Town of Lakeville

Natural Hazard Mitigation Plan

2022

Final Plan

July 2022

Adopted by the Lakeville Select Board on August 15, 2022

Prepared by:

The Lakeville Natural Hazards Mitigation Planning Committee

And

IMPROVING COMMUNITIES TOGETHER

With support from

SRPEDD
Southeastern Regional Planning & Economic Development District

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Acknowledgements

The Lakeville Select Board extends special thanks to the Lakeville Natural Hazards Mitigation Planning Committee as follows:

- Michael P. O'Brien, Fire Chief
- Robert (Bob) Bouchard, Conservation Agent/ Commission Chair
- Pete Conroy, Planning Board
- Edward Cullen, Health Agent
- Nathan Darling, Building Commissioner and Zoning Officer
- Pamela Garant, Fire Deputy Chief
- Kelly Howley, Council on Aging Director
- Christina Cotsoridis, Asst to the Town Administrator
- Franklin Moniz, DPW Director
- Matthew Perkins, Chief of Police
- Ari Sky, Town Administrator
- Jayme Viveiros, Library Director
- Marc Resnick, Town Planner

The Lakeville Select Board offers thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Commonwealth of Massachusetts Natural Hazards Mitigation Plan (www.state.ma.us/dem/programs/mitigate/index.htm) which served as a model for this plan. In addition, special thanks are extended to the staff of the Southeastern Region Planning and Economic Development District for providing content and mapping included in this document.

TOWN OF LAKEVILLE
SELECT BOARD OFFICE
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CERTIFICATE OF ADOPTION
TOWN OF LAKEVILLE, MASSACHUSETTS
SELECT BOARD

A RESOLUTION ADOPTING THE TOWN OF LAKEVILLE 2022 NATURAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Lakeville established a Committee to update the Town's local Hazard Mitigation plan; and

WHEREAS, the Town of Lakeville participated in the update of the Town of Lakeville 's local Hazard Mitigation Plan; and

WHEREAS, the Town of Lakeville Hazard Mitigation Plan update contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Lakeville, and

WHEREAS, a duly-noticed public meeting was held by the Select Board on August 15, 2022 for the public and municipality to review the Town of Lakeville Hazard Mitigation Plan update prior to consideration of this resolution; and

WHEREAS, the Town of Lakeville authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Lakeville Select Board formally approves and adopts the Town of Lakeville Hazard Mitigation Plan Update, in accordance with M.G.L. c. 40.

ADOPTED AND SIGNED this 15th day of August, 2022 by the Lakeville Select Board.

Richard LaCamera, Chairman

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Chapter 1: Introduction

New England weather is renowned for its mercurial and dramatic nature. Late summer hurricanes, major winter blizzards, and summer droughts are all part of life in the southeastern Massachusetts region. These events are frequent enough to be familiar--in the course of the development of this plan, the Town of Lakeville experienced record water levels in local waterbodies, a late October Nor'easter left residents without power for days and closed roads throughout town, and many parts of the Commonwealth of Massachusetts experienced four significant heat waves[1]. The intersection of these natural hazards with the man-made environment can transform these routine events into natural disasters. The historical development pattern of southeastern Massachusetts makes such an outcome more likely. Drawn to the waterways as transportation corridors and sources of power, many of the region's villages and cities are sited in riverine floodplains and along the unprotected coastline.

This plan examines the natural hazards facing Lakeville, how climate change impacts and interfaces with those hazards, assesses the vulnerabilities of the Town's infrastructure, residents and businesses, and makes recommendations on ways to mitigate the negative effects of likely events. The effort has drawn from the local knowledge of a large group of officials and residents and integrates findings of recently completed plans and reports. The recommendations presented are meant to be realistic and effective steps for mitigating natural hazards and build resilience to the impacts of climate change. Ultimately it is hoped these actions will translate into savings—fewer lives lost, less property destroyed, and minimal disruption to essential services.

Planning Requirements under the Federal Disaster Mitigation Act

The Federal Disaster Mitigation Act, passed in 2000, requires that after November 1, 2004, all municipalities that wish to continue to be eligible to receive FEMA funding for hazard mitigation grants, must adopt a local multi-hazard mitigation plan and update this plan in five-year intervals. This planning requirement does not affect disaster assistance funding.

Federal hazard mitigation planning and grant programs are administered by the Federal Emergency Management Agency (FEMA) in collaboration with the states. These programs are administered in Massachusetts by the Massachusetts Emergency Management Agency (MEMA) in partnership with the Department of Conservation and Recreation (DCR).

Massachusetts takes a regional approach and has encouraged the regional planning agencies to prepare plans for their member communities. The Town of Lakeville received a grant from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation Program (PDM) to create a local Hazard Mitigation Plan. Lakeville's previous HMP which was last adopted as part of a regional plan in 2004.

[1] It's official: Fourth heat wave of summer hits Mass. - The Boston Globe

What is a Hazard Mitigation Plan?

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

Planning efforts, like the one undertaken by the Town of Lakeville make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that pose a risk. The planning process pays dividends when it comes to post-disaster spending. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided, or significantly lessened if a community implements the mitigation measures detailed in the plan.

FEMA developed a "Local Mitigation Review Guide" (Guide) to ensure Local Hazard Mitigation Plans meet the requirements of the Stafford Act and Title 44 Code of Federal Regulations (CFR) 201.6. This Guide was used as a tool in developing this Plan.

Plan Description

The 2022 Lakeville Hazard Mitigation Plan (HMP) builds upon the 2004 SRPEDD Region Natural Hazard Disaster Mitigation Plan[2] but is the Town's first stand-alone HMP. In addition to updating aspects of the 2004 SRPEDD plan to reflect changes in development, mitigation priorities, and recent hazards in the town, the planning team revised some elements of the content, structure, and plan update process. A primary difference between the 2004 and 2022 plans is that this HMP update includes a new focus on climate adaptation. The integrated nature of this plan provides the opportunity to identify climate change impacts, describe the effect climate change is anticipated to have on natural hazards, and prepare an integrated strategy to understand and mitigate risks. The recent development of the town's Municipal Vulnerability Preparedness (MVP) planning process supported the integration of climate impacts into this HMP, and the results of the MVP process are incorporated into this plan's Mitigation Strategy.

The structure of the HMP was revised and reorganized based on the integrated nature of the plan and to align with the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan.

2 https://www.buzzardsbay.org/download/2004-natural-hazard-pre-disaster-mitigation-plan-semass.pdf

Previous Federal/State Disasters

The Town of Lakeville has experienced 18 natural hazards that triggered federal or state disaster declarations since 2010. These are listed in Table 1 below. The majority of these events involved severe winter weather, while 6 involved flooding, and 5 were due to hurricanes or nor'easters.

Table 1. Previous Federal/State Disaster Declarations

Disaster Name	Type of Assistance	Declared Areas
January Blizzard EM-3201 (January 22-23, 2005)	FEMA Public Assistance	All 14 MA Counties
Hurricane Katrina, EM-3252 (August 29, 2005)	FEMA Public Assistance	All 14 MA Counties
Severe Storms and Flooding, DR-1614 (Oct 7-16, 2005)	FEMA Public & Individual Assistance	Counties of Berkshire, Bristol, Franklin, Hampden, Hampshire, Middlesex, Norfolk, Plymouth, and Worcester
April Nor'easter, DR-1701 (April 15-27, 2007)	FEMA Public Assistance	Counties of Plymouth, Barnstable, Berkshire, Dukes, Essex, Franklin, Hampden, and Hampshire
Severe Storm and Flooding (Mar 12–Apr 26, 2010)	FEMA Public & Individual Assistance	Counties of Plymouth, Bristol, Essex, Middlesex, Norfolk, Suffolk, and Worcester
Tropical Storm Irene (August 27-29, 2011)	FEMA Public Assistance and Hazard Mitigation Grant Program	Counties of Plymouth, Barnstable, Berkshire, Bristol, Dukes, Franklin, Hampden, Hampshire, and Norfolk
Hurricane Sandy (Oct 27 – Nov 8, 2012)	FEMA Public Assistance and Hazard Mitigation Grant Program	Counties of Plymouth, Barnstable, Bristol, Dukes, Nantucket, and Suffolk
Severe Winter Storm (February 8-10, 2013)	FEMA Public Assistance and Hazard Mitigation Grant Program	All 14 MA Counties
Severe Winter Storm (January 26-28, 2015)	FEMA Public Assistance and Hazard Mitigation Grant Program	Counties of Plymouth, Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Suffolk and Worcester
Severe Winter Storm (March 2-3, 2018)	FEMA Public & Individual Assistance	Counties of Plymouth, Barnstable, Bristol, Nantucket, Norfolk and Essex
Massachusetts COVID-19 PANDEMIC, EM-3438/DR-4496 (January 20 and continuing)	FEMA Public & Individual Assistance	All 14 MA Counties

Source: FEMA, 2021

Notes:

HMGP Hazard Mitigation Grant Program
IA FEMA Individual Assistance
PA FEMA Public Assistance Project Grants

Chapter 2: Community Profile

Community Setting

Lakeville is a town of approximately 11,400 residents located in southeastern Massachusetts' Plymouth County. The Town's recent Master Plan described it as "a quiet bedroom community, blessed with features like beautiful open spaces and natural landscapes, a first-rate regional school system, a dedicated public safety community, and a variety of transportation options." The Town has a traditional New England government structure with a three-member Board of Selectmen, a Town Administrator, and an open Town Meeting. Among the basic services provided to the residents are public safety, schools, recreational facilities, and a public library.

Lakeville's water supply comes primarily from individual or small community groundwater wells, although parts of Routes 18, 44, and 105 are served by municipal water service from Taunton. Wastewater is currently disposed of by private septic systems, although according to Lakeville 2030 the Board of Selectmen is currently working with their counterpart chief elected officials in Middleborough and Taunton to pursue essential water and wastewater capacity for key development sites along Routes 18, 44, and 105.

Lakeville residents are served by a variety of local utilities for electricity including Eversource, Middleborough Gas & Electric District, and Taunton Municipal Light Plant. The northern part of the town has access to natural gas provided by Eversource.

All public roadways within the Town are maintained by the Lakeville Department of Public Works, who also maintains all cemeteries within the Town and all the properties under the supervision of the Park Commission. DPW is responsible for road sweeping in the spring, cutting of brush along the sides of the roads and mowing cul-de-sacs in the summer, road repair throughout the year, and snow plowing during the winter. The Lakeville Highway Department provides information on stormwater management, and fire protection is provided by the Lakeville Fire Department.

Geography

Lakeville is approximately 36 square miles in area and is bordered by bordered by Middleborough to the northeast and east, Rochester to the southeast, Freetown to the south and southwest, and Berkley and Taunton to the west. Located 40 miles south of Boston, 20 miles north of Bew Bedford, and 30 miles east of Providence, RI, the town is in the center of Southeastern Massachusetts. Its location has played a role in the significant expansion of its transportation infrastructure over the last 50 years. Interstate Route 495, together with a dense network of state highways and the MBTA commuter rail, make Lakeville easily accessible to all of southeastern Massachusetts, Boston, and Cape Cod.

Climate

Massachusetts in general has a humid continental climate with temperatures that average 68 to 72 degrees in the summer and about 28 to 32 degrees in the winter. The mean annual precipitation ranges

from 40 to 46 inches, with 1/3 of this in snow. The growing season, from the last killing frost in the spring to the first killing frost in the fall, is about 160 days. The area is subject to a variety of severe weather events: hurricanes, Northeasters, thunderstorms, blizzards, tornadoes, and drought. All of these are discussed more fully in Chapter Four: Natural Hazards Risk Assessment.

Climate Change Projections

The most localized climate change predictions in Massachusetts are provided for the county and major watershed level at Resilient MA. The majority of Lakeville is located in the Taunton River Watershed, so it's figures and data are presented below. Observed extreme weather changes are for Massachusetts as a whole.

Days over 90°F	Annual Rainfall	Number of Consecutive Dry Days	Extreme Weather Events
Observed: 7	Observed: 47.5"	Observed: 17	-
Predicted 2050: 14 to 36	Predicted 2050: 47.8" – 52.9" (winter/spring)	Predicted 2050: 0 – 3 (fall)	Predicted 2050: +2 days per year of extreme weather

Table 2. Climate Change Projections and Related Natural Hazards		
Climate Changes	**Related Natural Hazards**	**Projections by the end of this century**
Changes in precipitation	– flooding – Drought – Landslide	– Annual precipitation: Increase up to 15% (+ 5.4 inches by 2050 and +7.3 inches by 2090) – Days with rainfall accumulation 1+ inch: Increase up to 50% by 2090 (+4 days) – Consecutive dry days: Increase 24% (+4 days) – Winter season is expected to experience the greatest change (increase)
Rising temperatures	– Extreme temperatures – Wildfires – Invasive species	– Average annual temperature: Increase up to 21% (+5.9°F by 2050 and +10.5°F by 2090) – Days/year with daily minimum temperatures below freezing: Decrease up to 52% (-44 days by 2050, -68 days by 2090) – Maximum summer and fall temperatures are expected to see the highest projected increase – Days/year with daily maximum temperatures over 90°F: Increase by up to 900% (+65 days) – Summer cooling degree days: Increase by up to 103% by 2050, 197% by 2090
Extreme weather	– Hurricanes/tropical storms – Severe winter storms/ nor'easters – Tornadoes – Other severe weather	– Frequency and magnitude: Increase

Source: Northeast Climate Adaptation Science Center, 2018

Natural Environment

Lakeville's natural resources and landscapes are among its most important assets. Natural resources support the economy through tourism and recreation and provide clean drinking water and flood control, among other ecosystem services. These include the Assawompset Pond Complex - one of the most productive Bald Eagle nesting sites in the state - along with large blocks of intact woodland, farms, fields, and cranberry bogs. The natural environment also increases resiliency and reduces hazard impacts, through flood attenuation as wetland areas absorb flood waters, through stormwater management as rainwater drains through the soil, and through erosion control as vegetation secures soil along banks and shorelines. Over 3,417 acres in Lakeville are protected by Conservation Restrictions, supporting the preservation of Lakeville's rural character.

