were brought into the analysis to inform the priority ranking process for the different mitigation strategies. Factors considered in this step include costs and cost effectiveness (including eligibility and suitability for outside funding), timing, political and public support, and local administrative burden. Each strategy was ranked as being high, medium, or low priority.

- High priority strategies have obvious mitigation impacts that clearly justify their costs and to a large degree can be funded, can be completed in a timely fashion, can be administered effectively, and are locally supported.
- Medium priority strategies have some clear mitigation impacts that generally justify their costs and generally can be funded, can be completed in a timely fashion, can be administered effectively, and are locally supported.
- Low priority strategies have relatively low mitigation impacts that do not necessarily justify their costs and may have difficulty being funded, being completed in a timely fashion, being administered effectively, and garnering local support.

Costs and cost effectiveness – in order to maximize the effect of mitigation efforts using limited funds, priority is given to low-cost strategies. For example, regular tree maintenance is a relatively low-cost operational strategy that can significantly reduce the length of time of power outages during a winter storm. Strategies that have clear and viable potential funding streams, such as FEMA's Hazard Mitigation Grant Program (HMGP), are also given higher priority.

Time required for completion – Projects that are faster to implement, either due to short work duration, current or near-term availability of funds, and/or ease of permitting or other regulatory procedures, are given higher priority.

Political and public support – Strategies are given higher priority if they have political and/or public support which is shown through public feedback, prioritization in previous regional and local plans, initiatives that were locally initiated or adopted, and/or prioritization in the Municipal Vulnerability Preparedness Program Community Resilience Building workshop process.

Administrative burden – Strategies that are realistically within the administrative capacity of the Town and its available support network (CMRPC, local non-profit organizations, regional collaborative associations etc.) are prioritized. Grant application requirements, grant administrative requirements (including audit requirements), procurement, and staff time to oversee projects are all considered when figuring out the administrative burden of a strategy.

Impact – The HMP Core Team's consideration of each strategy included an analysis of the mitigation impact each can provide, regardless of cost, political support, funding availability, and other constraints. The intent of this step is to separately evaluate the theoretical potential benefit of each

strategy to answer the question: if cost were no object, what strategies have the most benefit? Factors considered in this analysis include the number of hazards each strategy helps mitigate (more hazards equals higher impact), the estimated benefit of the strategy in reducing loss of life and property (more benefit equals higher impact), and the geographic extent of each strategy's benefits (other factors being equal, a larger area equals higher impact).

- High impact actions help mitigate several hazards, substantially reduce loss of life and property (including loss of critical facilities and infrastructure), and/or aid a relatively large portion of the community.
- Medium impact actions help mitigate multiple hazards, somewhat reduce loss of life and property (including loss of critical facilities and infrastructure), and/or aid a sizeable portion of the community.
- Low impact actions help mitigate a single hazard, lead to little or no reduction in loss of life and property (including loss of critical facilities and infrastructure), and/or aid a highly localized area.

7.2 ESTIMATED COST

Each implementation strategy is provided with a rough cost estimate based on available third party or internal estimates and past experience with similar projects. Each cost estimate includes hard costs (construction and materials), soft costs (engineering design, permitting, etc.), and, where appropriate, Town staff time (valued at appx. \$25/hour for grant applications, administration, etc.). Strategies that already have secured funding are noted. Detailed and current cost estimates for strategies were generally not available, so costs are summarized within the following ranges:

- Low – less than \$50,000
- Medium – between \$50,000 – \$100,000
- High – over \$100,000

7.3 EXPECTED TIMELINE

Section 7.3 helps meet the following FEMA local mitigation plan requirements:

- C5. “Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction?” (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))

Each strategy is provided with an estimated length of time it will take for implementation. For strategies for which funding has been secured, a specific future timeline is provided for when completion is expected. However, most strategies do not currently have funding, and thus it is difficult to know exactly when they will be completed. For these projects, an estimate is provided for the amount of time it will take to complete the project once funding becomes available. Each strategy has a timeframe of either a specified period of less than 5 years, a 5+ year timeframe, or an ongoing timeframe.

7.4 STRATEGY TYPES

Mitigation strategies included in this plan are subdivided into the following four broad categories which can help facilitate local implementation discussions, especially regarding budget considerations and staff roles/responsibilities:

Structure and Infrastructure Projects relate to constructing “brick & mortar” infrastructure and building improvements in order to eliminate or reduce hazard threats or in order to mitigate the impacts of hazards. Examples of this type of project include drainage system improvement, dam repair, and generator installation. Structure and infrastructure improvements tend to have the greatest level of support at the local level but are highly constrained by funding limits.

Preparedness, Coordination and Response Actions ensure that a framework exists to facilitate and coordinate the administration, enforcement and collaboration activities described in this plan. They integrate disaster prevention/mitigation and preparedness into every relevant aspect of town operations, including the operations of the Police Department, Fire Department, EMD, EMS, DPW, Planning Board, Conservation Commission and Board of Selectmen; they also help the town coordinate with neighboring communities where appropriate. Recommendations in this category often help standardize generally practiced activities.

Education and Awareness Programs help raise awareness of overall or hazard-specific risk and generate support for individual or community-wide efforts to reduce risk. Education and awareness seek to affect broad patterns of behavior. Awareness-building activity tends to have a fairly slow effect, although in the end it can provide extraordinary benefits with relatively little cash outlay.

Local Plans and Regulations propose updates to or formally update or establish local bylaws, ordinances and other regulations to protect vulnerable resources and prevent future natural hazard impacts on these resources. Local plans can also review the effectiveness of past mitigation projects, programs, procedures, and policies so that strategies for making them more effective in the future can be formed. An example of a project which fits under this category is incorporating mitigation planning into master plans, open space plans, capital improvement plans, facility plans, and other town plans.

Planning and regulatory activity tends to provide extraordinary benefits to towns with relatively little cash outlay. However, in smaller communities where planning activities are largely the purview of volunteers, outside assistance from the state or regional levels may be required to maximize the benefits of planning. Political support may be difficult to achieve for some planning and regulatory measures, especially those that place new constraints on land use.

In addition to describing action items in each of these categories, the row for each strategy also identifies what hazard(s) the strategy is intended to address. Each row also identifies the lead organizations who serve as the primary points of contact for coordinating efforts associated with the corresponding strategy and identify potential funding sources for implementing the strategy.

7.5 STRATEGY GOALS

Section 7.5 helps meet the following FEMA local mitigation plan requirements:

- C3. “Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?” (Requirement 44 CFR § 201.6(c)(3)(i))

For each of the strategy types included above, there is an associated mitigation goal. The goals are as follows:

Structure and Infrastructure Projects – Harden and adapt the Town’s current infrastructure to withstand hazards in the near-term and the long-term, incorporating nature-based strategies whenever feasible and desirable to build a more resilient municipality.

Preparedness, Coordination and Response Actions – Improve the Town’s emergency and municipal service capabilities to effectively respond to and recover from natural disasters, as well as to build and establish relationships with stakeholders to ensure the continuation of essential services in the event of a disaster.

Education and Awareness Programs – Educate and inform the public about the threats of natural hazards and climate change; provide the resources for individual and community preparedness and foster a whole community response to natural hazards and climate change.

Local Plans and Regulations – Adopt and approve plans and legislation that prioritize climate resiliency and hazard mitigation; incorporate principles of resiliency within local and regional planning and legislative actions.

7.6 TOWN OF MILLBURY 2026 HAZARD MITIGATION STRATEGIES

Section 7.5 helps meet the following FEMA local mitigation plan requirements:

- C3. “Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?” (Requirement 44 CFR § 201.6(c)(3)(i));
- C4. “Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?” (Requirement 44 CFR § 201.6(c)(3)(ii));
- C5. “Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction?” (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii)); and
- D2. “Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)?” (Requirement 44 CFR § 201.6(c)(4)(i))

The Town has decided to prioritize the following mitigation strategies. The columns of the table below reflect the criteria described above. In the “Who (Agencies Involved)” column, the lead agency for each strategy is **bolded**.

OVERALL GOAL: The overall goal of these mitigation strategies is to facilitate activity within the Town of Millbury that reduces the loss of people’s lives, property in town, and environmental resources in town as well of the risk of these losses in the case of natural hazard occurrences. Please view section 8.4, Potential Federal and State Funding sources, for more information on the funding sources listed below.