The majority of Lakeville is located within the Taunton River Watershed, and the town is especially rich in water resources. Assawompset Pond is the largest natural freshwater lake in Massachusetts, and the

Assawompset Pond Complex serves as the public water supply for New Bedford and Taunton. Despite their location within Lakeville, the Town had not been permitted by the state to withdraw surface water from the Ponds until 2002, when they became eligible to withdraw one million gallons per day from New Bedford's water allotment.

Lakeville is home to a number of coldwater streams, which provide valuable habitat for reproducing coldwater fish by meeting one or more of their life history requirements. These are particularly sensitive habitats, and changes in land and water use can reduce the ability of these waters to support trout and other kinds of coldwater fish. These streams, as well as all inventoried stream crossings and drainage outfalls in Lakeville, are shown on Map 3 in Appendix D.

In 2018, SRPEDD produced a list of road stream crossings in Lakeville with severe constriction of the stream, and crossings in poor or damaged conditions.

Crossings with Severe Stream Constriction

Survey ID	Road	Stream Name	Crossing Type
6212	Crooked Lane	Bates Brook	Multiple Culverts
6217	Main Street (105)	Bates Brook	Single Culvert
6354	Freetown Street	Cedar Swamp River	Single Culvert
571	Southworth Street	Unnamed	Single Culvert

Crossings in Poor or Damaged Condition

Survey ID	Road	Stream Name	Condition	Crossing Type
2761	Harding Street (Rte. 44)	Poquoy Brook	Eroding	Bridge
6216	Old Main Street	Bates Brook	Poor	Single Culvert
6814	Bedford Street	Unknown	Poor	Single Culvert
6871	Pierce Avenue	Unknown	Poor	Multiple Culverts

Land Use and Development Trends

According to Lakeville 2030, residential uses (most of which are single-family homes) currently account for the majority (39%) of Lakeville's land area, followed by institutional uses (35%), vacant land (11%), open space and recreational uses (6%), industrial (2%), and agriculture (2%). Commercial, office, and mixed-use properties make up the remaining percentages. Generally speaking, the commercial and

industrial areas are located along major roadways while the residential, institutional and open space uses are spread throughout town. The *Lakeville Land Use by Parcel* map in Appendix D depicts the 2019 assessor's parcel dataset categorized by land use for the town.

For decades Lakeville has consistently been among the fastest growing towns in the region. Between 1970 and 2000, Lakeville's population increased by 124%, compared to Plymouth County's 90%, the Southeast Regional Planning and Economic Development District's regional community average of 25%, and the state's 12%. This population increase has been accompanied by an increase in development: over 400 acres of land were developed between 1999 and 2005, including the 200+ acre Le Baron Estates, 100+ acre Woodland Ridge, and new apartment complexes adjacent to the town's train station. The rate of development has since slowed within the Town of Lakeville since the 2004 regional hazard mitigation plan, and from 2012 to 2017, 90 acres of land were developed, a rate of 2.5 acres per square mile. (APC & Nemasket Watershed Management and Climate Action Plan, 2021)

Table 3 below summarizes the acreage of land that has been newly developed each year, in the town of Lakeville since 2004. The average annual development is 73.8-acres but the average development within the last four years is 92.11 acres.

Table 3: Lakeville Average Annual Development

Year	**Average Annual Development (acres)**
2004	224.9
2005	65.07
2006	226.58
2007	49.86
2008	12.16
2009	6.91
2010	12.77
2011	59.84
2012	59.72
2013	6.02
2014	46.01
2015	91.35
2016	11.08
2017	80.22
2018	127.08
2019	113.48
2020	58.36
2021	69.51

Source: Town of Lakeville Assessor

Development in Hazard Areas

Most hazards identified in this plan are regional risks, therefore, all new development falls into the hazard area. The exception to this is flooding. According to the Community Information System (CIS) of FEMA and FEMA Region 1, there were 68 National Flood Insurance Policy (NFIP) policies in force in

Lakeville in September 2021, all of which are residential policies, paying roughly $60,000 in annual premiums for a total coverage of $17,606,700. 30 of those policies are associated with structures located within the Special Flood Hazard Area (SFHA) (shown on the Flood Insurance Rate Maps as zones beginning with the letters 'A' or 'V'), which means that more than half of policies in town are voluntarily taking advantage of low-cost coverage for buildings located in the moderate-risk flood zones (shown on the Flood Insurance Rate Maps as zones beginning with the letters 'B', 'C', and 'X' Zones). The latest FEMA Flood Insurance Rate Maps in Lakeville were used to update the Town's Flood Plain Protection (Overlay) district in the zoning code, adopted at Town Meeting and went into effect on July 6, 2021.

From 1984 through September 2021, Lakeville property owners filed a total of 41 claims with the National Flood Insurance Program which have been paid for a total of $680,257 or an average of $16,591 per claim.

Lakeville's three large waterbodies – Quittacas, Assawompset, and Long Pond – have various levels of development. Quittacas' and Assawompset's shores are completely or largely protected from development. Long Pond, however, is not protected and heavily developed, which has led over the years has had negative impacts on water quality. Conversion of natural areas to impervious increases stormwater volumes, which leads to localized flooding. Flooding may cut off access to major thoroughfares, damage shorefront property and septic systems, and further threaten water quality.

The vision promoted in Lakeville 2030 vows to "explore additional opportunities to create new businesses and economic development in appropriate areas" and "balance future growth with maintaining Lakeville's semi-rural character, animal habitat areas, and natural beauty." Strategy 2-1-1 recommends focusing future, large scale business growth to existing commercial corridors and key locations along route 18, route 44, and route 105. While these areas are well positioned for growth due to their existing Business and Industrial zoning districts, highway access, and some supportive infrastructure (such as municipal water service from Taunton along parts of Route 18, Route 44 and Route 105), many of these roadways intersect or approach the boundaries of a FEMA 100-year or 500-year floodplain. When evaluating new development opportunities, the Planning Board should evaluate existing and future areas of flood risks to ensure future development does not contribute to or become vulnerable to this hazard. A review of existing stormwater and subdivision bylaws may be warranted to ensure future developers design stormwater mitigation solutions that anticipate for future conditions of increasing intensity and frequency of precipitation events.

Transportation

Lakeville is a suburban, generally auto-centric community. Residents benefit from Lakeville's close proximity to regional and interstate highways as well as an active commuter rail station. A number of major transportation corridors pass through the town including Routes 495, 18, 44, and 105. Lakeville has direct access to commuter rail service to Boston through the Middleborough/ Lakeville Line and seasonal service to Cape Cod through CapeFlyer service. Phase 1 of the South Coast Commuter Rail project involves relocating the current station in Lakeville less than a half-mile away, to Middleborough, at which point direct train service will no longer be provided to the current Lakeville station. Additionally, the town has limited access to dedicated fixed route transit service through the Greater

Attleboro-Taunton Regional Transit Authority (GATRA). GATRA provides two fixed route services to the Middleborough/Lakeville Commuter Rail Station – the "Middleborough Shuttle" and the "Wareham-Middleborough-Lakeville Train Connector." Lakeville's Council on Aging (COA) currently operates a GATRA vehicle to provide transportation to medical appointments for the senior population in town. Those trips can be local (nearby communities) or as far as Boston.

According to the National Bridge Inventory, there are 11 bridges in Lakeville, as shown on Map 3 in Appendix C. SRPEDD officials note that some of the stream crossings shown on this map labelled "Bridge" are short-span crossings that could be considered culverts.

Critical Facilities

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

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

Critical Facilities within Hazard Areas

Most hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding. There are several critical facilities that fall within the 100- and 500-year floodplain as shown in the table at the end of this section.

The list of Critical Facilities for the Town of Lakeville was developed during the town's 2019 MVP Planning Process and validated by the Hazard Mitigation Planning Committee. Maps showing Lakeville's critical community facilities (titled *Map 1*) and infrastructure, dams, and outfalls (titled *Map 2*), are provided in Appendix C, while the critical facilities potentially affected by hazard areas as determined by the HMPC are identified in Table 4, below. The Town's designated emergency shelter is located the George R Austin Intermediate School on Howland Road. This facility is outside of the floodplain and other known hazard areas, and is equipped with a back-up generator on-site. The Lakeville Council on Aging on Dear Crossing serves as the town's warming and cooling station, and also has complete coverage with a standby generator.

Pump stations and wastewater treatment facilities are not listed here for security purposes.

Table 4: Critical Facilities in Lakeville

Facility	Address	Hazard Area
Fire Station	346 Bedford Street	Surrounded by 1% annual chance floodplain. May be impacted by adjacent roadway flooding and limited access
Police Station	323 Bedford Street	No
Town Hall	346 Bedford Street	No, but may be impacted by adjacent roadway flooding and limited access
Emergency Shelter		
George R Austin Intermediate School	112 Howland Road	No
Library	4 Precinct Street	No
Council on Aging Also serves as a temporary warming and cooling shelter	1 Dear Crossing	No
Public Schools		
Freetown - Lakeville Regional School District	98 Howland Road	No
Apponequet Regional High	100 Howland Road	No
Assawompset Elementary School	232 Main Street	No
George R Austin Intermediate School	112 Howland Road	No
Private School		
Mullein Hill Christian Academy	25 Staple Shore Road	No
DPW Facility		
Highway Department	6 Montgomery Street	Across the road from 0.2% chance flood zone
Transfer Station	100 Kenneth Welch Drive	No
MBTA Active Commuter Stations		
Middleborough/Lakeville	125 Commercial Drive	No
Pumping Stations/Wastewater Treatment Plants		
Taunton Water, Elders Pond Pumping Station	Location information not provided.	
Taunton Water Treatment Plant	Location information not provided.	

A portion of the critical facilities listed above are located within high hazard areas, such as floodplains. Due to the importance of these facilities, special care must be taken to ensure facility preparedness as well as continued operation and maintenance of access during and after natural disasters.

Historic Properties

The Lakeville Historical Commission is the primary steward of the town's historical character and the primary information source regarding Lakeville's historical and cultural resources. Although there are no designated historic districts in Lakeville according to Lakeville 2030, several areas do have a concentration of historic structures and sites. In particular, the Route 18 & Route 105 area, the Tack Factory Neighborhood, and the Pierce Avenue area are among the most important in Lakeville from a historic preservation perspective. The area around the Route 18 and Route 105 intersection, used for the very popular annual Arts & Music Festival and home to Dickran Diran Square, the Old Town Hall, and the Old "Carnegie" Library is a cultural center of Lakeville.

While Lakeville's Historical Commission has significant documentation, organization and local knowledge of local historic resources, no comprehensive inventory of historic properties currently exists. With recent town funding, the Historical Committee is poised to produce a local Historic Preservation Plan, beginning with a comprehensive inventory of the town's historic assets.

Repetitive Loss Properties

Repetitive Loss Properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any ten-year period since 1978. As of 2021, the Town of Lakeville has 3 repetitive loss structures, all of which are single family residential structures located in the Special Flood Hazard Area (SFHA), and no Severe Repetitive Loss (SRL) properties. Each of the RL properties have incurred two losses - the most recent event to generate a RL claim was in 2018, however there were multiple RL losses recorded in 2010. The Town will continue to monitor RL properties as part of its ongoing planning activities.

Chapter 3: Planning Process and Public Participation

A hazard mitigation plan should be thought of as a living document that grows and adapts over time, keeping pace with a community's growth and change. Public participation is a central component of the hazard mitigation planning process as a means to provide critical information about the local occurrence of hazards while also providing opportunity to build a base of support for proposed hazard mitigation activities. The DMA of 2000 places high priority on the continuation of the planning process even after the initial HMP submittal, requiring communities to undertake plan updates and seek and receive approval from FEMA every five years in order to remain eligible for grant assistance.

This Hazard Mitigation Plan began in 2017 when the Town first began the process to develop a stand-alone Natural Hazard Mitigation Plan, building upon SRPEDD's Natural Hazard Pre-Disaster Regional Mitigation Plan from 2004. This 2022 Hazard Mitigation Plan (HMP) is the result of a dedicated group of individuals working for several years to evaluate natural hazards and propose ways to improve Lakeville's resiliency.

Lakeville Hazard Mitigation Planning Committee

- Michael P. O'Brien, Fire Chief
- Robert (Bob) Bouchard, Conservation Agent/ Commission Chair
- Pete Conroy, Planning Board
- Edward Cullen, Health Agent
- Nathan Darling, Building Commissioner and Zoning Officer
- Pamela Garant, Fire Deputy Chief
- Kelly Howley, Council on Aging Director
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- Matthew Perkins, Chief of Police
- Ari Sky, Town Administrator
- Jayme Viveiros, Library Director
- Marc Resnick, Town Planner

Planning Process

The Town of Lakeville began the process to develop a stand-alone Natural Hazard Mitigation Plan in 2017. With help from Southeastern Regional Planning and Economic Development District (SRPEDD), the town developed a Local HMP Committee (HMPC) to oversee the process. Between 2017-2018, SRPEDD and the committee held four (4) committee meetings; held two (2) joint meetings with the Local Emergency Planning Committee (LEPC); provided updates at three (3) APC meetings; participated in four (4) regional stream continuity project meetings; and completed analysis on Lakeville bridges and culverts related to the flood hazard. The HMPC established the local hazards of concern, developed hazard profiles, created a list of critical facilities, analyzed the town's existing mitigation capabilities, and drafted a list of mitigation strategies. There were a number of municipal staff turnovers between 2018 and 2021 and, as a result, the hazard mitigation planning process was delayed.

In December 2019, then standing Lakeville Fire Chief submitted a Letter of Intent and Non-Federal Cost Share Commitment for 2019 Hazard Mitigation Plan funding through the Pre-Disaster Mitigation (PDM) Grant Program to the Massachusetts Emergency Management Agency (MEMA). The request sought funding for the Town to create its first Local Multi-Hazard Mitigation Plan. Funding for the project was awarded in in 2020.

At the same time, the Town applied for and received a grant from the Massachusetts' Executive Office of Energy and Environmental Affairs (EEA) to undertake the Municipal Vulnerability Preparedness (MVP) planning process to consider and prioritize actions to improve local climate resilience, and to support the upcoming development of the town's HMP. SRPEDD served as the town's Certified MVP Provider to guide them through the process, and core members of the Resilient Taunton Watershed Network (RTWN) were tasked with coordinating the MVP Community Resilience building (CRB) workshop. Staff from the Nature Conservancy, Manomet, and Mass Audubon also supported the process. The planning workshops took place on two Saturdays in March of 2019 at the Lakeville Public Library.

Finally, in the summer of 2021, Fire Chief Michael P. O'Brien issued an RFP for a consultant to work with the HMPC to complete the process which had started nearly five years earlier. The town hired a consultant to resume planning efforts and carry forward the draft plan elements developed in 2017-2018. At this time, additional individuals were invited to be a part of the planning committee including the Lakeville Conservation Agent, Health Agent, a member of the Planning Board, the Assistant to the Town Administrator and the new Town Planner. A separate invitation to participate in the planning process was extended to members of the Lakeville Emergency Planning Committee and stakeholders involved in the MVP program. The HMPC reconvened in July 2021 and met several other times in 2021 and 2022 to provide information to the consultant and review plan elements.

Public Outreach Strategy

The Town of Lakeville completed the required public outreach for the HMP through the MVP Community Resilience Building Workshop and other public meetings. Outreach efforts included MVP Core Team meetings, the CRB public workshops, MVP listening session, distribution of a HMP public survey, a presentation to the Board of Selectmen during the development of the HMP, a public meeting held during the development of the HMP, and multi-media outreach including public notices on the Town's website. The HMPC worked closely with the Lakeville Emergency Planning Committee and Southeastern Regional Planning and Economic Development District to ensure coordination with regional partners. Furthermore, the Town of Lakeville, in an effort to encourage engagement with the drafting of the plan update, communicated electronically with neighboring communities. The Lakeville Fire Chief provided the Towns of Freetown, Berkley, Middleborough, and Rochester, and the City of Taunton with the draft plan during the designated public comment period. The invitation for comment was directed to the emergency planning / planning officials in each community and the Town of Lakeville utilized a survey software platform to collect the comments electronically.

Table 5 summarizes the meetings, outreach, and public forums conducted throughout the HMP development:

Table 5: Summary of Planning and Outreach Activities

Date	Activity Summary
2016 - 2017	SRPEDD and the committee held four (4) committee meetings
February-April, 2017	SRPEDD and the committee held two (2) joint meetings with the Local Emergency Planning Committee (LEPC) (2/2/17 and 4/27/17)
2017-2018	SRPEDD and the committee provided updates at three (3) APC meetings
2017-2018	SRPEDD and the committee participated in four (4) regional stream continuity project meetings
December, 2019	Lakeville Fire Chief applied for 2019 PDM Grant
March, 2019	Lakeville MVP CRB workshops
July 30, 2021	HMP committee (HMPC) reconvenes, discusses plan history and relevant activities to date, confirm committee make-up
August 19, 2021	HMPC meeting to review HMP update process, confirm hazards of concern, discuss public outreach, develop public survey
September 3, 2021	HMPC meeting to review critical facilities map, water supply map, dams and outfalls map, capabilities assessment, and 2004 regional mitigation strategies.
September, 2021	Press release distributed to LEPC and neighboring municipalities to announce the continuation of the HMP process and seeking input through the public survey
September, 2021	Public survey distributed - posted on town website, Council on Aging home page, and promoted on Town Facebook page
October 25, 2021	Consultant presented planning process to Lakeville Board of Selectmen
December 4, 2021	Public meeting to present risk assessment and discuss mitigation strategies
January 2022	HMPC meeting to review updated hazard profiles, risk assessment, and mitigation strategy
February 2022	HMPC conducts mitigation strategy prioritization
February 28, 2022	Draft Plan Posted for Public Review Notifications and requests for comment sent from Fire Department via CivicPlus, and posted on town website and Town Facebook page

Chapter 4: Risk Assessment

Lakeville is vulnerable to a wide range of natural hazards that can threaten the people, economy, infrastructure and natural resources of the Town. As suggested under FEMA planning guidance (FEMA 2011), the Town of Lakeville reviewed the full range of natural hazards identified in the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan. Also, given the many large bodies of water and privately-owned impoundments in the Town, and the potential risk associated with their failure, dam failure was also evaluated.

The resulting refined list of hazards profiled in this plan is as follows:

- Inland Flooding (riverine and urban drainage/localized)
- Dam failure
- Drought
- Landslide
- Extreme Temperatures
- Wildfires/Brushfires
- Hurricanes/Tropical Storms
- Severe Winter Storm/Ice Storm/Nor'easter
- Severe thunderstorms/Wind/Tornado/Microburst
- Earthquake
- Invasive Species

The Lakeville HMPC evaluated each of the hazard types that may affect the town, with the impacts of climate change considered throughout. This chapter provides a description of each hazard, the location(s) within Lakeville that are impacted by each hazard, previous occurrences of each hazard, the possible magnitude of each hazard, the probability of each hazard occurring in a given year, and some of the impacts that can happen in the event that hazard occurs.

4.1 Natural Hazard Identification and Organization

Hazards associated with natural disasters typically encountered in Lakeville include high winds, heavy rains, and winter weather. Natural disasters occurring less frequently, such as tornadoes, earthquakes or brush/forest fires, pose less frequent but unique challenges. In addition to the 2018 State Plan, other resources consulted during the drafting of this plan included news articles and other media sources, HMP survey responses, input from public meetings, and local knowledge from HMPC members.

4.2 Risk Assessment Methodology

The Hazard Identification and Analysis matrix is organized into the following sections: Type of Hazard, Likelihood / Frequency of Future Occurrence, Impact Area Assessment (also discussed elsewhere in the plan as Location of Occurrence), Severity / Magnitude, and Hazard Index. The Hazard Index ranks hazards according to the scores of the former categories and forms the basis for concentrating the future mitigation efforts outlined in this plan. A description of each of the matrix categories is provided below.

Frequency/Likelihood of Future Occurrence

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

Table 6: Frequency / Likelihood		
Point Value	**Frequency of Occurrence**	**Probability of Future Event**
3	Highly Likely	Near 100% probability in the next year
2	Likely	Between 10-100% probability in the next year
1	Possible	Between 1-10% probability in the next year
0	Unlikely	Less than 1% probability in the next year

Whether or not previous hazard events had occurred is also included, with detailed descriptions of specific previous occurrences within the hazard identification and vulnerability assessments, if necessary.

Location of Occurrence / Impact Area Assessment

The classifications are based on the area of the Town of Lakeville that would potentially be affected by the hazard. This characteristic is relative to the total land area and concentrations of populations, structures, and critical facilities that would be impacted. The following scale was used:

Table 7: Impact Area Assessment		
Point Value	**Category**	**Percentage of Town* Impacted**
3	Large	More than 50% of the town affected
2	Medium	10 to 50% of the town affected
1	Small	Less than 10% of the town affected

* relative to the total land area and concentrations of populations, structures, and critical facilities that would be impacted

Severity and Magnitude / Extent of Impacts

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

Table 8: Severity / Magnitude of Impacts		
Point Value	**Category**	**Severity / Magnitude of Impacts**
3	Catastrophic	Multiple deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of facilities for 30 days or more.
2	Critical	Multiple injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 week.
1	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for more than 1 day.
0	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of facilities.

Vulnerability

Vulnerability is the susceptibility of people, property, industry, resources, ecosystems, or historical buildings and artifacts to the negative impact of a natural hazard or disaster. The qualitative vulnerability assessments provided below estimate the extent of injury and damages that may result from a hazard event of a given intensity in a given area. Vulnerability was largely determined by outputs for Expected Annual Loss and Exposure Value by FEMA's National Risk Index (NRI), where Expected Annual Loss equals Exposure x Annualized Frequency x Historic Loss Ratio, and Exposure is a tally of presumed exposure values for buildings, population, and agriculture. NRI measurements are used here to fill in gaps in available data and analyses to support local risk reduction strategies.

National Risk Index (NRI)

FEMA has created a National Risk Index (NRI) that can be used to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather. The NRI leverages available source data by census tract for Expected Annual Loss due to these 18 hazard types, as well as to estimate Social Vulnerability, and overall Community Resilience in order to develop a baseline relative risk measurement for each United States county and Census tract. While the hazards laid out by the NRI vary slightly from the hazard profiles listed below, the NRI estimates for expected annual loss and annualized frequency value are included for relevant hazards in Lakeville's 2022 hazard risk assessment. The town of Lakeville is broken up into 3 counties/ census tracts.

4.3 Hazard Index

The hazard index ratings were determined after assessing the frequency, impact area and severity classifications for each hazard. The hazard index ratings are based on a scale of 1 (lowest risk) through 6 (highest risk). The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable; however, many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability. The 2004 Southeastern Regional Planning and Economic Development District (SRPEDD) Regional Disaster Mitigation Plan characterized hazards throughout SRPEDD's planning area as follows:

Natural Hazard	Likelihood/ Frequency	Impact Area Assessment	Severity/ Magnitude	Hazard Index
FLOOD RELATED HAZARDS ➢ Riverine ➢ Coastal ➢ Erosion ➢ Dam Failures ➢ Thunderstorms ➢ Winter Storms ➢ Coastal Storms/ Nor'easters ➢ Hurricanes	Highly Likely (3)	Medium (2)	Limited (1)	6 Pts.* Rank #1
WIND RELATED HAZARDS ➢ Hurricanes ➢ Coastal Storms/ Nor'easters ➢ Winter Storms ➢ Downspouts ➢ Tornadoes	Highly Likely (3)	Medium (2)	Limited (1)	6 Pts.* Rank #1
FIRE-RELATED HAZARDS ➢ Drought ➢ Wildfires ➢ Urban Fires ➢ Flooding	Highly Likely (3)	Medium (2)	Limited (1)	6 Pts.* Rank #1
GEOLOGIC HAZARDS ➢ Earthquakes ➢ Landslides ➢ Sink Holes ➢ Subsidence	Possible (1)	Small (1)	Limited (1)	3 Pts. Rank #4
				* equally ranked

The 2022 Town of Lakeville HMP will categorize local natural hazards based on primary climate change interaction following the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan. Lakeville's 2022 hazard index ratings are presented below:

Table 9: Hazard Risk Index				
Type of Hazard	**Likelihood/ Frequency**	**Impact Area**	**Severity/ Magnitude**	**Hazard Risk Index Rating**
Changes in Precipitation				
Flooding	Highly Likely 3	Medium 2	Critical 2	7
Dam Failure	Possible 1	Medium 2	Critical 2	5
Drought	Likely 2	Medium 2	Limited 1	5
Landslide	Possible 1	Small 1	Minor 0	2
Rising Temperatures				
Extreme Temperatures	Highly Likely 3	Medium 2	Limited 1	6
Wildfire/ Brushfire	Likely 2	Medium 2	Limited 1	5
Extreme Weather				
Hurricane/ Tropical Storm	Likely 2	Medium 2	Limited 1	5
Severe Winter Storm/ Ice Storm/ Nor'easter	Highly Likely 3	Medium 2	Limited 1	6
Severe thunderstorms / Wind / Tornado / Microburst	Highly Likely 3	Medium 2	Limited 1	6
Non-Climate-Influenced Hazards				
Earthquake	Unlikely 0	Large 3	Limited 1	4
Invasive Species	Highly Likely 3	Medium 2	Minor 0	5

Chapter 5: Hazard Profiles and Risk Assessment

5.1 Primary Climate Change Interaction: Changes in Precipitation

Flooding

Description

Flooding can be caused by extreme weather events such as hurricanes, nor'easters, severe rainstorms, and thunderstorms. The Town of Lakeville is subject to inland flooding, where heavy precipitation overwhelms the capacity of natural and structured drainage systems to convey water away from roads and other areas of concern, causing it to overflow the system. Inland flooding can be caused by major storms, such as nor'easters and hurricanes. Nor'easters can occur at any time of the year but they are most common in winter. Hurricanes are most common in the summer and early fall. Nor'easters tend to cover a larger area than hurricanes and tend to last longer. Large rain storms or snowfalls can also lead to inland flooding. See later sections for more specific details on these other natural hazards. Flooding due to storm run-off that overwhelms the carrying capacity of storm water infrastructure can be exacerbated by poor design or poor maintenance.

Flooding from inadequate or ineffective drainage occurs in flat or depressional areas where runoff or rain collects but cannot drain out. Drainage systems are made up of ditches, storm sewers, retention ponds and other infrastructure designed to transport storm water away from roadways and parking lots, to receiving streams, bays, and/or the ocean. Large storms can overwhelm these systems and blocked or clogged drainage ditches and culverts can inhibit the flow of water, resulting in back-ups and ponding. Water will remain in an area until it infiltrates into the soil, evaporates, the blockage is cleared, or the water is actively pumped out. Lakeville contains a relatively high area of natural stormwater storage systems including rivers and wetlands. These natural systems are valuable as they decrease the severity of flooding and the resulting damage experienced by the town.