Table 37: Town of Millbury 2026 Hazard Mitigation Strategies

Structure & Infrastructure Strategies							
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Pursue funding to power-retrofit municipal structures to accept portable external power for a mobile generator that can power multiple municipal buildings (see strategy under “preparedness, coordination & response”)	All	Emergency Management, DPW	Local (capital trust, current operating budget, town meeting), Federal (FEMA HMGP, FMA Grants, Homeland Security Grant funding through EOPSS and CRHSAC)	High	High	Medium	1-3 years
Find funding to rebuild the failing Wheelock Avenue bridge that is currently failing and under temporary repairs	FL, SS, ST, HU	DPW, Facilities	Federal (FEMA HMGP, BRIC, FMA Grants), Local (capital trust, current operating budget, town meeting)	High	High	High	1-2 years
Find funding to rebuild the failing Broad Meadow Bridge culvert incorporating nature-based solutions	FL, SS, ST, HU	DPW, Facilities	Federal (FEMA HMGP, BRIC, FMA Grants), Local (capital trust, current operating budget, town meeting)	High	High	High	1-2 years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Pursue construction funding to rebuild the failing Bright Side Bridge	FL, ST, SS, HU	DPW, Facilities	Local (capital trust, current operating budget, town meeting), Federal (FEMA HMGP, BRIC Grants), State (MVP Action Grant), State/Federal (CDBG)	High	High	High	1-2 years
Pursue funding for the Rhode Street Culvert Replacement	FL, ST, SS, HU	Facilities, DPW	Federal (FEMA FMA, BRIC Grants), Local (capital trust, current operating budget, town meeting)	High	High	High	1-3 years
Pursue culvert grants to rebuild the culvert on Mill Street	FL, ST, SS, HU	Facilities, DPW	Local (capital trust, current operating budget, town meeting), Federal (FEMA BRIC, FMA Grants)	High	High	High	1-2 years
Prioritize funding for physical improvements and maintenance at the Brierly Pond Dam Series.	DF, FL, HU	Facilities, DPW	Local (capital trust, current operating budget, town meeting), Federal (FEMA BRIC, FMA Grants)	High	High	High	1-2 years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Install a second ADA-compliant exit at the police station to promote enhanced emergency response. Ideally, pursue funding for a new police station.	All	Facilities, DPW	State, Federal (FEMA BRIC, FMA Grants, Army Corps of Engineers Grant Funding), Local	High	High	High	1-2 years
Pursue funding to replace the DPW salt shed. Specifically, it has a flat roof and there are snow load concerns. The rest of the building needs replacement to enhance the winter storm response.	SS, ST	DPW	Local (capital trust, current operating budget, town meeting), Federal (FEMA HMGP, BRIC, FMA Grants, TIP)	High	High	High	1-2 years
Implement flood prevention mechanisms for the sewer plant and wastewater treatment plants that run under Interstate 90. The upper Blackstone River drains nearby.	FL, SS, ST, HU	DPW	Local (capital trust, current operating budget, town meeting), Federal (FEMA HMGP, BRIC, FMA Grants, TIP)	High	Medium	High	1-3 years
Pursue funding to replace the sewer and highway buildings. Both buildings are in need of replacement, and both play a critical role in natural hazard response. In addition, both buildings have flat roofs and lead to snow load concerns.	FL, SS, ST, HU	DPW, Facilities	Local (capital trust, current operating budget, town meeting), Federal Grants (FEMA HMGP, BRIC, FMA Grants, TIP)	Medium	High	High	1-2 years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Extend the water station pipes to the 207 Riverlin Transfer Station to address fire concerns. There is no running water at the transfer station, where 3,800 residents drop off waste. This will also ensure effective removal of debris in the event of a natural hazard event.	WF	DPW	Local (capital trust, current operating budget, town meeting), Federal Grants (FEMA HMGP, BRIC Grants, TIP), State (MVP Action Grant)	Medium	Medium	High	0-1 years
Create a town-wide microgrid by installing the following: solar canopy system(s) on municipal and/or school parking lots, brownfields, capped landfills, and closed fuel facilities, rooftop solar array(s) for municipal, public hospital, and/or public school building rooftops, and a battery storage substation which connects to the grid. These microgrids can increase the town's resiliency to storm events.	SS, ST, HU, WF	School District, Municipal Government	Local (town meeting), State (MVP Action), Federal (BRIC)	Medium	High	High	1-2 years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Install sprinklers at municipal facilities to enhance fire protection.	WF	BOS, Facilities	Federal (Assistance to Firefighters Grants)	Medium	Medium	High	1-3 Years
Encourage electric utility (National Grid) and water utility (Aquarion) to flood-proof their facilities to ensure these can still operate during a flood emergency.	FL	Facilities, DPW, Emergency Management	Local (capital trust, operating budget, town meeting)	Medium	High	Low	1-3 years
Establish a town program to buy lightning rods on an as-needed basis.	LG, ST	Town Administrator, Building Department	Local (capital trust, current operating budget, town meeting)	Low	Medium	Low	1-2 years, then ongoing

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Install central air conditioning in the town's schools, including the schools which act as emergency shelters, to protect children, older adults, people with disabilities, and other vulnerable populations from the impacts of extreme temperatures.	XT, DR	DPW, BOS, Millbury Public Schools	Local (capital trust, current operating budget, town meeting), Federal (FEMA BRIC Grant)	Medium	Medium	Medium	3-5 years
Pursue funding to construct solar fields to increase resiliency for critical infrastructure during power outage events.	All	Police, Fire, DPW	Local (capital trust, current operating budget, town meeting), Homeland Security Grant funding through EOPSS and CRHSAC	Medium	High	Medium	3-5 years
Retrofit municipal facilities to improve / strengthen resiliency to natural hazards and increase energy efficiency.	All	BOS	Local, State (DEP funding, MVP Action Grant, DOER grants), Federal (FEMA BRIC Grant)	High	High	High	3-5 Years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Pursue funding for an upgraded cellular tower near Butler Farm. The farm serves as a backup emergency operations center but does not have reliable cellular or radio service.	All	Facilities, DPW, Emergency Management	Local (capital trust, current operating budget, town meeting)	High	High	High	1-2 years

Preparedness, Coordination & Response Action Strategies							
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Pursue funding for a portable generator for use at various town facilities, including the library and the senior center. The town could lend it to nearby towns, making it a regional asset.	All	Emergency Management , Facilities, BOS	Local (capital trust, current operating budget, town meeting), State (LPA), Federal (FEMA FMA Grant)	High	High	Medium	1-3 years
Enhance weather and emergency information access for residents who may lack equitable information access. The planning team noted some residents do not have access to computers.	All	Emergency Management, Facilities, BOS	Local (capital trust, current operating budget, town meeting)				
Investigate the benefits and requirements of the Community Rating System (CRS) and decide whether to participate in this program or not.	FL, SS, ST, HU	DPW, PB	Local (capital trust, current operating budget, town meeting)	Low	Low	Low	1-2 years
Complete evacuation plan updates, and where possible, ensure that evacuation routes are outside of hazard areas.	All	Local Emergency Management , DPW, CMRPC, MassDOT	Local (capital trust, current operating budget, town meeting), Federal (FEMA BRIC, FMA, EMPG Grants, Homeland Security Grant funding through EOPSS and CRHSAC, US DOT PROTECT Grant)	High	High	Low	Update every 5 years

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Work with homeowners to mitigate localized flooding caused by development.	FL	DPW	Local (capital trust, current operating budget, town meeting), State (MEMA Grants), Federal (FEMA BRIC, FMA Grants)	High	High	High	0-5 years, then ongoing
Provide more resilient storage facilities for vital information, including birth, death, and marriage records as well as voter registration data, and associated equipment. Establish coordination between the Town Clerk, Treasurer, Assessor, and Planning Board to assess all vulnerable records information and ensure that the town protects critical data.	All	BOS, Town Clerk, Treasurer, Assessor, Planning Board	Local (capital trust, current operating budget, town meeting)	High	Medium	Low / Medium	1-3 years
Pursue funding for digital GIS maps for catch basin cleaning to replace paper maps, including inspectional software to enter information. The digital maps will result in an MS4 compliance system that coordinates and streamlines cleaning requirements.	All	DPW, BOS	Local (capital trust, current operating budget, town meeting), State (MVP Action, MEMA Grants)	High	High	Medium	1 year
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Assess communications systems and identify the required infrastructure for communications upgrades across town. There are dead zones in several parts of town. Federal radio systems were also recently upgraded.	All	Emergency Management	Local, (capital trust, current operating budget, town meeting), State (MEMA grants, MVP Action), Federal (FEMA BRIC, FMA Grants)	Medium	Medium	High	1 year
Reinstate the town emergency management committee and establish either a local or regional community emergency response team (CERT).	All	BOS, Emergency Management	Local, (capital trust, current operating budget, town meeting)	High	Medium	Low	0 – 1 years
Enhance the town's participation in and coordination and planning relating to regional disaster and emergency response training and drills, including a regional evacuation plan.	All	CMRPC, BOS, Emergency Management	Local, State (MEMA Grants), Federal (Homeland Security Grant funding through EOPSS and CRHSAC, FEMA Grants)	High	Medium	Low	0 – 1 years, then ongoing
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Improve and maintain emergency services for vulnerable populations such as seniors, which could require increasing emergency transportation options (rideshare options), diversifying communications, expanding planning, and ensuring reliable power.	All	BOS, Emergency Management , PB, Facilities	Local, State (DLTA, Support and Incentive Grant, Green Communities Grants MassWorks), Federal (FEMA BRIC Grant, USDA Community Facilities Direct Loan & Grant Program, Homeland Security Grant funding through EOPSS and CRHSAC)	High	High	High	1 – 2 years, then ongoing
Enhance road information coordination as well as planning for snow removal.	SS	DPW , Emergency Management, Fire, Police	Local, Federal (FEMA HMGP, BRIC Grants), State (LPA), private contracts	High	High	Low	1 – 2 years, then ongoing
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Switch the fire department from paid on-call to full-time to increase emergency response capacity.	All	Emergency Management, Fire, BOS	Local, (capital trust, current operating budget, town meeting)	High	High	High	0 – 5 years
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Education & Awareness Strategies
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Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Conduct a public education outreach program about the benefits of sprinklers in structures and the importance of having them at private-owned and municipal-owned structures.	DR, WF	DPW, CC, Fire	Local (capital trust, current operating budget, town meeting)	High	Medium	Low	0-2 years, then ongoing
Conduct a public outreach program about waste/debris management. The campaign should include information about how to dispose of waste/debris from natural hazard events properly. Coordinate with neighboring towns.	FL, SS, ST, HU	Fire, DPW	Local (capital trust, current operating budget, town meeting), Federal (Assistance to Firefighters Grant, Fire Prevention and Safety Grant)	High	Medium	Low	0-2 years, then ongoing
Increase education and outreach (on social media and through schools, the senior center, and community-based organizations) on how natural hazards and climate change impact the town.	All	All Town Departments	Local (capital trust, current operating budget, town meeting)	High	High	Low	0-2 years, then ongoing
Conduct an education program surrounding NPDES MS4 permit to supplement pollution prevention efforts; educate on storm drain safety/clearance and related topics.	FL, SS, ST, HU	DPW	Local (capital trust, current operating budget, town meeting)	High	Medium	Low	0-2 years, then ongoing
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Educate residents about invasive species management using existing and new resources. Explore establishing a regionalized education and abatement program for invasive species management.	IS	All Town Departments	Local (capital trust, current operating budget, town meeting)	High	Medium	Low	0 – 1 years
Develop and provide annual outreach information to employers and employees on the dangers of exposure to extreme temperatures and strategies for minimizing the risks posed by such exposure.	XT	BOH, Emergency Management, BOS	Local (capital trust, current operating budget, town meeting), State (LPA)	Medium	Medium	Low	0 – 1 years, then ongoing
Support local public health initiatives and evaluate the management of public health related concerns.	IS, XT, DR	BOH	Local (capital trust, current operating budget, town meeting)	Medium	Medium	Low	0 – 1 years, then ongoing
Educate residents about the benefits of nature-based solutions for homes, including infiltration gardens, dragonfly gardens, and bat boxes	All	CC, BOS	Local (capital trust, current operating budget, town meeting)	Medium	Medium	Low	0 – 1 years