Location

The Assawompset Pond Watershed has several characteristics that make it prone to flooding. Infamous flooding in late March and early April of 2010 resulted in evacuations, school closures, and brought a sense of vulnerability to Lakeville's shore front communities. It emphasized the environmental risks of such dense development with inadequate septic management, created concern about the water level control in the ponds, and led to in-depth studies of the hydrology of the ponds and of the Nemasket River. Other smaller flood events frequently result in loss of emergency service due to temporary road closures.

According to documents produced during the 2017 SRPEDD HMP update process, the 2019 MVP planning process, and this 2022 HMP planning process, the following locations in Lakeville are particularly at risk from flooding:

- Cross Street
- Pickens Street

- County Road by the Eagles
- Taunton Street (Poquoy Brook)
- Route 18,
- Snake River (Long Pond River)
- Main Street (Route 105 and Bates Brook)
- Pierce Avenue and unnamed stream at Bittersweet Road
- Freetown Street and Cedar Swamp River (noted as severe stream constriction in 2013)
- Harding Street (Route 44) and Poquoy Brook (noted as in poor or damaged condition in 2013)
- Southworth Street and Unnamed stream (noted as severe stream constriction in 2013)
- Bedford Street and Unnamed stream (noted as in poor or damaged condition in 2013)
- Unnamed culverts on Captain's Way, Riverside Drive, and Old Powder House
- Properties along Barstow Street (specifically surrounding the stormwater feature between properties along the southern section of Barstow St.) where shallow depth to bedrock may reduce rainfall infiltration capabilities[3]

Previous Occurrence and Extent

According to the NOAA NCDC storm data many flood events have occurred in between the time period of 2008-2021. Only 22 of the events caused over $5,000 in property damage throughout the town of Lakeville. As a result of the more severe floods that have occurred in Lakeville, two advisory committees were created to study the flooding events and determine actions for future mitigation of such flooding, "The Dam Working Group" and the "Nemasket River Committee".

The most recent significant flood event on record occurred on March 29, 2010 and was declared a FEMA disaster (DR-1701) for Plymouth County and a number of neighboring counties. Three to eight inches of rain fell across Plymouth County resulting in several small streams rising above flood stage. Several ponds in Lakeville rose out of their banks, forcing at least 35 families to be evacuated because of the pond flooding. Schools in Lakeville closed early Tuesday, March 30 and closed for the day Wednesday, March 31 because of the flooding. Many streets flooded (and most were eventually closed) in Wareham, Mattapoisett, Scituate, Bridgewater, Brockton, East Bridgewater, Middleborough, Kingston, and Lakeville, including Route 105 in Middleborough where it passes under Interstate 495 at exit 4 right at the Lakeville border. Several sewage treatment plants flooded resulting in raw sewage being discharged into rivers and other bodies of water.

The need for better stewardship of the Assawompset Pond Complex and Nemasket River, especially in the form of a watershed management plan, is articulated as a priority in Lakeville's MVP Plan. All communities surrounding the ponds have a stake in flood abatement, while the water supplier entities have an interest in storing water for potential future drought conditions. Currently (Oct 2021) water levels in ponds are very high due to the above average rainfall from spring and summer, 2021. Much public attention and concern exists about potential for spring flooding if water levels aren't managed.

[3] Public comment from Barstow Street homeowner submitted to the HMPC 2/28/22.

The Watershed Management and Climate Resilience plan, currently underway, will promote active management coordinated across stakeholder needs. Lakeville department heads are also having contingency meetings to deal with the present risk.

Future Occurrence and Vulnerability

According to the National Risk Index, the annualized frequency value of a flooding event is 2.4 events per year. Based on the frequency of past flooding occurrences described above, **it is likely (between 10 and 100% probability in the next year)** that a flooding event will occur in Lakeville. A flooding event in Lakeville would affect a large geographic area and population base, with between 10-50% of the town affected. Climate change is projected to increase the frequency and intensity of severe weather events that can lead to major flooding events, such as heavy precipitation events, thunderstorms, or hurricanes. Thus, it is possible that in the future Lakeville may experience more severe or more frequent flooding. The severity of the impacts on persons, property, and public infrastructure can be expected to be significant but limited. According to the National Risk Index, Lakeville's Expected Annual Loss from flooding is $70,324.

Due to Lakeville's recent increase in new infrastructure throughout the town, flooding has become an even greater threat. An increase in the amount of impervious surfaces can also cause the impacts of flooding to worsen. Flooding causes debris and sediment deposits on Town infrastructure and roads. Potential loss of potable drinking water in flooded areas due to the need to shut valves to protect the Town's drinking water supply. Buildings can float off their foundations if not anchored properly. Basements can flood or can collapse due to external water pressure. Floods can wash out bridges and culverts. Debris lodged in culverts can inhibit flow, causing additional flooding on the upstream side. Major disruptions to transit services can also result from flooding.

Dam Failure

Description

A dam is any artificial barrier with the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage or water control. Dam failure can be a catastrophic type of failure characterized by the sudden, immediate, and uncontrolled release of impounded water, or the likelihood of such an uncontrolled release with secondary impacts to downstream structures within the inundation zone.

Many dams in Massachusetts were built during the 19th Century without the benefit of modern engineering design and construction oversight. Dams of this age can fail because of structural problems due to age and/or lack of proper maintenance, as well as from structural damage caused by an earthquake or flooding.

The Massachusetts Department of Conservation and Recreation Office of Dam Safety is responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dam safety regulations enacted

in 2005 transferred significant responsibilities for dams from the State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

Massachusetts dam owners must complete a Dam Registration Form provided by the Office of Dam Safety. Owners of the dam must also hire a qualified engineer to inspect, and report results every 2 years for High Hazard Potential dams, ever 5 years for Significant Hazard Potential dams, and every 10 years for Low Hazard Potential dams (See Table 11 below for explanation of dam classification). While the monitoring of dam condition falls to the owner, be it a private or public entity, damage from dam failure may include multiple owners and even property across town boundaries. Coordination between towns may be important, especially concerning the release of water to adjust levels before and during storm events.

There are a number of ways in which climate change could alter the flow behavior of a river, causing conditions to deviate from what the dam was designed to handle. For example, more extreme precipitation events could increase the frequency of intentional discharges. Many other climate impacts—including shifts in seasonal and geographic rainfall patterns—could also cause the flow behavior of rivers to deviate from previous hydrographs. When flows are greater than expected, spillway overflow events (often referred to as "design failures") can occur. These overflows result in increased discharges downstream and increased flooding potential.

Location

According to MassGIS, there are 8 dams on public and private land in the Town of Lakeville. Lakeville's spillway and dams are controlled by the Town of Middleborough, Taunton Water Department, and New Bedford Water Department. The names and hazard levels of the individual structures are:

Table 10: Dams in Lakeville

Dam Name	Manager/Owner	Hazard Level
Crystal Waters	Private	Low
Pierce Avenue	Private	Significant
Assawompset Pond	Public	Significant
The Reservoir	Private	N/A
St. Yues Bog	Private	N/A
Mill Pond	Private	N/A
Egger Bog	Private	N/A
Fischer	Private	N/A

Previous Occurrence and Extent

According to the Association of State Dam Safety Officials (ASDSO) Dam Incident Database, there have been no previous occurrences of dam failure in the Town of Lakeville. However, aging infrastructure,

increased storm intensity and rising sea levels may produce such incidents in the future. In recent years, dams located just a few towns over from Lakeville have already experienced the threat of failure.

The extent of the impacts could range anywhere from medium to large. Dam failure can cause loss of life and property and can degrade the environment. There are two primary types of dam failure: catastrophic failure, characterized by the sudden, rapid, and uncontrolled release of impounded water, and design failure, which occurs as a result of minor overflow events. Dam overtopping is caused by floods that exceed the capacity of the dam, and it can occur as a result of inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors. Overtopping accounts for 34 percent of all dam failures in the U.S.

Dams in Massachusetts are assessed according to their risk to life and property. The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area. The state has three hazard classifications for dams:

Table 11: Classification System of Dams from 302 CMR 10

Hazard Classification	Hazard Potential
High Hazard (Class I):	Dams located where failure or misoperation will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).
Significant Hazard (Class II):	Dams located where failure or misoperation may cause loss of life and damage home(s), industrial or commercial facilities, and secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.
Low Hazard (Class III):	Dams located where failure or misoperation may cause minimal property damage to others. Loss of life is not expected.

Future Occurrence and Vulnerability

As a dam failure has never occurred in the Town of Lakeville, the probability of it occurring is low, but possible **(1-10% probability in the next year).** More extreme precipitation events could increase the frequency of overtopping events. So, although climate change will not increase the probability of catastrophic failure, it may increase the probability of design failure.

Flooding from dam failure can cause direct damage to critical facilities and result in roadblocks and inaccessible streets that impact the ability of public safety and emergency vehicles to respond to calls for service.

Drought

Description

Drought is an extended period of time where a region experiences a notable reduction in available water supply typically caused by a lack of precipitation. Drought can affect either surface water or groundwater sources. Though most droughts in Massachusetts last only a matter of months, it is

possible for drought conditions to extend over a period of years due to reduced rainfall and snowfall accumulations contributing to lower groundwater and surface water levels. How this deficiency is experienced can depend on factors such as land use change, the existence of dams, and water supply withdrawals or diversions. For example, impervious surfaces associated with development can exacerbate the effects of drought due to decreased groundwater recharge.

Location

The entire Town of Lakeville is equally susceptible to drought. Drought is a natural phenomenon, but its impacts are exacerbated by the volume and rate of water withdrawn from these natural systems over time as well as the reduction in infiltration from precipitation that is available to recharge these systems. Natural infiltration is reduced by impervious cover (pavement, buildings) on the land surface and by the interruption of natural small-scale drainage patterns in the landscape caused by development and drainage infrastructure. Highly urbanized areas with traditional stormwater drainage systems tend to result in higher peak flood levels during rainfall events and rapid decline of groundwater levels during periods of low precipitation. Thus, the hydrology in these areas becomes more extreme during floods and droughts (ERG and Horsley Witten Group, 2017). The importance of increasing infiltration is widely recognized, as well as the implementation of green infrastructure practices.

Previous Occurrence and Extent

Significant periods of drought have occurred in Plymouth County, and Lakeville specifically, in the past. The Massachusetts Department of Conservation and Recreation (DCR) compiles monthly water conditions reports, summarizing the rainfall and its diversion from average conditions for each of the 6 regions in the state (Cape Cod and Islands, Central, Connecticut River, Northeast, Southeast, and Western). Data for the Southeast region from a recent eleven (11) month period (DCR 2020) is summarized in Table 12. Between 2015 and 2020, the Town of Lakeville has experienced more greater than normal droughts that ranged from an advisory status to a warning status. During 2020, the entire state of Massachusetts experienced more severe drought conditions than in the past.

Table 12 – Summary of the Southeast Region rainfall from DCR Hydrologic Conditions Reports (2020)

Month-Year	Total Rainfall (inches)	Departure from normal (inches)
Jan 2020	1.63	-2.33
Feb 2020	3.10	-0.52
Mar 2020	4.03	-0.59
Apr 2020	7.14	2.84
May 2020	2.74	-0.92
Jun 2020	3.96	0.03
Jul 2020	1.67	-1.84
Aug 2020	2.68	-1.23
Sep 2020	1.26	-2.59
Oct 2020	5.39	0.87
Nov 2020	4.74	0.24
Total	38.34	-6.04

Source: DCR Water Data Tracking, 2020

Future Occurrence and Vulnerability

Based on the data summarized above about past drought conditions in Lakeville, **the probability that a drought will occur in Lakeville in the future is likely (between 10% and 100% probability in the next year**. Although climate change is predicted to increase precipitation in the Northeast, such as through snowfall, more frequent and severe droughts are still predicted to occur as a result of increased temperature and evaporation. The frequency and intensity of droughts are projected to increase during the summer and fall as higher temperatures lead to greater evaporation and earlier winter and spring snowmelt. According to the National Risk Index, Lakeville's Expected Annual Loss from drought is $49,023. Additionally, according to the National Risk Index, the annualized frequency value of a drought is 2.3 events per year.

The number and type of impacts increase with the persistence of a drought as the effect of the precipitation deficit cascades down parts of the watershed and associated natural and socioeconomic assets. For example, a precipitation deficiency may result in a rapid depletion of soil moisture that may be discernible relatively quickly to agriculture. The impact of this same deficiency on reservoir levels may not affect hydroelectric power production, drinking water supply availability, or recreational uses for many months.

Drought conditions can increase conflicts between water users. Water conservation actions may impact users' activities, reduction in drinking water supply. Health related issues may arise due to dust inhalation. Residents with private wells are considered to be the most vulnerable part of the population. Droughts can result in lower water levels in reservoirs, and loss of fish habitat as streams, rivers, and ponds dry up. Drought can cause well water quality, and potentially quantity, to worsen. Drought can cause sanitary issues in the water distribution system, as well as increase water demand. Farmers experience financial losses if a drought destroys their crops, which can lead to an increase of local or regional food costs.