Local Plan & Regulation Strategies

Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline
Identify dam ownership for dams in town and enforce maintenance and regulations of dams.	FL	DPW	State (MVP Action Grant), Federal (FEMA FMA, BRIC Grants)	High	High	Medium / High	0-3 years
Participate in a regional debris management plan to enhance coordination regarding post-disaster debris cleanup	HU, EQ, SS, ST	Railroad Companies in town, Fire, DPW	Local, State (DLTA, LPA), Federal (FEMA BRIC Grant)	High	High	Low	0-3 years, then ongoing
Establish a comprehensive emergency awareness plan to build awareness of town resources and make town residents aware of the many planning efforts, agreements, shelters, etc. which are focused on making / help make the town more resilient. Ensure that all residents know how to access these resources when they are needed.	All	DPW, Fire , Police, Health Department, PB	Local (capital trust, current operating budget, town meeting), State (EEA Planning Assistance Grant, DLTA), Federal (FEMA BRIC Grant, Homeland Security Grant funding through EOPSS and CRHSAC)	High	High	Low / Medium	1-2 years
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Assess green infrastructure opportunities for stormwater management in town and develop a list of specific priorities. Review town regulations and update them as necessary to support green infrastructure and low-impact development. Consider projects in areas that are prone to flooding.	FL, ST, HU	PB, DPW, CMRPC	Local (capital trust, current operating budget, town meeting), State (EEA Planning Assistance Grant, DLTA), Federal (FEMA BRIC Grant)	Medium	Medium	Medium	2-3 years
Incorporate hazard mitigation goals into the Open Space and Recreation planning process (CMRPC can be a resource for this).	All	PB, Parks	Local (capital trust, current operating budget, town meeting), State (LPA, Land Conservation Assistance Grant)	High	Medium	Medium / High	3-5 years, then at least every 7 years
Review and update local plans, bylaws, and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure that new construction will not be affected by hazards.	All	All Town Departments	Local (capital trust, current operating budget, town meeting)	Medium	High	Low	1-3 years, then ongoing
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Monitor implementation of Hazard Mitigation Plan. Once a year, meet to discuss the progress of mitigation strategies.	All	All Town Departments	Local (capital trust, current operating budget, town meeting)	High	High	Low	At least yearly / as hazards affecting the town occur
Inventory unreinforced masonry and brick buildings in town that may be vulnerable to earthquakes. Conduct a study which identifies ways that these buildings can meet the Massachusetts State Building Code's seismic standards.	EQ	Building Commissioner, PB	Local (current operating budget), State (MEMA Grants), Federal (FEMA Grants (National Earthquake Hazards Reduction Program's State Assistance Program))	Low	Medium	Low	0-3 years, then ongoing
Complete a town-wide dam assessment of all public, private, and beaver dams. In this assessment, focus on reducing the risk of flooding from dam failures during intense storm events and protecting ecosystems that provide flood storage and other resilience benefits.	DF, FL, SS, ST, HU	DPW	Local (capital trust, current operating budget, town meeting), State (MVP Action Grant), Federal (FEMA, FMA, BRIC Grants)	High	High	Medium	2-3 years
Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Expected Timeline

Implement a stormwater utility, which would create a funding stream for maintenance and physical improvements to stormwater and infrastructure. The user fees collected would fund replacement and upkeep, increasing resilience to flooding.	FL, SS, HU, ST	DPW, BOS	Local (capital trust, current operating budget, town meeting)	High	High	Low	0 – 1 years, then ongoing
Implement a hazard mitigation plan action tracker system to spread awareness about the actions the town is taking to implement various mitigation strategies	All	All Departments	Local (capital trust, current operating budget, town meeting)	Medium	High	Low	0 – 1 years, then ongoing
Develop a town water plan that examines all options the town can take to secure water resources for the town (including water conservation planning for residents, water acquisition planning for the town, and possible municipalization of town water resources)	DR	Planning, BOS, DPW	Local (capital trust, current operating budget, town meeting), State (DLTA, Eco-One Stop, EEA Planning)	Medium	Medium	Low	0-1 Years, then ongoing

'Hazards Addressed' abbreviations:

DF Dam Failure

EQ Earthquakes

HU Hurricanes

LG Lightning Strikes

SS Severe Snowstorms / Ice Storms / Nor'easters

WF Wildfire / Brushfire

'Agencies Involved' abbreviations:

CMRPC Central Mass. Regional Planning Commission

DPW Department of Public Works

BA Board of Appeals

DR Drought

FL Flooding

IS Invasive Species

OT Other

ST Severe Thunderstorms / Wind / Tornadoes

XT Extreme Temperatures

CC Conservation Commission

PB Planning Board

BOH Board of Health

8.0 PLAN ADOPTION, IMPLEMENTATION, AND MAINTENANCE

8.1 PLAN ADOPTION

A public meeting was held on August 12th, 2025, as part of the Board of Selectmen meeting in order to detail the Millbury Hazard Mitigation Plan update process to that date and to solicit comments and feedback from the public and the Board of Selectmen on the draft plan which was then being developed. The draft plan was provided to the town for distribution and posted on the Town's website for two weeks starting on August 18th, 2025, for public review and input. The Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their review. Upon receiving conditional approval of the plan by FEMA, the final plan was adopted by vote of the Millbury Board of Selectmen and certified on July 14th, 2026.

8.2 PLAN IMPLEMENTATION

Section 8.2 helps meet the following FEMA local mitigation plan requirements:

- A4. "Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information?" (Requirement 44 CFR § 201.6(b)(3)); and
- E2. "Was the plan revised to reflect changes in priorities and progress in local mitigation efforts?" (Requirement 44 CFR § 201.6(d)(3)).

The Town of Millbury has completed the Open Space and Recreation Plan (2020), a Master Plan (2019), an ADA Self-Evaluation and Transition Plan (2023), a Watershed-Based Plan (2019), a Municipal Vulnerability Preparedness (MVP) Summary of Findings (2018), and a Housing Production Plan (2025). Findings from the 2025 Millbury Hazard Mitigation Plan update may be integrated into future iterations of all of these plans as well as into zoning updates for the town, stormwater and/or flooding studies/plans completed in town, and other planning mechanisms and documents.

The implementation of the 2025 plan update began upon its formal adoption by the Board of Selectmen and approval by MEMA and FEMA. Town departments and boards responsible for ensuring the development of policies, ordinance revisions, and programs as described in Sections 6 and 7 of this plan will be notified of their responsibilities immediately following this plan's approval. The local Hazard Mitigation Planning Team in town will oversee the implementation of this plan, led by the town's emergency management director, who will annually assemble this team to review the plan and work towards implementing the strategies in this plan. This meeting will also be called by the emergency management director following a disaster event to review applicable strategies to address that disaster as well.

Incorporation with Other Planning Documents

Findings from the 2019 Millbury Hazard Mitigation Plan were not incorporated into other planning mechanisms and policies in town besides this plan update and (through a brief mention) the Town's 2023 Comprehensive Emergency Management Plan. Existing plans, studies, reports, and municipal documents completed by and/or relating to the Town were incorporated throughout this planning process. The following key documents were reviewed as part of the planning process, and information from these documents was incorporated into this plan update:

- **Millbury Comprehensive Emergency Management Plan** (particularly the critical infrastructure section) – the critical infrastructure section of this plan was used to help identify infrastructure components in town that have been identified as crucial to the function of the Town; this resource was also used to identify potentially vulnerable populations and potential

emergency response shortcomings.

- **Regional Evacuation Plan** – Funded by United States Department of Homeland Security via the Commonwealth of Massachusetts and the Central Region Homeland Security Advisory Council, this regional evacuation plan prepared by CMRPC was used to identify evacuation routes and emergency shelters. This plan will soon be updated by CMRPC.
- **Millbury Open Space and Recreation Plan** – This Plan was used to identify the natural context within which mitigation planning takes place; it proved useful for this planning process insofar as it identified water bodies, rivers, streams, infrastructure components (i.e., water and sewer, or the lack thereof), and population trends. This information was incorporated into this plan to ensure that the Town's mitigation efforts would be sensitive to the surrounding environment.¹⁶⁹
- **Millbury Zoning Bylaw** – The Zoning Bylaw was used in this planning process to identify the actions that the Town is already taking (such as implementing and enforcing floodplain regulations) that reduce the potential impacts of a natural hazard and to make sure that this plan's mitigation strategies do not duplicate existing successful efforts.¹⁷⁰
- **Millbury Master Plan** – This plan was used to identify the main priorities for the Town so that the Hazard Mitigation Plan's strategies can align with these priorities.¹⁷¹
- **Millbury Municipal Vulnerability Preparedness Plan** – The medium and high-priority recommendations from this plan were incorporated into the Hazard Mitigation Plan's mitigation strategies.¹⁷²
- **ResilientMass State Hazard Mitigation and Climate Adaptation Plan** - This plan was used to ensure that the town's HMP data and priorities, especially in the hazards section of the plan, are consistent with the State's data and priorities.¹⁷³
- **2022 Massachusetts Climate Change Assessment** - This plan was used to ensure that the town's HMP data and priorities, especially in the hazards section of the plan, are consistent with the State's data and priorities.¹⁷⁴
- **2025 Massachusetts Statewide Comprehensive Housing Plan** - This plan was used to ensure that the town's HMP data and priorities, especially in the development trends section of the plan, are consistent with the state's data and priorities.¹⁷⁵ Priorities from the state plan are also reflected in the town's 2025 Housing Production Plan.
- **Active Dam Emergency Action Plans** - This plan incorporated information from existing Dam Emergency Action Plans in town for the following dams: (MA00144) Singletary Pond

¹⁶⁹ The Town of Millbury, "Open Space and Recreation Plan 2020: Millbury, Massachusetts," Drive.google.com, The Town of Millbury, April 1, 2026, <https://www.millburyma.gov/DocumentCenter/View/318/2020-Open-Space-and-Recreation-Plan-Update>

¹⁷⁰ "Town of Millbury Zoning Bylaws," millburyma.gov.

¹⁷¹ BSC Group, "Town of Millbury Comprehensive Master Plan 2019," millburyma.gov, The Town of Millbury, 2019, <https://www.millburyma.gov/DocumentCenter/View/315/2019-Town-of-Millbury-Master-Plan>

¹⁷² CMRPC, "Towns of Grafton, Millbury & Northbridge Municipal Vulnerability Preparedness Summary of Findings", <https://www.millburyma.gov/DocumentCenter/View/324/2018-Millbury-Vulnerability-Preparedness-MVP-Summary-of-Findings-Report>

¹⁷³ "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

¹⁷⁴ "2022 Massachusetts Climate Change Assessment"

¹⁷⁵ HOUSING ADVISORY COUNCIL, "A HOME FOR EVERYONE: A Comprehensive Housing Plan for Massachusetts 2025 – 2029," Mass.gov, Executive Office of Housing and Livable Communities, 2025, <https://www.mass.gov/doc/a-home-for-everyone/download>.