Landslide

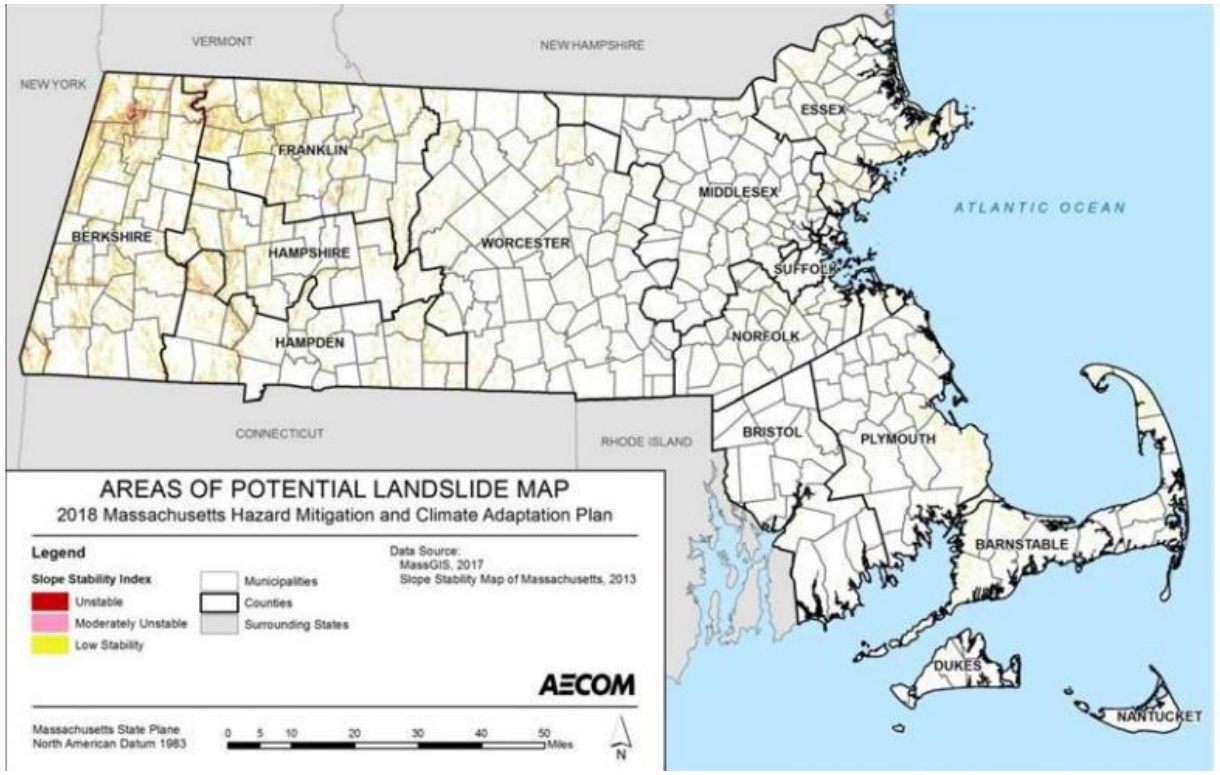
Description

Landslides are a form of mass wasting in which there is a mass movement of rock, debris, or earth down a slope under the direct influence of gravity. There are five different types of slope movement that are considered landslides including falls, topples, slides, spreads, and flows. These categories can be further divided up by the type of material composing the landslide including bedrock, debris, or earth. The most common types of landslides are mudflows or mudslides, otherwise known as debris flows. Depending on the severity of the event, landslides can be a threat to human life, buildings, infrastructure, and the natural environment. Generally, landslides are not common in Massachusetts.

Location

As the topography of Lakeville is relatively uniform, most of the Town is relatively stable and not very vulnerable to landslides. However, there are small areas of steeper topography where the landslide risks are slightly higher. The Slope Stability Map (see Figure 1) categorizes areas of Massachusetts into stability zones, and the categorization is correlated to the probability of instability in each zone. Thus, although specific landslide events cannot be predicted, this map shows where slope movements are most likely to occur after periods of high-intensity rainfall. According to the map, these unstable areas are located throughout the Commonwealth, but the highest concentrations are west of Worcester County.

Figure 1 - Slope Stability Map



Source: MassGIS Slope Stability Map, 2013

Previous Occurrence and Extent

In Massachusetts, landslides tend to be more isolated in size and pose threats to highways and structures that support fisheries, tourism, and general transportation. According to USGS Landslide Inventory, Lakeville and surrounding towns have a low incidence (less than 1.5% of the area is involved in landslides). Some landslide events may have occurred in remote areas, causing their existence or impact to go unnoticed. Table 13 shows an inventory of landslides that have occurred within 100 miles of Lakeville from 1900 to 2019.

Table 13: Landslide Inventory

Date	Location	Confidence
3/14/2010	Topsfield, MA	Probable landslide in the area
3/15/2010	Clinton, MA	Likely landslide at or near this location
3/15/2010	Walpole, MA	Confident consequential landslide at this location
3/30/2010	Middletown, MA	Likely landslide at or near this location
3/31/2010	Greenville, NH	Likely landslide at or near this location
9/30/2013	Southbridge, MA	Probably landslide at or near this location
11/1/2014	Attleboro, MA	Likely landslide at or near this location
12/9/2014	Topsfield, MA	Likely landslide at or near this location

Source: USGS Landslide Inventory

Future Occurrence and Vulnerability

Landslides are often triggered by other natural hazards such as earthquakes, heavy rain, floods, or wildfires, so landslide frequency is often related to the frequency of these other hazards. Considering the low occurrence of landslides within the vicinity of the Town of Lakeville, as well as the relatively flat topography and lack of major hills, the **likelihood of a landslide occurring within The Town of Lakeville is unlikely (less than 1% probability in the next year)**. According to the National Risk Index, Lakeville's Expected Annual Loss from a landslide is $957. The annualized frequency value of a landslide is 0 event per year.

Landslides do not typically trigger other natural hazards. However, they can cause several types of secondary effects, such as blocking access to roads, which can isolate residents and businesses and delay commercial, public, and private transportation. This could result in economic losses for businesses. Other potential problems resulting from landslides are power and communication failures. Vegetation or poles on slopes can be knocked over, resulting in possible losses to power and communication lines.

5.2 Primary Climate Change Interaction: Rising Temperatures

Extreme temperatures

Description

There is no universal definition for extreme temperatures. The term is relative to the usual weather in the region based on climatic averages. According to the Massachusetts State Hazard Mitigation and Climate Adaptation Plan (2018), extreme heat for Massachusetts is usually defined as a period of 3 or more consecutive days above 90 degrees Fahrenheit (°F), but more generally as a prolonged period of excessively hot weather, which may be accompanied by high humidity. Extreme cold is also considered relative to the normal climatic lows in a region. Massachusetts has four seasons with several defining factors, and temperature is one of the most significant. Extreme temperatures can be defined as those that are far outside the normal ranges.

Extreme Cold

The extent (severity or magnitude) of extreme cold temperatures is generally measured through the Wind Chill Temperature Index. The NWS issues a Wind Chill Advisory if the Wind Chill Index is forecast to dip to –15°F to – 24°F for at least 3 hours, based on sustained winds (not gusts). The NWS issues a Wind Chill Warning if the Wind Chill Index is forecast to fall to –25°F or colder for at least 3 hours. Wind Chill Temperature is the temperature that people and animals feel when they are outside, and it is based on the rate of heat loss from exposed skin by the effects of wind and cold. As the wind increases, the body loses heat at a faster rate, causing the skin's temperature to drop. Extreme cold is a dangerous situation that can result in health emergencies for susceptible people, such as those without shelter or who are stranded or who live in homes that are poorly insulated or without heat.

Extreme Heat

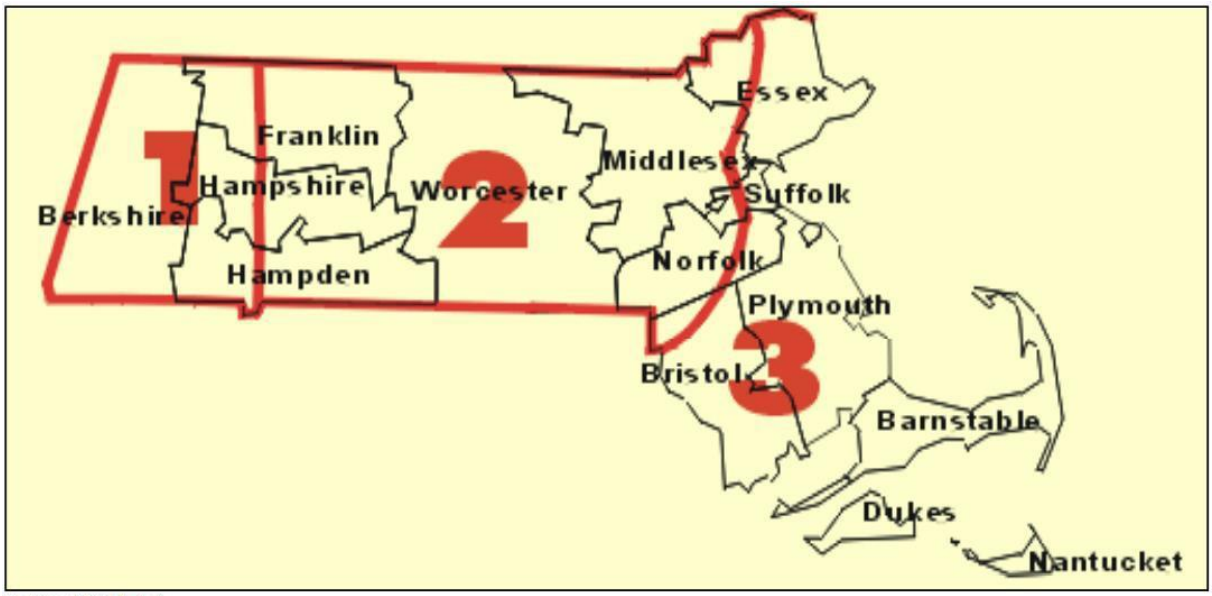
The NWS issues a Wind Chill Advisory if the Wind Chill Index is forecast to dip to –15°F to – 24°F for at least 3 hours, based on sustained winds (not gusts). The NWS issues a Wind Chill Warning if the Wind Chill Index is forecast to fall to –25°F or colder for at least 3 hours. A heat wave is defined as 3 or more days of temperatures of 90°F or above. A basic definition of a heat wave implies that it is an extended period of unusually high atmosphere-related heat stress, which causes temporary modifications in lifestyle and which may have adverse health consequences for the affected population.

Location

According to the NOAA, Massachusetts is made up of three climate divisions: Western, Central, and Coastal, as shown in Figure 2 (NOAA, n.d.). Average annual temperatures vary slightly over the divisions, with annual average temperatures of around 46°F in the Western division (area labeled "1" in the figure), 49°F in the Central division (area labeled "2" in the figure) and 50°F in the Coastal division (area labeled "3" in the figure). Extreme temperature events occur more frequently and vary more in the inland regions where temperatures are not moderated by the Atlantic Ocean.

Heat impacts can be particularly significant in urban areas. As municipalities develop and change, so does the landscape. Buildings, roads, and other infrastructure replace open land and vegetation. Surfaces that were once permeable and moist are now impermeable and dry. Dark-colored asphalt and roofs also absorb more of the sun's energy. These changes cause highly developed areas to become warmer than the surrounding areas.

Figure 2 - Climate Divisions of Massachusetts



Source: NOAA, n.d.

Previous Occurrence and Extent

NOAA's National Centers for Environmental Information houses a Storm Events Database (NOAA 2021), which includes accounts of Cold/Wind Chill, Extreme Cold/Wind Chill, Heat, and Excessive Heat. Querying the data for these types of events for the past 10 years returned five occurrences of extreme temperature in Plymouth County that may have impacted Lakeville:

1) July 6, 2010: Temperatures neared 100°F with a high percent of relative humidity. Heatindex values ranged from 100 to 106 for most of Southern New England. Heat index values at the Plymouth Municipal Airport ranged between 100 and 104.
2) July 22, 2011: High temperatures and high humidity levels brought the heat index above 105 for several hours. Heat index values at the Plymouth Municipal Airport ranged between 105 and 108.
3) February 16, 2015: A winter storm brought significant snowfall, as well as frigid temperatures. The Automated Surface Observation Station at the Plymouth Municipal Airport recorded wind chill values as low as -28°F.
4) February 14, 2016: An arctic high-pressure system brought strong northwest winds and extremely cold wind chills to southern New England. Wind chills as low as -36°F were reported in Plymouth.

5) July 3, 2018: An area of high pressure brought high temperatures and humidity to southern New England. The Automated Surface Observation Station at the Plymouth Municipal Airport reported a heat index of 107.

According to Massachusetts State Hazard Mitigation and Climate Adaptation Plan (September 2018), In the last decade, U.S. daily record high temperatures have occurred twice as often as record lows. High, low, and average temperatures in Massachusetts are all likely to increase significantly over the next century as a result of climate change. This gradual change will put long-term stress on a variety of social and natural systems and will exacerbate the influence of discrete events.

Future Occurrence and Vulnerability

Based on the data summarized above about past extreme temperature conditions in Plymouth County, **the probability that extreme temperatures will occur in Lakeville in the future is likely (between 10% and 100% probability in the next year).** The most significant secondary hazard associated with extreme temperatures is a severe weather event. According to the National Risk Index, Lakeville's Expected Annual Loss from extreme temperatures in total is $2,419 with extreme cold equaling $628 and extreme heat equaling $1,791. Additionally, the annualized frequency values for extreme temperatures are 0.2 event per year and 0.6 event per year, respectively.

Hot weather events are often associated with drought, as evaporation increases with temperature, and with wildfire, as high temperatures can cause vegetation to dry out and become more flammable. Warmer weather will also have an impact on invasive species. Cold weather events are primarily associated with severe winter storms. The combination of cold weather with severe winter storm events is particularly dangerous because winter weather can knock out heat and power, increasing the vulnerability of populations sheltering from the cold.

Wildfires/Brushfires

Description

A wildfire can be defined as any non-structure fire that occurs in vegetative wildland that contains grass, shrub, leaf litter, and forested tree fuels. Wildfires in Massachusetts are caused by natural events, human activity, or prescribed fire. Wildfires often begin unnoticed but spread quickly, igniting brush, trees, and potentially homes. The Bureau of Fire Control estimates that nearly 98% of fires in Massachusetts are started by human carelessness.

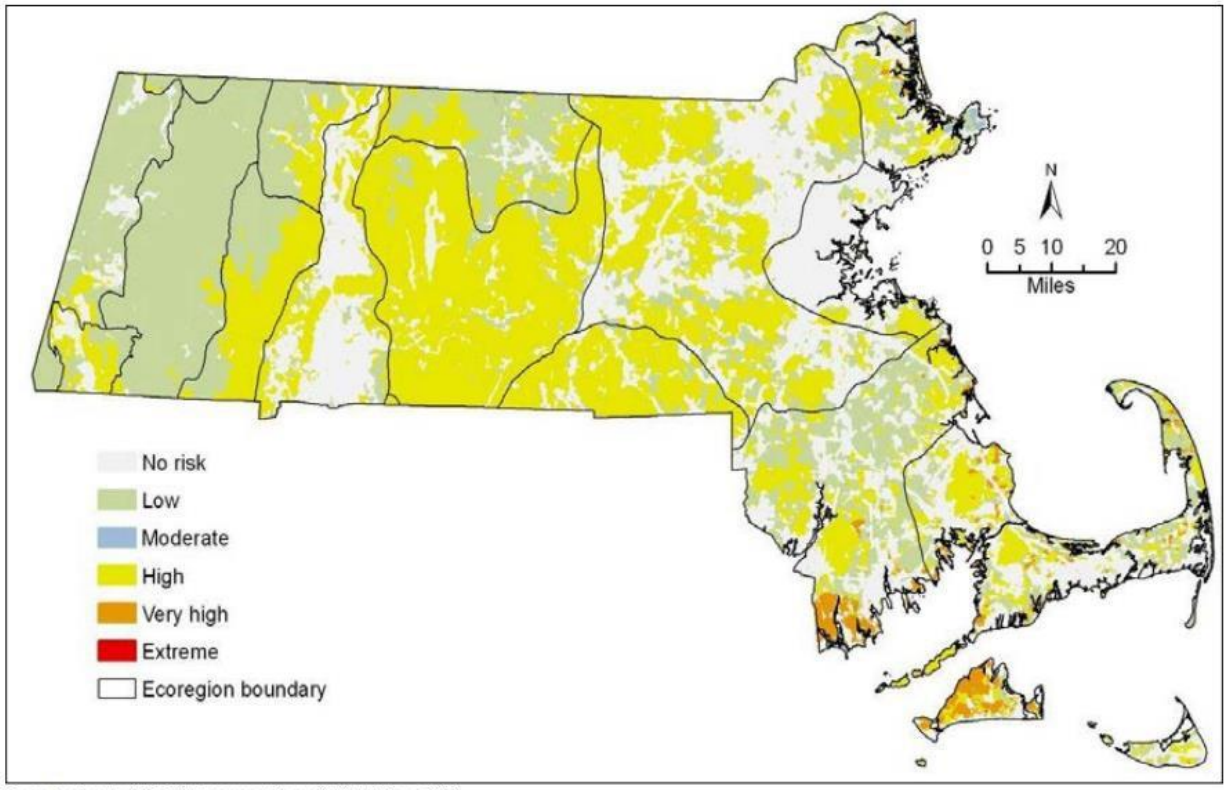
The wildfire season in Massachusetts usually begins in late March and typically culminates in early June, corresponding with the driest live fuel moisture periods of the year. April is historically the month in which wildfire danger is the highest. Drought, snowpack level, and local weather conditions can impact the length of the fire season.

Location

The ecosystems that are most susceptible to the wildfire hazard are pitch pine, scrub oak, and oak forests, as these areas contain the most flammable vegetative fuels. Wildfire has played a role in

shaping the Plymouth County landscape for thousands of years. Fortunately, Lakeville's forests are not composed of pitch pine or scrub oak. See Figure 3 below which illustrates aeras at risk for wildfires.

Figure 3 - Wildfire Risk Areas for the Commonwealth of Massachusetts



Source: Northeast Wildfire Risk Assessment Geospatial Work Group, 2009

Previous Occurrence and Extent

Forest fires vary in size, however thanks to modern detection and firefighting equipment methods, fires in the Northeast are typically kept to a reasonably small area. Fortunately, most fires are quickly identified and suppressed, or extinguish themselves naturally due to wet weather conditions. The majority of wildfires in Massachusetts occur in the spring, before "green-up", or in late summer, following periods of drought.

Future Occurrence and Vulnerability

The probability of a significant wildfire occurring in Lakeville is likely. Increasing temperatures caused by climate change leads to dryer soil within forests and a higher flammability of vegetation. In addition, snow may melt earlier, meaning forests will experience drier conditions for a longer period of time. All of these factors contribute to a higher risk of wildfire within the Town of Lakeville in the future as a result of climate change. According to the National Risk Index, Lakeville's Expected Annual Loss from a wildfire is $8,112. Additionally, the annualized frequency value of a wildfire event is 0.006% chance per year.

There is a limited public water supply in Lakeville. In sparsely developed, rural areas, the town relies on tanker trucks and fire ponds for the fighting of wildfires. The severity of the impacts would be considered limited and would include property damage, loss of life, and environmental damage.

5.3 Primary Climate Change Interaction: Extreme Weather

Hurricanes/tropical storms

Description

Hurricanes can range from as small as 50 miles across to as much as 500 miles across. There are generally two source regions for storms that have the potential to strike New England: (1) off the Cape Verde Islands near the west coast of Africa, and (2) in the Bahamas. The Cape Verde storms tend to be very large in diameter, since they have a week or more to traverse the Atlantic Ocean and grow. The Bahamas storms tend to be smaller, but they can also be just as powerful, and their effects can reach New England in only a day or two. The official hurricane season runs from June 1 to November 30. In New England, these storms are most likely to occur in August, September, and the first half of October.

A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds and heavy rain (winds are at a lower speed than hurricane-force winds, thus gaining its status as a tropical storm versus a hurricane). Tropical storms strengthen when water evaporated from the ocean is released as the saturated air rises, resulting in condensation of water vapor contained in the moist air. They are fueled by a different heat mechanism than other cyclonic windstorms, such as nor'easters and polar lows.

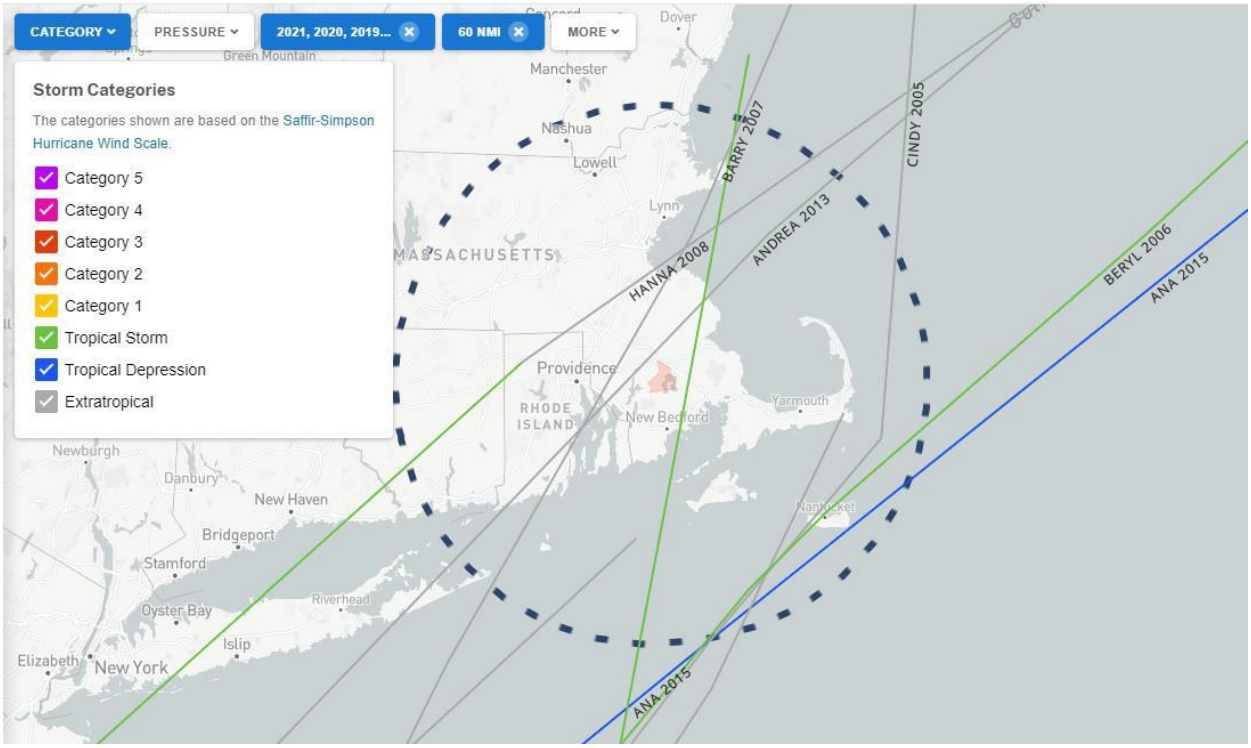
Location

Although the Lakeville is inland, the Town can still be affected by the flooding, strong winds and heavy rains associated with these events. The majority of the damage following hurricanes and tropical storms often results from residual wind damage and inland flooding, as was demonstrated during recent tropical storms. Such as Hurricane Irene (2011) and Tropical Storm Jose (2017).

Previous Occurrence and Extent

A hurricane has not made landfall in Massachusetts for almost 30 years (Hurricane Bob in 1991), and it has been more than 60 years since a major hurricane (Category 3 or higher) has occurred. Since the 2004 Regional Hazard Mitigation Plan, 9 tropical storm systems have passed within 60 nautical miles of Lakeville, as show in Figure 4, below. Three of these were categorized as Tropical Storms when they passed near Lakeville, and one, Hurricane Hanna of 2008, was categorized as Category 1 Hurricane until it was nearing the Massachusetts border with Rhode Island, when it was downgraded to an Extratropical Storm.

Figure 4 – Historical Hurricane Tracks



Source: Historical Hurricane Tracks (noaa.gov), 2021

Smaller tropical storms and depressions have also affected the area, generally inflicting minor damage, such as downed tree limbs and power outages. In 2011 after Tropical Storm Irene, certain parts of the Town experienced electrical outages for up to a week. Due to the large diameter of many hurricanes and tropical storms, even storms that don't make landfall in New England can have significant hazard impacts on Lakeville. According to FEMA, there have been 11 federally declared disasters in Lakeville since 2005, 5 of them being severe tropical storms or hurricanes (See Table 1).

Future Occurrence and Vulnerability

Based on the hurricane and tropical storm frequency documented in this section, **it is likely (between 10 and 100% probability in the next year)** that a hurricane or tropical storm will impact Lakeville in the next year. In the future, higher category storms are predicted to increase as a result of climate change, meaning Lakeville may experience more of the severe weather associated with these storms. According to the National Risk Index, Lakeville's Expected Annual Loss from a hurricane/tropical storm is $22,452. Additionally, the annualized frequency value of a hurricane/ tropical storm is 0.2 events per year.

Tropical storms and tropical depressions, while generally less dangerous than hurricanes, can be deadly. The winds of tropical depressions and tropical storms are usually not the greatest threat; rather, the rains, flooding, and severe wind associated with the tropical storms are what customarily cause more significant problems. Serious power outages can also be associated with these types of events.

Potential cascading events include health issues (mold and mildew from residential flooding); increased risk of fire hazards; hazardous materials, including waste byproducts; coastal erosion; compromise of levees or dams; isolated vulnerable populations; increased risk of landslides or other types of land movement; disruptions to transportation; disruption of power transmission and infrastructure; structural and property damage; debris distribution; and environmental impacts. Certain areas, types of building, and infrastructure are at greater risk than others, based on their proximity to the coast and/or manner of construction. In coastal and tidally influenced areas, storm surge from a hurricane/tropical storm poses one of the greatest risks to residents and property.

Severe Winter storms/ Nor'easters

Description

Severe winter storms include ice storms, nor'easters, heavy snow, blowing snow, and other extreme forms of winter precipitation. A blizzard is a winter snowstorm with sustained or frequent wind gusts to 35 mph or more, accompanied by falling or blowing snow that reduces visibility to or below a quarter of a mile (NWS, 2018). These conditions must be the predominant condition over a 3-hour period. Extremely cold temperatures are often associated with blizzard conditions, but are not a formal part of the definition. However, the hazard created by the combination of snow, wind, and low visibility increases significantly with temperatures below 20ºF. A severe blizzard is categorized as having temperatures near or below 10°F, winds exceeding 45 mph, and visibility reduced by snow to near zero.

Ice storm conditions are defined by liquid rain falling and freezing on contact with cold objects, creating ice buildups of one-fourth of an inch or more. These can cause severe damage.

Nor'easters are among winter's most ferocious storms. These winter weather events are notorious for producing heavy snow, rain, and oversized waves that crash onto Atlantic beaches, often causing beach erosion and structural damage.

Location

Nor'easters can also bring heavy snow, which can paralyze inland cities or regions. Inland areas, especially those in floodplains, are also at risk for flooding and wind damage. The majority of Lakeville falls within a band of average annual snowfall of 36-48 inches of snow each year.

Previous Occurrence and Extent

Although there is significant interannual variability in the frequency and severity of winter storms, a notable winter storm generally occurs at least once every winter. Nor'easters generally occur on at least an annual basis, with some years brining up to four nor'easter events. The level of damage in a strong hurricane is often more severe than a nor'easter, but historically Massachusetts has suffered more damage from nor'easters because of the greater frequency of these coastal storms (one or two per year). The comparison of hurricanes to nor'easters reveals that the duration of high surge and winds in a hurricane is 6 to 12 hours, while a nor'easter's duration can be from 12 hours to 3 days. Variations on

this hazard are a snowstorm in combination with rain that produces very heavy wet snow or ice storms, both of which can weigh down trees and power lines.