Dam, (MA00145) Ramshorn Pond Dam, (MA00146) Dorothy Pond Dam, and (MA02830) Bucks Pond Dam.. Personally Identifiable Information for specific residences located within inundation zones were referred to, but not included within the plan to protect the privacy of those residents.

Additionally, this plan incorporated information from the 2011 FIRM maps for Millbury and the 2023 Worcester County Flood Insurance Study.

After this plan has been approved by both FEMA and the Millbury Board of Selectmen, a link to the plan will be emailed to all town staff, boards, and committees; along with this link, the town staff, boards, and committees will be sent a reminder to review the plan periodically and work to incorporate its contents, especially the action plan, into other town planning processes and/or documents. In addition, during annual monitoring meetings for the Hazard Mitigation Plan implementation process, the local Hazard Mitigation Team will review whether any of these plans are in the process of being updated. If so, the Hazard Mitigation Team will remind people to work on these plans and/or documents of the Hazard Mitigation Plan and will encourage them to incorporate information and strategies from the Hazard Mitigation Plan into their efforts. The Hazard Mitigation Team will also review current town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan. Information from the Hazard Mitigation Plan will also be incorporated into updates of the town's Comprehensive Emergency Management Plan.

8.3 PLAN MONITORING AND EVALUATION

Section 8.3 helps meet the following FEMA local mitigation plan requirements:

- D1. “Is there discussion of how each community will continue public participation in the plan maintenance process?” (Requirement 44 CFR § 201.6(c)(4)(iii));
- D2. “Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a five-year cycle)?” (Requirement 44 CFR § 201.6(c)(4)(i)); and
- D3. “Does the plan describe a process by which each community will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate?” (Requirement 44 CFR § 201.6(c)(4)(ii))

The town will review and update the Hazard Mitigation Plan every five years through forming a HMP planning team and working with a contractor to complete the update. The town’s Emergency Management Director will also call meetings of all parties responsible to review, track, and monitor the progress of the Hazard Mitigation Plan on a yearly basis and/or as is needed based on the occurrence of hazard events. Any substantial revisions made to the plan will be made open for public comment and/or will be presented on at a Board of Selectmen meeting which is open to the public. Parties identified as responsible for specific mitigation actions will be asked to submit their reports relating to these actions in advance of town hazard mitigation planning meetings.

Town hazard mitigation planning meetings will involve evaluation, assessment, tracking, and monitoring of the most recent HMP plan update. Responsible parties will review the plan’s effectiveness at achieving its goals and stated purpose at these meetings. The following questions will serve as the criteria that are used to evaluate the plan:

PLAN MISSION AND GOAL

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

HAZARD IDENTIFICATION AND RISK ASSESSMENT

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.
- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.
- Is there any new data available from local, state, or federal sources relating to the impact of previous hazard events or the probability of future hazard occurrences? If so, this information should be incorporated into the plan.
- How will progressing climate change impact the risk of this natural hazard? What impacts do hotter, wetter, and more variable weather have on each natural hazard?

EXISTING MITIGATION STRATEGIES

- Are the current strategies effectively mitigating the effects of any recent hazard events?

- Has there been any damage to property caused by natural hazards since the plan was last reviewed?
- How could the existing mitigation strategies be improved to reduce the impact from recent occurrences of hazards? If there are improvements, these should be incorporated into the plan.

PROPOSED MITIGATION STRATEGIES

- What progress has been accomplished for each of the previously identified proposed mitigation strategies?
- How have any recently completed mitigation strategies affected the level of impact in town of hazards that have occurred since the strategy was completed?
- Should the criteria for prioritizing the mitigation strategies in the plan be altered in any way?
- Should the priority given to individual mitigation strategies be changed, based on any recent changes to financial and staffing resources and/or recent hazard events?

REVIEW OF THE PLAN AND INTEGRATION WITH OTHER PLANNING DOCUMENTS

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

Plan tracking and monitoring will be accomplished by a group of town stakeholders led by the town's Emergency Management Director who have similar, if not the same, credentials as the local HMP planning team for this plan update. When this team meets, they will review the mitigation strategies table from this plan update, will update it with any progress on the strategies which has been made since the plan update was adopted, and will discuss priorities for mitigation strategies which have not yet been implemented. Following these meetings, it is anticipated that the HMP planning team in town may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the most recent plan update. The town also has the option to work with a contractor to help facilitate the tracking and monitoring of the plan.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. Any substantial revisions to the plan will be made open for public comment and/or will be presented on at a Board of Selectmen meeting which is open to the public. Plan implementation will be approved through standard capital planning, town Meeting, and/or other publicly accessible local approval processes. The public will be notified of any changes to the Plan via the meeting notices board at town Hall, and copies of the revised plan will be made available to the public at town Hall.

8.4 POTENTIAL FEDERAL AND STATE FUNDING SOURCES

8.4.1 FEDERAL FUNDING SOURCES

The following is a summary of the programs which are the primary sources for federal funding of hazard mitigation projects and activities in Massachusetts:

Table 38: Federal Hazard Mitigation Funding Sources

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>National Flood Insurance Program (NFIP)</i>	Pre-disaster insurance	Any time (pre & post disaster)	DCR Flood Hazard Management Program	Property Owner, FEMA
<i>Community Rating System (CRS) (Part of the NFIP)</i>	Flood insurance discounts	Any time (pre & post disaster)	DCR Flood Hazard Management Program	Property Owner
<i>Hazard Mitigation Grant Program (HMGP)</i>	Post-disaster cost-share grants	Post disaster program	MEMA	75% FEMA / 25% non- federal
<i>Building Resilient Infrastructure and Communities (BRIC)</i>	National, competitive cost-share grant program for projects & planning	Annual, pre-disaster mitigation program	MEMA	75% FEMA / 25% non- federal
<i>Flood Mitigation Assistance (FMA) Program</i>	Cost share grants for pre-disaster planning & projects	Annual pre-disaster grant program	MEMA	75% FEMA / 25% non- federal
<i>Public Assistance</i>	Post-disaster aid to state & local governments	Post Disaster	MEMA	FEMA, plus a non-federal share
<i>Small Business Administration (SBA) Mitigation Loans</i>	Pre- & Post- disaster loans to qualified applicants	Ongoing	MEMA	Small Business Administration
<i>Emergency Management Performance Grant (EMPG)</i>	Pre- & post-disaster management and implementation grants	Annual	MEMA	50% FEMA / 50% non-federal match
<i>Homeland Security Grant Program (HSGP)</i>	Funding to prevent, respond to, and recover from acts of terrorism	Annual	MEMA	FEMA

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>Hazard Mitigation Grant Program Post-Fire (HMGP-PF)</i>	Cost-share post-wildfire disaster mitigation measures	Annual, within six months after a Fire Management Assistance Grant declaration	FEMA	75% FEMA / 25% non-federal
<i>Assistance to Firefighters Grants (AFG)</i>	Training & equipment for wildfire-related hazards	Annual	FEMA	FEMA
<i>Fire Prevention & Safety Grant Program (AFG) (FP&S)</i>	Cost-share funding to support projects that protect people from fire-related hazards	Annual	FEMA	95% FEMA / 5% non-federal
<i>Fire Management Assistance Grants (FMAG)</i>	Cost-share funding to mitigate & manage major disasters caused by fire	Any time (pre- & post disaster)	FEMA	75% FEMA / 25% non-federal
<i>National Dam Safety Program (State Assistance Grant Program) (NDSP)</i>	Funding to improve dam safety & state dam safety programs	Annual	FEMA	FEMA, Bipartisan Infrastructure Law
<i>Rehabilitation of High Hazard Potential Dam Program (State Dam Safety Divisions) (HHPD)</i>	Cost-share funding to plan and rehabilitate high hazard potential dams	Annual	FEMA	65% FEMA / 35% non-federal
<i>National Earthquake Hazards Reduction Program's State Assistance Program (NEHRP)</i>	Cost-share funding for pre-earthquake risk management	Annual	FEMA	75% FEMA / 25% non-federal
<i>Emergency Food and Shelter Program (EFSP)</i>	Grant funding for supplemental food & shelter for those experiencing / at risk of experiencing homelessness	Annual	FEMA	FEMA

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>Public Health Crisis Response Cooperative Agreement (PHCRCA)</i>	Funding to support surge needs of existing public health programs responding to public health emergencies	Annual for approved by unfunded (ABU) roster	CDC	Varies
<i>Army Corp of Engineers Planning Assistance</i>	Water supply, conservation, wetlands, & dam safety funding	Any time (pre & post disaster)	U.S. Army Corps of Engineers	50% Federal / 50% non-federal
<i>Forest Service Community Wildfire Defense Grant (USDA-FSCWDG)</i>	Grant funding to plan for and reduce wildfire risk	Annual	USDA-FS	75% USDA / 25% non-federal
<i>Emergency Watershed Protection Program (EWP)</i>	Technical assistance and funding for helping communities mitigate natural disaster risks which affect watersheds	Ongoing	USDA-NRCS	75% USDA / 25% non-federal (90% USDA / 10% non-federal in limited resource areas)
<i>Agricultural Management Assistance (Drought Mitigation Funding Program) (AMA)</i>	Technical assistance for agricultural producers to manage financial risks	Ongoing	USDA-NRCS	75% USDA / 25% non-federal
<i>USDA Community Facilities Direct Loan & Grant Program (Rural Development) (CFDLGP)</i>	Funding for improving essential community facilities	Annual	USDA-RD	Varies
<i>National Culvert Removal, Replacement, & Restoration Grant (NCRRRG)</i>	Competitive grant funding to replace, remove, and repair culverts or weirs	Annual	US DOT	Varies
<i>Bridge Investment Program (BIP)</i>	Competitive grant program for improving the conditions of existing bridges	Annual	US DOT	80% FHWA / 20% other

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program (PROTECT)</i>	Discretionary program which includes Competitive Resilience Improvement Grants and planning grants	Annual	US DOT	Varies (generally, up to 80% federal share)

This FEMA web page describes several funding opportunities: [FEMA Grants | FEMA.gov](#). The programs listed in the above table are described in more detail below.

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) AND COMMUNITY RATING SYSTEM (CRS) (PART OF THE NFIP)

The National Flood Insurance Program (NFIP) provides insurance to communities required to manage and adopt mitigation practices for high flood-risk areas. The Community Rating System (CRS) incentivizes communities to incorporate flood management practices and mitigation strategies through discounted flood insurance rates; Incentives are available on a voluntary and participatory basis to encourage communities to meet the minimum requirements of the NFIP. In encouraging communities to meet NFIP's minimum requirements, CRS can extend the availability of funding to homeowners, businesses, and renters for whom flood insurance may not be accessible. CRS allocates insurance discount rates according to a community's demonstrated efforts to implement the program's three goals:

- Reduce flood damage to insurable properties;
- Strengthen and support NFIP; and
- Incentivize proactive floodplain management.

Communities can earn CRS points based on their implementation of various flood mitigation initiatives, including but not limited to: (1) restricting development on flood prone areas, (2) extending public risk communication with flood warning systems, and (3) enhancing infrastructural resilience to flood damage. Please refer to [The National Flood Insurance Program \(floodsmart.gov\)](#) and [Community Rating System | FEMA.gov](#) for more information.

HAZARD MITIGATION ASSISTANCE (HMA)

The Hazard Mitigation Assistance (HMA) grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of these programs differ, all share the common goal of reducing the risk of loss of life and property from natural hazards. Brief descriptions of the HMA grant programs can be found below. For more information on the individual programs, or to see information related to a specific fiscal year, please click on one of the program links.

Hazard Mitigation Grant Program (HMGP)

The Hazard Mitigation Grant Program (HMGP) assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available under this program to implement projects in accordance with state, tribal, and local priorities. Please refer to [Hazard Mitigation Assistance Grants | FEMA.gov](#) for additional information.

HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects completed under this program must provide a long-term solution to a problem; for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight a flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage. Examples of eligible HMGP projects include, but are not limited to:

- Acquisition of real property from willing sellers and demolition or relocation of buildings to convert this property to open space use;
- Retrofitting structures and facilities to minimize damages from high winds, earthquakes, flooding, wildfires, or other natural hazards;
- Elevation of flood prone structures;
- Development and initial implementation of vegetative management programs;
- Minor flood control projects that do not duplicate the flood prevention activities of other federal agencies;
- Localized flood control projects, such as certain ring levees and floodwall systems, that are designed specifically to protect critical facilities; and
- Post-disaster building code related activities that support building code officials during the reconstruction process.

Hazard Mitigation Grant Program Post-Fire (HMGP-PF)

The Hazard Mitigation Grant Program Post-Fire (HMGP-PF) is a program aimed at providing financial funding to localities to reduce risk of damage from future fires after a given area has experienced a fire. Funds are determined through benefit-cost analysis software. For more information, please refer to: [Hazard Mitigation Grant Program Post Fire | FEMA.gov](#).

Building Resilient Infrastructure and Communities (BRIC)

The Building Resilient Infrastructure and Communities (BRIC) program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. Examples of BRIC projects are projects that demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design. For example, an innovative BRIC project may bring multiple funding sources or in-kind resources from a range of private and public sector partners. Or an innovative project may offer multiple benefits to a community in addition to the benefit of risk reduction. The BRIC program has replaced the Pre-Disaster Mitigation (PDM) grant program. More information on the BRIC program can be found here: [Building Resilient Infrastructure and Communities | FEMA.gov](#).

The Massachusetts Emergency Management Agency (MEMA) coordinates BRIC applications for municipalities within the Commonwealth. Links to MEMA resources and BRIC application materials can be found here: [Building Resilient Infrastructure and Communities \(BRIC\) & Flood Mitigation Assistance \(FMA\) Grant Programs | Mass.gov](#).

FLOOD MITIGATION ASSISTANCE (FMA)

Flood Mitigation Assistance (FMA) provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program. Please refer to the FMA website: [Flood Mitigation Assistance Grant Program | FEMA.gov](#).

The following types of FMA grants are available to states and communities:

- **Project Scoping Grants** are designed to develop mitigation strategies and obtain data to prioritize, select, and develop complete applications in a timely manner that result in either an improvement in the capability to identify appropriate mitigation projects or in the development of an application-ready mitigation project for FMA or another program.
- **Planning Grants** to prepare flood mitigation plans; Only NFIP-participating communities with approved flood mitigation plans can apply for FMA project grants.
- **Technical Assistance Grants** are awards of up to \$50,000 federal cost share for recipients to which FEMA obligated at least \$1 million federal share the previous FMA cycle.
- **Project Grants** to implement measures to reduce flood losses, such as the elevation, acquisition, or relocation of NFIP-insured structures. States are encouraged to prioritize FMA funds for applications that include repetitive loss properties (structures with 2 or more losses each with a claim of at least \$1,000 within any ten-year period since 1978).

MEMA coordinates FMA applications for municipalities within the Commonwealth. Links to MEMA resources and FMA application materials can be found here: [Building Resilient Infrastructure and Communities \(BRIC\) & Flood Mitigation Assistance \(FMA\) Grant Programs | Mass.gov](#).

DISASTER ASSISTANCE

Disaster Assistance is money or direct assistance to individuals, families, and businesses whose property has been damaged or destroyed and whose losses are not covered by insurance. It is meant to help with critical expenses that cannot be covered in other ways. This assistance is not intended to restore damaged property to its condition before the disaster. While some housing assistance funds are available through FEMA's Individuals and Households Program, most disaster assistance from the Federal government is in the form of loans administered by the Small Business Administration.

Disaster Assistance Available from FEMA

Assistance from FEMA in the event of a disaster declaration is grouped into the following 3 categories:

A. Housing Needs

- **Temporary Housing** (a place to live for a limited period of time): Money is made available to rent a different place to live, or a government-provided housing unit when rental properties are not available.
- **Repair**: Money is available to homeowners to repair damage from the disaster to their primary residence that is not covered by insurance. The goal is to make the damaged home safe, sanitary, and functional.
- **Replacement**: Money is available to homeowners to replace their home destroyed in the disaster that is not covered by insurance. The goal is to help the homeowner with the cost of replacing their destroyed home.
- **Permanent Housing Construction**: Direct assistance or money is made available for the construction of a home. This type of help occurs only in insular areas or remote locations specified by FEMA, where no other type of housing assistance is possible.

B. Other than Housing Needs

- Money is available for necessary expenses and serious needs caused by a disaster, including:
 - Disaster-related medical and dental costs;
 - Disaster-related funeral and burial costs;
 - Clothing;
 - Household items (room furnishings, appliances);
 - Tools (specialized tools or protective clothing and equipment) required for people's jobs;
 - Necessary educational materials (computers, schoolbooks, supplies);
 - Fuels for primary heat source (heating oil, gas);
 - Clean-up items (wet/dry vacuums, dehumidifiers);
 - Expenses relating to disaster-damaged vehicles;
 - Moving and storage expenses related to the disaster (moving and storing property to avoid additional disaster damage while disaster-related repairs are being made to the home);
 - Other necessary expenses or serious needs as determined by FEMA; and
 - Other expenses that are authorized by law.

C. Additional Services

- Crisis Counseling
- Disaster Unemployment Assistance
- Legal Services
- Special Tax Considerations

For additional information, please refer to: [Get Assistance After a Disaster | FEMA.gov](https://www.fema.gov/get-assistance-after-a-disaster).

DISASTER LOANS AVAILABLE FROM THE U.S. SMALL BUSINESS ADMINISTRATION

The U.S. Small Business Administration (SBA) can make federally subsidized loans to repair or replace homes, personal property, or businesses that sustained damages not covered by insurance. The Small Business Administration can provide the following three types of disaster loans to qualified homeowners and businesses:

- Physical damage loans: Loans to cover repairs and replacement of physical assets damaged in a declared disaster.
- Mitigation assistance: Funding to cover small business operating expenses after a declared disaster.
- Economic injury disaster loans: Loans which provide economic relief to small businesses and nonprofit organizations that have suffered damage to their home or personal property.
- Military reservist loans: Loans to help eligible small businesses with operating expenses to

make up for employees on active duty leave.

For many individuals, the SBA disaster loan program is the primary form of disaster assistance. Please find more information about this loan program here: [Disaster assistance | U.S. Small Business Administration \(sba.gov\)](#).

DISASTER ASSISTANCE FROM OTHER ORGANIZATIONS AND ENTITIES

[Home | disasterassistance.gov](#) is a secure, user-friendly U.S. Government web portal that consolidates disaster assistance information in one place. If individuals need assistance following a Presidentially declared disaster which has been designated for individual assistance, they can now go to DisasterAssistance.gov to register for receiving assistance online. Local resource information to help keep citizens safe during an emergency is also available. Currently, 17 U.S. Government agencies, which sponsor almost 70 forms of assistance, contribute to the portal.

DisasterAssistance.gov speeds up the application process by feeding common data to multiple online applications. Application information is shared only with those agencies individuals identify and is protected by the highest levels of security. DisasterAssistance.gov will continue to expand to include forms of assistance available at federal, state, tribal, regional, and local levels.

EMERGENCY MANAGEMENT PERFORMANCE GRANT (EMPG)

The Emergency Management Performance Grant (EMPG) provides resources for state, local, tribal, and territorial emergency response organizations required for the National Preparedness System. EMPG supports efforts in building and strengthening capabilities in areas related to protection, mitigation, prevention, response and recovery. In fiscal year 2024, this grant had a total available funding of \$319.55 million. Please find more information about this grant program at the link here: [Emergency Management Performance Grant | FEMA.gov](#).

HOMELAND SECURITY GRANT PROGRAM (HSGP)

The Homeland Security Grant Program (HSGP) provides a suite of grant opportunities in support of efforts in the mitigation of, prevention of, protection from, and recovery from terrorist and other threats at the state, local, tribal, and territorial levels. As of the 2024 fiscal year, the program, including its three separate grants, had \$1.008 billion in funding. The three grants available under this program are:

- The State Homeland Security Program (SHSP);
- The Urban Area Security Initiative (UASI); and
- Operation Stonegarden (OPSG).

Please find more about this program at the link here: [Homeland Security Grant Program | FEMA.gov](#).

ASSISTANCE TO FIREFIGHTERS GRANTS (AFG) AND FIRE PREVENTION & SAFETY GRANT PROGRAM (FP&S)

The FEMA Assistance to Firefighters Grants (AFG) program provides funds to equip and train emergency personnel to recognized standards, enhance operations efficiencies, foster interoperability, and support community resilience. Under AFG, funds may be available for equipment, vehicles, and/or training that can be used to mitigate and/or respond to wildfire-related hazards. AFG also has a Fire Prevention and Safety (FPS) component which funds public outreach programs and prevention activities, which can emphasize wildfire mitigation. More about

these programs can be found at these links: [Assistance to Firefighters Grants Program | FEMA.gov](#), [Fire Prevention and Safety \(FP&S\) | FEMA.gov](#).