The most severe winter storm to ever hit New England was the Blizzard of 1888, which occurred in March of that year. Snow accumulations reached 30 to 50 inches where precipitation was entirely snow. In more recent years, Winter Storm Juno, in January 2015, was a powerful nor'easter that impacted the northeast. A state of Emergency was declared in Massachusetts and travel bans were issued in preparation for the storm. The storm produced winds that gusted to 75 mph, a rain/snow mix that resulted in 15 to 18 inches of snowfall and multi-day loss of electricity for many properties. This nor'easter resulted in a federal disaster declaration for many counties in Massachusetts. According to FEMA, there have been 11 federally declared disasters in Lakeville since 2005, 5 of them being severe winter storms or Nor'easters (See Table 1).

Future Occurrence and Vulnerability

The impacts of a nor'easter depends on several factors, including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, time of occurrence during the day (e.g., weekday versus weekend), and time of season. The severity of a nor'easter also depends on the time of occurrence relative to the lunar tide cycles (spring or neap tides) and during what tide stage the maximum storm surge occurs at (high tide or low tide).

According to the National Risk Index, Lakeville's Expected Annual Loss from severe winter storms is $6,134. Additionally, the annualized frequency value of a severe winter storm is 5.3 events per year. Based on the snow frequency recorded from past events, **it is highly likely (near 100% probability in the next year)** that a severe winter storm will occur in Lakeville. Climate change is predicted to increase moisture within the air, leading to an increase in the intensity and severity of winter storms in places that experience cold winter temperatures. Therefore, future storms that impact Lakeville may result in heavier snowfall.

Natural hazards that could occur as a result of a nor'easter include coastal erosion, flooding, levee or dam failure, increased risk of landslides or other land movement, the release of hazardous materials, and environmental damage. Secondary social hazards could include health issues such as the growth of mold or mildew, isolation due to impacts on transportation, power loss, and structural and property damage. Power outages may also result in inappropriate use of combustion heaters, cooking appliances, and generators in indoor or poorly ventilated areas, which can lead to increased risks of carbon monoxide poisoning. Loss of power and refrigeration can also cause food contamination. The impact of a nor'easter on life, health, and safety is dependent upon several factors, including the severity of the event and whether or not adequate warning time was provided to residents.

Heavy snow can immobilize a region and paralyze a city, shutting down air and rail transportation, stopping the flow of supplies, and disrupting medical and emergency services. According to the NOAA National Severe Storms Laboratory, every year, winter weather indirectly and deceptively kills hundreds of people in the U.S., primarily from automobile accidents, overexertion, and exposure.

Severe thunderstorms / Wind / Tornado / Microburst

Description

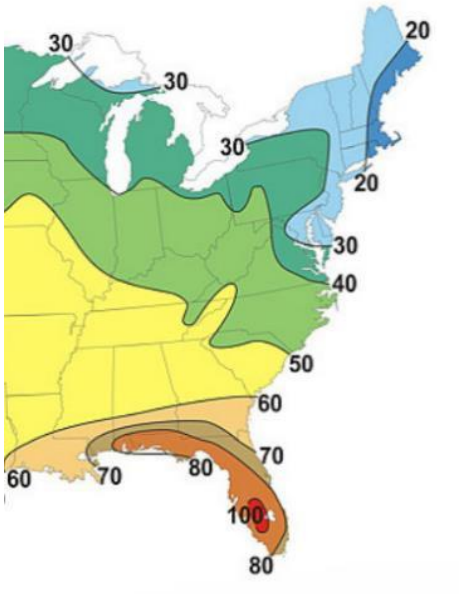
A thunderstorm is a storm originating in a cumulonimbus cloud. Cumulonimbus clouds produce lightning, which locally heats the air to 50,000 degrees Celsius, which in turn produces an audible shock wave, known as thunder. Frequently during thunderstorm events, heavy rain and gusty winds are present. Less frequently, hail is present, which can become very large in size. A thunderstorm is classified 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 (NWS, 2013). An average thunderstorm is 15 miles across and lasts 30 minutes; severe thunderstorms can be much larger and longer. Southern New England typically experiences 10 to 15 days per year with severe thunderstorms.

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." These occasionally occur in Massachusetts.

Location

Heavy precipitation and high winds can affect all portions of the Town of Lakeville. The entire Town of Plympton is at risk from thunderstorms. NOAA has compiled data about the annual number of thunderstorms across the United States. Figure 5 shows the annual number of thunderstorms in the northeastern United States. The arrow shows that all of eastern Massachusetts, including Lakeville, falls in the darker blue area, which receives, on average, 10-20 thunderstorms per year.

Figure 5 - Annual Number of Thunderstorms



Source: WeatherSTEM Thunderstorms, 2017

Previous Occurrence and Extent

Heavy Precipitation: Because heavy rain is often associated with other major weather events (e.g., tropical storms, nor'easters, etc.), the list of heavy rain events from the NOAA NCDC Storm Events (NOAA 2019) does not have many entries from the past 10 years:

1) July 4, 2014: Torrential rain produced significant flash flooding in southeast Massachusetts where storm totals of 4 to 8 inches were reported.

2) September 18, 2018: Heavy downpours and damaging thunderstorms occurred throughout Massachusetts. Storm total

rainfall amounts reached 2 to 5 inches across Plymouth County. Numerous roads were flooded and impassable.

3) July 12, 2019: A warm front moving northward across southern New England brought heavy rain and thunderstorms, causing significant flooding. Plymouth airport recorded 5.3 inches of rain in just 6 hours.

4) June 28, 2020: A cold front met with high humidity conditions to produce a severe thunderstorm and flashfloods throughout Massachusetts and within Plymouth County.

High Wind: Based on a summary of high wind events from NOAA NCDC Storm Events database from the last five years shows that high wind events are relatively common in Lakeville (more than once per year).

Future Occurrence and Vulnerability

Based on the data presented above, it is **highly likely (near 100% probability in the next yea**r) that other severe weather (heavy precipitation, high wind, and thunder/lightning) will occur in Lakeville. As mentioned with prior hazards, climate change is predicted to increase the frequency and intensity of storms and severe weather events, which includes heavy precipitation, high winds, and thunder/lightning storms. Thunderstorms and high winds can result in power outages, leaving people without heat or other utilities. Heavy rains associated with thunderstorms can result in flooded roads and overwhelm drainage systems. Wind and wind-born debris can damage roofs, windows and other portions of houses and buildings. According to the National Risk Index, Lakeville's Expected Annual Loss from severe thunderstorms/strong wind/tornado in total is $38,430. Severe thunderstorms shows the highest annualized frequency value of 8.6 events per year, with strong winds having a value of 0.6 event per year, and tornados valuing in at 0 events per year.

5.4 Non-Climate-Influenced Hazards

Earthquake

Description

An earthquake is the vibration of the Earth's surface that follows a release of energy in the Earth's crust. These earthquakes often occur along fault boundaries. As a result, areas that lie along fault boundaries—such as California, Alaska, and Japan—experience earthquakes more often than areas located within the interior portions of these plates. New England, on the other hand, experiences intraplate earthquakes because it is located deep within the interior of the North American plate. Scientists are still exploring the cause of intraplate earthquakes, and many believe these events occur along geological features that were created during ancient times and are now weaker than the surrounding areas.

Location

New England is located in the middle of the North American Plate. One edge of the North American Plate is along the West Coast where the plate is pushing against the Pacific Ocean Plate. The eastern

edge of the North American Plate is located at the middle of the Atlantic Ocean, where the plate is spreading away from the European and African Plates. New England's earthquakes appear to be the result of the cracking of the crustal rocks due to compression as the North American Plate is being very slowly squeezed by the global plate movements. As a result, New England epicenters do not follow the major mapped faults of the region, nor are they confined to particular geologic structures or terrains. Because earthquakes have been detected all over New England, seismologists suspect that a strong earthquake could be centered anywhere in the region. Furthermore, the mapped geologic faults of New England currently do not provide any indications detailing specific locations where strong earthquakes are most likely to be centered.

Previous Occurrence and Extent

Although it is well documented that the zone of greatest seismic activity in the U.S. is along the Pacific Coast in Alaska and California, in the New England area, an average of six earthquakes are felt each year. Damaging earthquakes have taken place historically in New England. According to the Weston Observatory Earthquake Catalog, 6,470 earthquakes have occurred in New England and adjacent areas. However, only 35 of these events were considered significant. According to a USGS interactive earthquakes map, the last identified earthquake in Lakeville was 1982. The magnitude of the earthquake was 3.0 and was not felt or reported by anyone in the town.

The severity of earthquake effects is dependent upon the magnitude of energy released, proximity to the epicenter, depth to the epicenter, duration, geologic characteristics, and type of ground motion. The Modified Mercalli (MMI) Intensity Scale is used in the U.S. to evaluate the perceived intensity of earthquakes – specifically, it describes how strongly an earthquake was felt at a particular location, Table 14 below. The Richter Scale (Table 15) is frequently used to measure the magnitude of earthquakes by measuring the maximum recorded amplitude of a seismic wave, quantifying the ground motion and the energy released at the source of an earthquake.

Table 14: Modified Mercalli Intensity Scale

Mercalli Intensity	Equivalent Richter Scale Magnitude	Description	Abbreviated Modified Mercalli Intensity Scale Description	Acceleration (percent g) PGA
I		Detected only on seismographs	Not felt except by a very few under especially favorable conditions	< .17
II	< 4.3	Some people felt it	Felt only by a few persons at rest, especially on upper floors of buildings	.17 – 1.4
III		Felt by people resting; like a truck rumbling by	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck.	.17 – 1.4
IV		Felt by people walking	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably	1.4 – 3.9
V	< 4.8	Sleepers awake; church bells ring	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop	3.9 – 9.2
VI	< 5.4	Trees sway; suspended objects swing; objects fall off shelves	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	9.2 - 18
VII	< 6.1	Mild alarm; walls crack; plaster falls	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken	18 - 34
VIII		Moving cars are uncontrollable; masonry fractures, poorly constructed buildings damaged	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned	34 - 65
IX	< 6.9	Some houses collapse; ground cracks; pipes break open	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations	65 - 124
X	< 7.3	Ground cracks profusely; many buildings destroyed; liquefaction and landslides are widespread	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent	> 124
XI	< 8.1	Most buildings and bridges collapse; roads, railways, pipes and cables are destroyed; general triggering of other hazards occurs	Few, if any, (masonry) structures remain standing. Bridges destroyed. Rails bent greatly	>124
XII	>8.1	Total destruction; trees fall; ground rises and falls in waves	Damage total. Lines of sight and level are distorted. Objects thrown into the air	>124

Source: USGS Modified Mercalli Intensity Scale, n.d.

Table 15: Richter Scale

Richter Scale	
M = 1-3	Recorded on local seismographs, but generally not felt
M = 3-4	Often felt, no damage
M = 5	Felt widely, slight damage near epicenter
M = 6	Damage to poorly constructed buildings and other structures within 10's km
M = 7	"Major" earthquake, causes serious damage up to 100 km
M = 8	"Great" earthquake, great destruction, loss of life over several 100 km
M = 9	Rare earthquake, major damage over a large region over 1000 km

Source: USGS Richter Scale, n.d.

Future Occurrence and Vulnerability

The probability of a magnitude 5.0 or greater earthquake centered somewhere in New England in a 10-year period is about 10 percent to 15 percent. This probability rises to about 41 percent to 56 percent for a 50-year period. While the likelihood of a powerful earthquake in the region is low, the risk of such an event would be high because of how old the buildings are and because few structures have been built to withstand earthquakes. Critical infrastructure such as bridges and dams would be vulnerable. Overall, the likelihood of an earthquake in Lakeville is considered to be possible but the magnitude of event would be such that the impacts would be small and the severity limited. According to the National Risk Index, Lakeville's Expected Annual Loss from an earthquake is $28,753. Additionally, the annualized frequency value of an earthquake is 0.046% chance per year.

Invasive Species

Description

Invasive species are defined as non-native species that cause or are likely to cause harm to ecosystems, economies, and/or public health. The focus of this section is on invasive terrestrial plants, as this is the most studied and managed typed of invasive; information for invasive aquatic flora and fauna (including marine species) is also provided when relevant.

The Massachusetts Invasive Plant Advisory Group (MIPAG), a collaborative representing organizations and professionals concerned with the conservation of the Massachusetts landscape, is charged by EOEEA to provide recommendations to the Commonwealth to manage invasive species. MIPAG defines invasive plants as "non-native species that have spread into native or minimally managed plant systems in Massachusetts, causing economic or environmental harm by developing self- sustaining populations and becoming dominant and/or disruptive to those systems" (MIPAG, n.d.). These species have biological traits that provide them with competitive advantages over native species, particularly because in a new habitat they are not restricted by the biological controls of their native habitat. As a result, these invasive species can monopolize natural communities, displacing many native species and causing widespread economic and environmental damage. MIPAG recognized 69 plant species as "Invasive," "Likely Invasive," or "Potentially Invasive."

Location

The entire Town of Lakeville is considered to be exposed to the invasive species hazard. Minimally managed ecosystems of native plant or animal life may be at higher risk. The damage rendered by invasive species can be significant. Furthermore, the ability of invasive species to travel far distances (either via natural mechanisms or accidental human interference) allows these species to propagate rapidly over a large geographic area. Similarly, in open freshwater and marine ecosystems, invasive species can quickly spread once introduced, as there are generally no physical barriers to prevent establishment, outside of physiological tolerances, and multiple opportunities for transport to new locations (by boats, for example).