FIRE MANAGEMENT ASSISTANCE GRANTS (F-MAG)

The Fire Management Assistance Grants (F-MAG) Program supports firefighting efforts in cases of fire-related disasters impacting public and private forests as well as grasslands at the state, local and tribal levels. For more information on this program, please refer to: [Fire Management Assistance Grants | FEMA.gov](#).

NATIONAL DAM SAFETY PROGRAM (STATE ASSISTANCE GRANT PROGRAM) (NDSP)

The National Dam Safety Program (NDSP) provides financial assistance to strengthen the individual dam safety programs of states and territories. In the 2024 fiscal year, this program distributed \$24.2 million among 49 states and Puerto Rico. For more information on this program, please refer to: [Grant Assistance to States | FEMA.gov](#).

REHABILITATION OF HIGH HAZARD POTENTIAL DAM PROGRAM (STATE DAM SAFETY DIVISIONS) (HHPD)

The Rehabilitation of High Hazard Potential Dams Program (HHPD) provides technical, planning, design, and construction assistance in the form of grants for the rehabilitation of high hazard potential dams in eligible states and territories. For more information, please refer to: [Rehabilitation Of High Hazard Potential Dam \(HHPD\) Grant Program | FEMA.gov](#).

NATIONAL EARTHQUAKE HAZARDS REDUCTION PROGRAM'S STATE ASSISTANCE PROGRAM (NEHRP)

The National Earthquake Hazards Reduction Program's State Assistance Program (NEHRP) provides funding to localities for the reduction of risk associated with earthquakes. This is done through two grants:

- Individual State Earthquake Assistance (ISEA) and
- Multi-State National Earthquake Assistance (MSNEA).

More information about this program can be found at this link: [National Earthquake Hazards Reduction Program's State Assistance Program | FEMA.gov](#).

EMERGENCY FOOD AND SHELTER PROGRAM (EFSP)

The Emergency Food and Shelter Program (EFSP) assists and expands upon the work of local nonprofit and governmental social service organizations to provide shelter, food, and other services to people experiencing or at risk of hunger and/or homelessness. For more information, please refer to: [Emergency Food and Shelter Program | FEMA.gov](#).

PUBLIC HEALTH CRISIS RESPONSE COOPERATIVE AGREEMENT (PHCRCA)

The Center for Disease Control and Prevention's Public Health Crisis Response Cooperative Agreement (PHCRCA) allows for opportunities for state, local, and tribal government to receive funding in response to public health emergencies. For more information, please refer to: [The Centers for Disease Control and Prevention's Public Health Crisis Response Cooperative Agreement Program Awards \(hhs.gov\)](#).

ARMY CORP OF ENGINEER PLANNING ASSISTANCE

Under the authority provided by Section 22 of the Water Resources Development Act of 1974 (PL 93-251), as amended, the U.S. Army Corps of Engineers can provide states, local governments, other non-federal entities, as well as eligible Native American Indian tribes, assistance in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. Typical studies funded under this program are only at the planning level of detail; they do not include detailed engineering designs intended for project construction. The program can encompass many types of planning studies which address water resources issues. Types of studies conducted in recent years under the program include the following: water supply/demand, water conservation, water quality, environmental/conservation, wetlands evaluation/restoration, dam safety/failure, flood damage reduction, coastal zone protection, and harbor planning. For more information, please refer to: [Planning Assistance to States, U.S. Army Corps of Engineers, New England District](#).

FOREST SERVICE COMMUNITY WILDFIRE DEFENSE GRANT (USDA-FSCWDG)

The Forest Service Community Wildfire Defense Grant Program (USDA-FSCWG) provides funding and assistance to at-risk local communities and tribes to reduce wildfire risk. Funding and assistance under this program are primarily used to revise and develop community wildfire protection plans and to assist in implementing new projects described in said plans. For more information on this program, please refer to: [Community Wildfire Defense Grant Program | US Forest Service \(usda.gov\)](#).

EMERGENCY WATERSHED PROTECTION PROGRAM (EWP)

The Emergency Watershed Protection Program (EWP) provides technical and financial assistance to localities in response to imminent life- and property-threatening natural disasters which negatively impact local watersheds. For more information about this program, please refer to: [Emergency Watershed Protection | Natural Resources Conservation Service \(usda.gov\)](#).

AGRICULTURAL MANAGEMENT ASSISTANCE (DROUGHT MITIGATION FUNDING PROGRAM) (AMA)

Agricultural Management Assistance (AMA) is a program to help farmers build on and diversify their agricultural practices. The program is available in 16 states that have had historically low rates of participation in the Federal Crop Insurance Program. AMA covers up to 75% of funds needed to install conservation practices on farms, with a cap of \$50,000 per individual participant in a given fiscal year. For more information, please refer to: [Agricultural Management Assistance | Natural Resources Conservation Service \(usda.gov\)](#).

USDA COMMUNITY FACILITIES DIRECT LOAN & GRANT PROGRAM

The USDA Community Facilities Direct Loan & Grant program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial or business undertakings. Rural areas including cities, villages, and townships and towns, including Federally Recognized Tribal Lands, with no more than 20,000 residents according to the latest U.S. Census Data are eligible for this program. Program funds can be used to purchase, construct, and / or

improve essential community facilities, purchase equipment, and pay related project expenses. For more information on this program, please refer to: [Community Facilities Direct Loan & Grant Program | Rural Development \(usda.gov\)](#).

NATIONAL CULVERT REMOVAL, REPLACEMENT, & RESTORATION GRANT (NCRRRG)

The National Culvert Removal, Replacement, and Restoration Grant Program (NCRRRG) (Culvert Aquatic Organism Passage (AOP) Program) assists eligible tribes, states and local governments in issues related to culverts and weirs to improve and/or restore passage for anadromous fish in freshwater waterways. Anadromous fish are those that spawn in freshwater but live most of their lives in saltwater. More information about this program can be found at this link: [Aquatic Organism Passage - Culvert Hydraulics - Hydraulics - Bridges & Structures - Federal Highway Administration \(dot.gov\)](#).

BRIDGE INVESTMENT PROGRAM (BIP)

The Bridge Investment Program (BIP) provides the opportunity for governments at all levels to receive funding to repair and restore aging bridge infrastructure. BIP grant applications have a maximum grant award of 80% of the total eligible bridge project costs. For more information regarding this program, please refer to: [BIP - Funding Programs - Management and Preservation - Bridges & Structures - Federal Highway Administration \(dot.gov\)](#).

PROMOTING RESILIENT OPERATIONS FOR TRANSFORMATIVE, EFFICIENT, AND COST-SAVING TRANSPORTATION PROGRAM (PROTECT)

The Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (Protect) Program is a program established by the Bipartisan Infrastructure Law (BIL) which funds resilience-building activities for surface transportation, such as plans (including evacuation plans) and infrastructure improvements, which increase reliance to natural hazards and climate change. For more information regarding this program, please refer to: [Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation Program \(PROTECT\) | US Department of Transportation](#) and [Bipartisan Infrastructure Law - Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation \(PROTECT\) Formula Program Fact Sheet | Federal Highway Administration \(dot.gov\)](#).

8.4.2 STATE FUNDING SOURCES

The following is a summary of state funding opportunities for hazard mitigation projects and activities in Massachusetts:

Table 39: State Hazard Mitigation Funding Sources

<i>Program</i>	<i>Type of Assistance</i>	<i>Availability</i>	<i>Managing Agency</i>	<i>Funding Source</i>
<i>604b Water Quality Management Planning Grant Program</i>	Grants focused on nonpoint source pollution assessment and watershed planning	Annual	Mass DEP	State funding (match not required but recommended)
<i>Section 319 Nonpoint Source Competitive Grants Program</i>	Competitive grant program funding projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution	Annual	Mass DEP	State funding
<i>Water Quality Monitoring Grant Program</i>	Reimbursement funding for monitoring and/or data collection efforts that support water quality assessments	Annual	Mass DEP	State funding
<i>Statewide Water Management Act Grant</i>	Reimbursement grant funding for projects to help public water suppliers plan and manage water use	Annual	Mass DEP	Reimbursement grant
<i>Massachusetts Gap Energy Grant Program (Gap III)</i>	Program providing grant assistance (up to \$200,000 per community) for implementing energy efficiency and clean energy generation projects at water and wastewater plants	Annual (likely)	Mass DEP	State funding
<i>State Revolving Fund</i>	Low-interest loans	Annual	Mass DEP	Municipal funding with state loan

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>Municipal Vulnerability Preparedness (MVP) Action Grants</i>	Competitive climate adaptation grants	Annual	EEA	75% EEA / 25% non-state match
<i>Planning Assistance Grants (EEA PAG)</i>	Competitive grants that support efforts to plan, regulate (zone), and act to conserve and develop land consistent with the Massachusetts Sustainable Development Principles	Annual	EEA	75% EEA / 25% non-state match
<i>Dam and Seawall Repair or Removal Program</i>	Competitive grants for dam and seawall repair and removal, as well as construction loans	Annual	EEA	State funding
<i>Massachusetts Land & Water Conservation Fund Grant Program (LWCF)</i>	Federal grant program to help improve access to and protection for public lands and waters	Annual	DCS	Federal program that funds up to 50% of total costs for acquisition, development, and renovation
<i>Local Acquisitions for Natural Diversity (LAND)</i>	Financial assistance to municipalities for the acquisition of conservation land	Annual	DCS	Reimbursement grant, the reimbursement rate varies per town
<i>Drinking Water Supply Protection Grant (DWSP)</i>	Competitive grants for protection of drinking water supplies	Annual	DCS	State funding
<i>Land and Recreation Grants and Loans</i>	Varies, though primarily grant funding for conservation and recreation projects	Varies, generally annually	DCS	Varies

Program	Type of Assistance	Availability	Managing Agency	Funding Source
Land Conservation Assistance Grant Program	Financial assistance for permanently protecting land	Annual (Likely)	DCS	90% state reimbursement / 10% other
Forest Legacy Grant Program (USDA-FS) (FLGP)	Grant funding to protect environmentally important forestland from conversion	Annual	DCR	75% USDA FS / 25% non-federal
Culvert Replacement Municipal Assistance Grant Program	Competitive grants for replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value	Annual	DER	State funding
Division of Ecological Restoration Priority Project Program	State competitive grant program that funds projects that restore and protect the state's rivers, wetlands, and watersheds (priority projects may differ each year)	Annual	DER	State funding
Mass Wildlife Habitat Management Grant Program (MWHMGP)	Reimbursement grant funding to assist municipalities in enhancing wildlife habitat and increasing recreational opportunities on protected lands	Annual	DFW	USDA NRCS
Agricultural Climate Resiliency and Efficiencies Program (ACRE)	Competitive reimbursement grant funding that supports practices that mitigate the agricultural sector's vulnerability to climate change	Annually through Climate Smart Agriculture Program (CSAP)	MDAR	MDAR

Program	Type of Assistance	Availability	Managing Agency	Funding Source
<i>Agricultural Preservation Restriction Program (APR)</i>	Financial assistance in exchange for permanent deed restriction to protect lands' agricultural viability	Any time for owners of at least 5 acres of farmland	MDAR	MDAR
<i>Hazard Mitigation Grant Program (State) (HMGP)</i>	Sub-grant programs for the Hazard Mitigation Grant Program	Annual	MEMA	State funding
<i>Community Development Block Grants (CDBG)</i>	Competitive community development grants	Annual	EOHLC	US Department of Housing and Urban Development
<i>Emergency Solutions Grant (ESG)</i>	Competitive grant funding designed to support services that assist those experiencing / at risk of experiencing homelessness	Annual	EOHLC	MA EOHLC
<i>Mass Works</i>	Competitive infrastructure grants	Annual	EOED	State funding
<i>Community Preservation Act (CPA)</i>	Establishes a local community preservation fund through tax surcharge to support a variety of project related to conservation and housing	Ongoing	Department of Revenue (DOR)	Statewide Community Preservation Trust Fund / Local Community Preservation Fund
<i>Special appropriations and legislative earmarks</i>	Varies	Infrequent, after natural disasters or legislature vote	Massachusetts General Legislature	State funding
<i>District Local Technical Assistance (DLTA)</i>	Funding to support planning and technical assistance for housing, economic growth, and regional projects	Varies, generally annually	Massachusetts General Legislature, CMRPC	State funding

Program	Type of Assistance	Availability	Managing Agency	Funding Source
Local Planning Assistance (LPA)	Planning and technical assistance	Annual	CMRPC	Planning assistance hours
Support and Incentive Grant	Reimbursement grant funding designed to assist in providing enhanced 911 service	Annual	MA EOPSS	MA EOPSS
Municipal Small Bridge Program	Competitive grants for small bridge replacement, preservation, and rehabilitation projects	Annual	MassDOT	State funding
Chapter 90 Program (Transportation Capital Improvement Projects) (Chpt. 90)	Reimbursable grants to support capital improvements on local public ways	Ongoing	MassDOT	State funding
State Transportation Improvement Program (STIP)	Competitive funding opportunity for transportation projects along federal-aid roadways	Annually updated five-year programming document	MassDOT	MassDOT
Complete Streets (CS)	Reimbursement grant funding to provide safe and accessible options for all travel modes	Annually available to municipalities that adopt a Complete Streets Policy	MassDOT	State funding
Drought Resiliency and Water Efficiency Grant Program	Funding for reducing indoor and outdoor water use, improving water loss control, and increasing drought management and planning in public water systems across the state	Annual	EEA	State funding

The Community Grant Funder web page includes the municipal grant programs listed above, as well as other funding opportunities: [Community Grant Finder | Mass.gov](#). The programs listed in the above table are described in more detail below.

604B WATER QUALITY MANAGEMENT PLANNING GRANT PROGRAM

The 604B Water Quality Management Planning Grant Program provides funding opportunities to regional planning agencies, councils of governments, conservation districts, counties, cities and towns, federally and state recognized tribes, and other substate public planning agencies and interstate agencies to determine and correct water quality issues in Massachusetts. For more information on this program, please refer to: [Grants & Financial Assistance: Watersheds & Water Quality | Mass.gov](#).

SECTION 319 NONPOINT SOURCE COMPETITIVE GRANTS PROGRAM

Section 319 of the Clean Water Act provides funding opportunities for the prevention, control, and abatement of nonpoint source (NPS) pollution. These grants are available to eligible Massachusetts public or private organizations, including: state and federally recognized tribes, regional planning agencies, councils of governments, counties, conservation districts, cities and towns, other substate public planning agencies, and interstate agencies. To be eligible for this program, these entities' projects must: include measures that address the prevention, control, and abatement of NPS pollution, target major sources of NPS pollution within a watershed, contain an appropriate method for evaluating the project results, and address activities in the current Massachusetts NPS Management Program Plan. For more information on this program, please refer to: [Grants & Financial Assistance: Watersheds & Water Quality | Mass.gov](#).

WATER QUALITY MONITORING GRANT PROGRAM

The Water Quality Monitoring Grant Program provides funding opportunities to eligible entities and organizations to increase the amount of data on water quality in Massachusetts. For more information, please refer to: [Grants & Financial Assistance: Watersheds & Water Quality | Mass.gov](#).

STATEWIDE WATER MANAGEMENT ACT GRANT

The Statewide Water Management Act Grant provides grant funding for projects which improve the ecological conditions of specific watersheds and projects aimed at reducing water demand. Specifically, projects funded under this program must: improve or increase instream flow, keep wastewater local, relate to stormwater management, reduce impervious cover and/or improve water quality, relate to water supply operational improvements, improve habitat, reduce wastewater inflow and infiltration, and/or be another type of project which can be demonstrated to mitigate the impacts of water withdrawals. This program awards approximately 10 grants a year and has a reimbursement rate of 80%. Grants are awarded to eligible public water suppliers and municipalities with Water Management Act permits. For more information, please refer to: [Water Management Act Grant Programs for Public Water Suppliers | Mass.gov](#).

MASSACHUSETTS GAP ENERGY GRANT PROGRAM (GAP III)

Through a partnership between the Massachusetts Department of Energy Resources (DOER) and the Massachusetts Clean Energy Center (MassCEC), the Massachusetts Gap Energy Grant Program (Gap III) provides funding to fill the last financial "gap" needed for clean energy projects spearheaded by a variety of organizations to promote clean and efficient energy projects. In 2022, the GAP III program awarded a total of \$8.1 million in grants. For more information about this program, please refer to: [Massachusetts' Gap Energy Grant Program | Mass.gov](#).

PLANNING ASSISTANCE GRANTS (EEA PAG)

Executive Office of Energy and Environmental Affairs Planning Assistance Grant (EEA PAG) program grants are available to municipalities and regional planning agencies acting on their behalf to financially support efforts to conserve and develop land consistent with the Massachusetts Sustainable Development Principles. Top priorities of the program include: zoning for sustainable housing production, mitigation of climate change through zoning and other regulatory actions, and zoning that results in permanent land conservation. For more information about these grants, please refer to: [Planning Assistance Grants | Mass.gov](#).

STATE REVOLVING FUND

This statewide loan program through the Massachusetts Department of Environmental Protection assists communities in funding local drinking water, wastewater, and stormwater infrastructure improvements.

MUNICIPAL VULNERABILITY PREPAREDNESS ACTION GRANT PROGRAM

The Municipal Vulnerability Preparedness (MVP) Action Grant program offers financial resources to municipalities that are seeking to advance priority climate adaptation actions to address impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate change-related events. Towns are eligible for this competitive grant program after successfully completing an MVP planning grant. A variety of project types are eligible for funding under this program, but projects must address local vulnerabilities to climate change and incorporate MVP Core Principles. Grant application information can be found here: [MVP Action Grant | Mass.gov](#). The MVP Core Principles can be found here: <https://www.mass.gov/doc/mvp-core-principles/download>.

DAM AND SEAWALL REPAIR OR REMOVAL PROGRAM

The EEA funds projects for the repair and removal of dams, levees, seawalls, and other forms of inland and coastal flood control under the Dam and Seawall Repair or Removal Program. For additional information, please refer to [Dam and Seawall Repair or Removal Program Grants and Funds | Mass.gov](#).

LAND & WATER CONSERVATION FUND GRANT PROGRAM (LWCF)

The Land & Water Conservation Fund Grant Program (LCWF) provides up to 50% of total project funding to eligible municipalities, tribes, and state agencies for park, trail and conservation area related projects. For more information, please refer to: [Massachusetts Land and Water Conservation Fund Grant Program | Mass.gov](#).

LOCAL ACQUISITIONS FOR NATURAL DIVERSITY (LAND)

The Local Acquisitions for Natural Diversity (LAND) grant program assists cities and towns in acquiring new lands for conservation and passive recreation purposes. Grants are awarded at a maximum of \$500,000 with reimbursement rates ranging from 52% to 70%. For more information, please refer to: [Local Acquisitions for Natural Diversity \(LAND\) Grant Program | Mass.gov](#).

DRINKING WATER SUPPLY PROTECTION GRANT (DWSP)

The Drinking Water Supply Grant (DWSP) program provides financial assistance to public water systems and municipal water departments for the purchase of land or interests in land for the following purposes: 1) protection of existing DEP-approved public drinking water supplies; 2)

protection of planned future public drinking water supplies; or 3) groundwater recharge. This is a reimbursement program. For more information, please refer to [Drinking Water Supply Protection Grant Program | Mass.gov](#).

LAND AND RECREATION GRANTS AND LOANS

The Massachusetts Division of Conservation Services (DCS) manages several grant and loan programs that enable land preservation, natural resources conservation, and public recreation. Municipalities with an active Open Space and Recreation Plan are generally eligible to apply for these programs. Preserving natural open space can buffer natural systems from development impacts, protect open spaces from future development, and maintain ecosystem services like natural flood mitigation. The full list of DCS grant programs can be found here: [Land and Recreation Grants & Loans | Mass.gov](#).

LAND CONSERVATION ASSISTANCE GRANT PROGRAM

The Land Conservation Assistance Grant Program from the Massachusetts Division of Conservation Services (DCS) provides reimbursement funding to municipalities, qualified 501(c)(3) land trusts, tribal governments, and other public entities for the permanent protection of land as well as to Regional Planning Agencies (RPAs) and qualified 501(c)(3) land trusts which assist these entities in this goal. Eligible activities under this program include preparing grant applications for permanently protecting land, completing other tasks which progress transactions which permanently protect land, developing or updating municipal Open Space and Recreation Plans, and planning for developing and/or renovating a park to help with a grant application to DCS. For more information on this program, please refer to: [Apply to the Land Conservation Assistance Grant Program | Mass.gov](#).

FOREST LEGACY GRANT PROGRAM (USDA-FS) (FLGP)

The Forest Legacy Grant Program (FLGP) is a voluntary grant funding opportunity for private landowners to either sell their land outright or to sell a conservation restriction on their land. A conservation restriction is a legally binding agreement which limits the types of land use on a property, in this case restricting land to forestry, recreation, or another conservation-related use. For more information about this program, please refer to: [Forest Legacy Program | Mass.gov](#).

CULVERT REPLACEMENT MUNICIPAL ASSISTANCE GRANT PROGRAM

The Culvert Replacement Municipal Assistance Grant program provides a funding opportunity for local governments to replace undersized, perched, and/or degraded culverts in areas of high ecological value. For more information on this program, please refer to: [Culvert Replacement Municipal Assistance Grant Program | Mass.gov](#).

DER PRIORITY PROJECTS

The Priority Project Program is an opportunity under the Division of Ecological Restoration (DER) for organizations to receive technical assistance, consulting, and/or direct grant funding for wetland and river restoration projects through a state-wide, competitive process. DER chooses high-priority projects that bring significant ecological and community benefits to the Commonwealth. DER's most recent call for applications solicited projects that focus on cranberry bog wetland restoration, dam removal and river restoration, coastal wetland restoration projects, or a combination of these topics. More information on the Priority Projects program can be found here: [Become a DER Priority Project | Mass.gov](#). This program can be used to remove significant or high hazard dams that communities no longer want to maintain; the removal of these dams

may improve the health and resilience of aquatic systems.

MASS WILDLIFE HABITAT MANAGEMENT GRANT PROGRAM (MWHMGP)

The Mass Wildlife Habitat Management Grant Program (MWHMGP) is a program dedicated to the protection and restoration of wildlife habitat. MWHMGP awards grants ranging from \$10,000 to \$75,000 to private landowners for habitat restoration projects. The program places emphasis on the protection of endangered species, the expansion of outdoor recreation opportunities, and the enhancement of ecological communities disproportionately susceptible to climate change. For more information about this program, please refer to: [Mass Wildlife Habitat Management Grant Program | Mass.gov](#).

AGRICULTURAL CLIMATE RESILIENCY AND EFFICIENCIES PROGRAM (ACRE)

The Agricultural Climate Resiliency and Efficiencies Program (ACRE) is a competitive grant program available to eligible farmers that funds materials and labor to improve climate and economic resilience and forwards the goals of the Massachusetts Local Food Action Plan. For more about this program, please refer to: [Agricultural Climate Resiliency & Efficiencies \(ACRE\) Program | Mass.gov](#).

AGRICULTURAL PRESERVATION RESTRICTION PROGRAM (APR)

The Agricultural Preservation Restriction (APR) program is a voluntary program that allows farmers to be paid the difference between the "fair market value" and the "agricultural value" of their farms in exchange for a permanent deed restriction by the state. This restriction is meant to prevent any use of the property that will negatively impact the land's future agricultural viability. To qualify for this program, a farm must be at least 5 acres in size, must have been actively devoted to agriculture for at least the past 2 tax years, and must produce at least \$500 in gross sales per year for the first five acres plus \$5 for each additional acre or 50 cents per each additional acre of woodland and/or wetland; there are various other considered criteria which farms must meet to qualify for this program. For more information on this program, please refer to: [Agricultural Preservation Restriction \(APR\) Program Details | Mass.gov](#).

HAZARD MITIGATION GRANT PROGRAM (STATE) (HMGP)

The Hazard Mitigation Grant Program (HMGP) provides funds to areas after a natural disaster with the purpose of lowering the risk of damage and loss of life from future natural disasters. This grant program seeks to reduce the reliance on taxpayer-funded federal assistance for disaster recovery. For more information about this program, please refer to: [Hazard Mitigation Grant Program \(HMGP\) | Mass.gov](#).

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

The Community Development Block Grant (CDBG) program remains the principal source of revenue for many communities to use in identifying solutions to address physical, economic, and social deterioration in lower-income neighborhoods and communities. CDBG is primarily a housing and community development program administered through the Executive Office of Housing and Livable Communities (EOHLC). The program can fund certain critical infrastructure projects, and necessary housing improvements that benefit populations who may be more vulnerable to certain natural hazards. The program can also fund the rehabilitation of municipal buildings serving low- and moderate-income populations, which in many cases also serve as Emergency Operations Centers for their communities. For more information, please refer to: [Community Development Block Grant \(CDBG\) | Mass.gov](#).

EMERGENCY SOLUTIONS GRANT (EFG)

The Emergency Solutions Grant (EFG) program funds necessary services to help house/rehouse those who are homeless or at risk of homelessness and to provide shelter for those in need of emergency shelter. For more information on this program, please refer to: [Emergency Solutions Grant Program \(ESG\) | Mass.gov](#).

MASSWORKS INFRASTRUCTURE PROGRAM

The MassWorks Infrastructure Program provides a one-stop shop for municipalities and other eligible public entities seeking public infrastructure funding to support economic development and job creation. Although this program is not specific to natural hazards per se, infrastructure enhancements under MassWorks can address identified hazard mitigation needs. The MassWorks Infrastructure Program is administered by the Executive Office of Housing and Economic Development, in cooperation with the Department of Transportation and Executive Office for Administration & Finance. For additional information on this program, please refer to [MassWorks Infrastructure Program | Mass.gov](#).

COMMUNITY PRESERVATION ACT (CPA)

The Community Preservation Act (CPA) is a smart growth tool that helps communities preserve open space and historic sites, create affordable housing, and develop outdoor recreational facilities. CPA also helps strengthen the state and local economies by expanding housing opportunities and construction jobs for the commonwealth's workforce and by supporting the tourism industry through preservation of the commonwealth's historic and natural resources. All communities in Massachusetts pay into statewide Community Preservation Trust fund through a real estate excise tax. However, communities must set up a local Community Preservation Fund and governing committee to utilize the trust fund. CPA projects can build local resilience by protecting open spaces and/or creating affordable housing; these types of projects can benefit residents who may be the most vulnerable to natural hazards. More information on the CPA program can be found here: [CPA: An Overview | Community Preservation Coalition](#).

SPECIAL APPROPRIATIONS AND LEGISLATIVE EARMARKS

Although there is no separate state disaster relief fund in Massachusetts, the state legislature may enact special appropriations for those communities sustaining damages following a natural disaster that are not large enough for a Presidential disaster declaration. Since 2011, Massachusetts has issued 12 state of emergency declarations. Additionally, individual legislators may seek specific project funding for projects through the legislative budgeting and appropriations process.

DISTRICT LOCAL TECHNICAL ASSISTANCE

District Local Technical Assistance (DLTA) is funding allocated by the Massachusetts General Assembly (Legislature) to the Central Massachusetts Regional Planning Commission (CMRPC) to provide technical assistance to member communities on eligible projects. DLTA planning dollars help cities and towns take on necessary projects that they don't have the staff capacity to address on their own and partner with neighboring communities to tackle shared projects with reduced administrative burden.

According to the most recent guidelines of the Commonwealth's DLTA program, a proposed project must fall into one of the following four (4) general priority categories to be considered eligible for technical assistance:

1. Planning Ahead for Housing;

2. Planning Ahead for Growth;
3. Technical Assistance to support Community Compact Cabinet Activities including Regionalization; and
4. Supporting the Housing Choice Initiative

The goal of the DLTA Fund is to direct funds to projects and activities that result in change in the municipality/municipalities receiving DLTA Fund services, whether in law, regulation, program management, or practice, that serve to further the objectives listed above. Community Compact Cabinet (CCC) best practices should include both those that the Commonwealth of Massachusetts is seeking to fund as part of the CCC program as a first priority and best practices that explicitly align with CCC best practices but are not best practices identified in a signed CCC agreement. COVID-19 relief / recovery activities that fall under the above priority categories are eligible. For more information, please refer to [2024 District Local Technical Assistance \(DLTA\) Call for Concepts - CMRPC](#).

LOCAL PLANNING ASSISTANCE

The Local Planning Assistance (LPA) program was initiated to improve the direct services of CMRPC to its member communities. Under the LPA program, each CMRPC community annually receives a set number of hours of technical assistance to be used in any reasonable planning project authorized by the community's CMRPC commissioner.

SUPPORT AND INCENTIVE GRANT

The Support and Incentive Grant provides opportunity funding to public safety answering points (PSAPs) and regional emergency communication centers (RECCs) in providing enhanced 9-1-1 service. Entities eligible for the Support Grant include: primary or regional public safety answering points, regional secondary public safety answering points, and regional emergency communication centers. To be eligible for the Incentive Grant, a regional public safety answering point or regional emergency communication center must be expanding. For more on this program, please refer to: [Apply for the Support & Incentive Grant | Mass.gov](#).

MUNICIPAL SMALL BRIDGE PROGRAM

The Municipal Small Bridge Program offers funding opportunities to Massachusetts municipalities for small bridge replacement, preservation, and rehabilitation projects. For more information about this program, please refer to: [Municipal Small Bridge Program | Mass.gov](#).

CHAPTER 90 FUNDS

The statewide Chapter 90 program reimburses communities for roadway improvement projects, such as projects relating to resurfacing and related work, preliminary engineering (including State Aid/Consultant Design Agreements), right-of-way acquisition, shoulders, side road approaches, landscaping and tree planting, roadside drainage, structures (including bridges), sidewalks, traffic control and service facilities, and street lighting (excluding operating costs), as well as for such other purposes specifically authorized. Maintaining and upgrading critical infrastructure and evacuation routes is an important component of hazard mitigation. For more information, please refer to [Chapter 90 Program | Mass.gov](#).

STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

The State Transportation Improvement Program (STIP) is an annual list of transportation infrastructure projects funded and planned through the combined effort of MassDOT and other

state agencies. For more information on this program, please refer to: [State Transportation Improvement Program \(STIP\) | Mass.gov](#).

COMPLETE STREETS (CS)

The Complete Streets (CS) Funding Program provides grants to municipalities in Massachusetts for projects that improve safety and accessibility for all modes of transportation. To qualify for the program, municipalities must pass a Complete Streets Policy and develop a Prioritization Plan. After these requirements have been met, municipalities can apply for up to \$500,000 in construction funding. For more information about this program, please refer to: [Complete Streets Public Overview \(site.com\)](#).

DROUGHT RESILIENCY AND WATER EFFICIENCY GRANT PROGRAM

The Drought Resiliency and Water Efficiency Grant Program aims to provide funding for projects that will help the Commonwealth become more climate resilient, specifically by reducing indoor and outdoor water use, improving water loss control, and increasing drought management and planning in public water systems across the state. Target awards are up to \$50,000 per project, with potential for larger awards depending on the number of applications received. This grant program helps implement actions in the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP). For more information about this program, please refer to: [COMMBUYS](#).