Previous Occurrence and Extent

Invasive species are a widespread problem in Massachusetts and throughout the country. The geographic extent of invasive species varies greatly depending on the species in question and other factors, including habitat and the range of the species. Lakeville's MVP CRB report noted local presence of gypsy moth (Lymantria dispar) in recent years, and a recent report for the Freetown & Lakeville Lake District Association identified two aquatic invasive species in Long Pond - fanwort (Cabomba caroliniana) and variable milfoil (Myriophyllum heterophyllum). According to Solitude Lake Managements, Invasive Aquatic Plants Survey Report from Fall 2020, the list of invasive species currently present in Plymouth County that may impact Lakeville include:

- Asiatic Bittersweet (Celastrus orbiculatus): Fast growing vines can cover, shade and outcompete other vegetation. It can even girdle and kill large trees.
- Autumn Olive (Elaegnus umbellate): Rapidly spreads across forest edges, roadsides, meadows and grassland and outcompetes and displaces native vegetation, often changing the chemistry of the soil around it and over-shading.
- Common Reed (Phragmites australis): Rapidly form dense stands of stems which crowd out or shade native vegetation in inland and estuary wetland areas. Turns rich habitats into monocultures devoid of the diversity needed to support a thriving ecosystem.
- Japanese Knotweed (Polygonum cuspidatum): Chokes-out native species by way of limiting sunlight infiltration, altering nutrient cycles, or by releasing toxic/inhibiting chemicals. Knotweed can contribute to stream bank erosion and flooding.
- Multiflora Rose (Rosa multiflora): Extremely prolific and can form dense thickets, excluding native plant species.
- Norway Maple (Acer platanoides): Produces large numbers of seeds that are wind dispersed and invade forests and forest edges. The dense canopy formed by Norway maple inhibits the regeneration of sugar maple and other tree seedlings, reducing forest diversity.
- Purple Loosestrife (Lythrum salicaria): Dense growth along shoreland areas makes it difficult to access open water. Overtakes habitat and outcompetes native aquatic plants, potentially lowering diversity. Dense root systems change the hydrology of wetlands.

Invasive species typically harm native species through predation, habitat degradation and competition for shared resources. Negative consequences can be far-reaching, considering they can spread at astonishing rates and can affect property values, agricultural productivity, public utility operations, native fisheries, tourism, outdoor recreation, and the overall health of an ecosystem. Dependent upon the species, invasives often thrive along roadsides, forested and understory areas, lakes, ponds, rivers, streambanks, pond margins and along the coast.

Future Occurrence and Vulnerability

Increased rates of global trade and travel have created many new pathways for the dispersion of exotic species. As a result, the frequency with which these threats have been introduced has increased significantly. Increased international trade in ornamental plants is particularly concerning because many of the invasive plants species in the U.S. were originally imported as ornamentals. Eradication involves both chemical and mechanical methods, combined with ongoing monitoring. Often, due to limited staffing and diminished municipal budgets, limited controlled stands are typically often realized at best. Furthermore, as climate change facilitates the spread and establishment of invasive species in formerly inhospitable climactic regions, Lakeville may become susceptible to new invasive species. Additionally, some research suggests that elevated atmospheric CO2 concentrations could reduce the ability of ecosystems to recover after a major disturbance, such as a flood or fire event. As a result, invasive species—which are often able to establish more rapidly following a disturbance—could have an increased probability of successful establishment or expansion.

There are known invasive species within the Town of Lakeville, so **it is 100% likely** that invasive species occur. However, the likelihood that a significant negative impact would occur due to the presence of these species is possible, but not as high. Because invasive species are present throughout the Town of Lakeville, all elements are considered exposed to this hazard; however, the built environment is not expected to be impacted by invasive species to the degree that the natural environment is. Buildings are not likely to be directly impacted by invasive species. Amenities such as outdoor recreational areas that depend on biodiversity and ecosystem health may be impacted by invasive species. Facilities that rely on biodiversity or the health of surrounding ecosystems, such as outdoor recreation areas or agricultural/forestry operations, could be more vulnerable to impacts from invasive species.

An analysis of threats to endangered and threatened species in the U.S. indicates that invasives are implicated in the decline of 42 percent of the endangered and threatened species. In 18 percent of the cases, invasive species were listed as the primary cause of the species being threatened, whereas in 24 percent of the cases they were identified as a contributing factor. A 1998 study found that competition or predation by alien species is the second most significant threat to biodiversity, only surpassed by direct habitat destruction or degradation. This indicates that invasive species present a significant threat to the environment and natural resources in Lakeville.

Chapter 6: Capability and Adaptive Capacity

The mitigation strategy is for this HMP was not created in, nor will it be implemented in a vacuum. Rather, it is based on existing local authorities, policies, programs, and resources, as well as the ability to expand on and improve these existing tools. Lakeville's hazard mitigation planning team reviewed existing capabilities for reducing long-term vulnerability to hazards, identified gaps to be addressed and strengths to enhance through new mitigation actions.

6.1 Existing Capabilities

Lakeville has a unique set of capabilities, including Town plans, policies, staff, funding, and other resources available to accomplish mitigation actions and reduce short- and long-term vulnerability. These capabilities are summarized in this section.

Town Plans and Policies

Lakeville has a series of planning documents that address natural hazards. These documents include measures associated with the Town's mitigation strategy, highlighting the town's efforts to integrate mitigation issues and priorities into its other planning mechanisms. Through the implementation of these other Town plans, Lakeville can guide and manage growth and development in ways that are consistent with the goals of this HMP. These plans include:

1. Lakeville 2030: A Plan for the Future. Master Plan (2020): This recent plan addresses topics such as covers land use, economic development, services and facilities, stewardship and service, transportation, housing, open space and recreation, and natural and cultural resources.
2. Lakeville MVP Report (2019): The MVP Summary of Findings Report qualitatively evaluates the present and future probability of climate impacts to municipal infrastructural, societal and environmental features throughout town. This report includes a range of climate change adaptation measures for specific locations within Lakeville, as well as regional actions addressing larger-scale vulnerabilities.
3. Lakeville Open Space and Recreation Plan (OSRP) (2013): Identifies resource areas that sustain the community by providing clean drinking water, flood control, and other critical "ecosystem services." Includes objectives and actions relative to purchasing land in critical natural landscape areas and restoring habitat. OSRPs develop a 7-year action plan, and the Lakeville plan is in need of an update.
4. Lakeville Comprehensive Emergency Management Plan: This plan contains detailed procedures to respond quickly and effectively to a variety of emergency scenarios. The CEMP is in need of update.

In addition to Town plans, Lakeville has participated in a number of regional plans and initiatives with direct relevance to local natural hazard mitigation, specifically flooding and dam failure. These include:

1. Green Infrastructure Network Maps and Assets (developed by the Resilient Taunton Watershed Network partnership, including SRPEDD, Manomet, Mass Audubon, and The Nature Conservancy in 2019): Green Infrastructure analysis includes a network of lands of highest

conservation value due to the multiple ecosystem services that they provide, including: flood control, improved water quality, habitat retention, and improved resiliency.

2. Mass Audubon/TRWA – Stream Continuity Assessment of the Taunton River Watershed (2013): 517 culverts in the watershed were assessed by trained, supervised, volunteer teams. A list of culverts with severe constrictions and/or in poor or damaged condition was established for each of the 27 cities and towns surveyed. A list of eight (8) culverts fitting these conditions was established for Lakeville.
3. Nemasket River Watershed 208 Plan (being finalized by The Nature Conservancy and Horsley Witten Group (2018)): Recommendations for actions to be taken to improve water quality in the Nemasket River Watershed, including the Assawompset Ponds and significant tributaries; incorporating nature-based solutions when and where appropriate feasible.
4. Assawompsett Ponds Complex (APC) Management Plan: This initiative of the Assawompset Ponds Committee aims to address environmental issues of silting, invasive species, water quality, dams and herring passage, as well as improve communications processes and protocols between the Local Emergency Planning Committees for all Assawompset Pond Complex communities. So far the process has led to the development of a regional emergency management plan, discussions on water rights and access during drought and other emergencies, and methods for collaborative preparation for predicted weather events. The APC Management Plan is staged for completion in 2022, and will include recommendations for land conservation, recreation, water quality, habitat management, hazardous materials management, and coordination for dam operation.

Regulations/Bylaws/Codes

The Town of Lakeville regulates growth and development through the authority of the Planning Board and the Zoning Board of Appeals. Project applicants must go before each board for project vetting. Prior to projects going before the Boards, the applications are reviewed by the town planner. The Select Board, the Police Chief, the Building Commissioner, and the Fire Chief are also granted the opportunity to review the proposed projects and provide comments to the authority having jurisdiction. Any proposed change to Town zoning requirements must be vetted by legal counsel and approved at the annual financial town meeting.

Many of the existing Town policies and ordinances also provide an effective means of mitigating hazards. Lakeville has Zoning, Subdivision and Floodplain ordinances. The Town has adopted an Illicit Discharge Bylaw as part of its MS4 program, and required new developments to underground most utilities, though power lines are excepted from that rule. Lakeville updated it's Flood Plain Protection (Overlay) district (an element of the Town's Zoning Code) in 2021 consistent with state policy and updated FEMA Flood Insurance Rate Maps (FIRMs). The town currently enforces development erosion control through the Conservation Agent's site inspection program, but this could be strengthened by adoption of a local Wetlands Protection bylaw. In fact, the Town worked with SRPEDD to develop a wetland protection bylaw that would strengthen protections against sedimentation build up in waterways as a result of run-off from construction activities, however the initiative failed at Town Meeting.

The Town of Lakeville addresses participation in the National Flood Insurance Program (NFIP) through the promulgation and enforcement of § 7.1 Flood Plain District Regulations of the Town of Lakeville Zoning By-Laws, 780 Commonwealth of Massachusetts Regulation, and 310 Commonwealth of Massachusetts Regulation (13.00). The Town utilizes the established Floodplain Overlay District to identify properties subject to increased scrutiny. In compliance with the NFIP, all construction and site features must be configured with the requirements established by the flood zone designation. Zoning By-law § 7.1.6 requires developers and property owners to coordinate with the NFIP State Coordinator and the Federal Emergency Management Agency (Region I) NFIP Program Specialist.

The Town of Lakeville employs a designated Floodplain Administrator, charged with oversite and coordination of all requirements. FEMA Flood Maps and the Flood Insurance Study are available on the Town's Website and thanks to the Board of Assessors, the FEMA Flood Maps are now available as a data layer on Lakeville's GIS platform.

More detail is provided in Appendix F - Capability Assessment/Community Existing Protection Measures.

Town Staff and Departments

The Town of Lakeville has a very capable staff that includes an Emergency Manager, a Town Administrator, Building Commissioner, and part-time Conservation Agent. The Town retains a part-time consultant to serve as a Chief Engineer, as needed, and recently hired a full-time Town Planner. The Town also appointed a local Storm water Coordinator to implement its MS4 program. Together these staff allow the Town to effectively plan for and implement specific mitigation actions. In addition, the Town has a Local Planning Board, Municipal Vulnerability Preparedness Committee, Hazard Mitigation Planning Committee, and Assawompset Pond Complex Committee which are instrumental in developing and coordinating mitigation actions.

Operations and Administration

While the water levels in the Assawompset Pond Complex pose the largest threat of flooding in Lakeville, the Lakeville Department of Public Works (DPW) also plays a role in mitigating the flood, specifically with regards to stormwater management. DPW follows MS4 guidelines regarding sweeping roads which helps keep materials and debris from clogging road drainage systems. The department conducts annual catch basin cleaning to allow basins to function properly.

Lakeville Highway Department conducts routine tree maintenance, though they are limited by funding, and the height of the Town's bucket truck. To date, there is no specific protocol for the pruning or removal of diseased, compromised trees, in vulnerable areas (wind, flood zones). The Town's efforts are regularly supplemented by subcontractors hired by power companies. MassDOT Region 5 has jurisdiction over many Lakeville roads, and should be a partner in future hazard tree maintenance initiatives.

The Highway Department also leads maintenance of drainage facilities within the public right of way along town-owned roads, supplemented by MassDOT crews along state highways within town and on the perimeter. Mass DOT has a three-year Order of Conditions with the Conservation Commission for

routine repairs and maintenance of drainage systems on Routes 18, 44, 105, 140, and County Road. Keeping this Order active is the responsibility of the Conservation Commission and MassDOT.

Lakeville Town staff and departments operate a number of public engagement activities, and, in general, the town has improved significantly on this front in the last five years. The Police Department has significantly increased its social media presence in recent years. It also purchased a digital message board that was installed in front of the station. During the COVID-19 pandemic, LakeCam was a major asset for communication and messaging between town departments and local residents. The Town's partnership with LakeCam should continue as a means to distribute town information.

Lakeville has also been part of a regional Assawompset Pond Complex (APC) Management Plan initiative with SRPEDD and Taunton River Watershed Council. The APC facilitates good education programs and special events; quarterly meetings; Lakeville Conservation Agent is the APC Ranger for the six municipalities involved - more funding would be very helpful to support these responsibilities of the Conservation Agent.

Financial Capabilities

Financial capabilities are the resources that a Town has to fund mitigation actions. Implement costs will vary based on the mitigation strategy proposed from low cost to high cost. Low-cost actions include education or outreach efforts, which require little to no costs other than staff time and existing operating budgets. Alternatively, higher cost actions, such as the acquisition of flood-prone properties, could require a substantial monetary commitment from local, state, and federal funding sources.

The Town of Lakeville has the following potential sources of funding to implement hazard mitigation activities:

1. Capital improvements funding – the Town has a Capital Improvement Planning Committee which prepares the CIP on an annual basis covering a 5-year cycle. However, the town has, at times, struggled to fund CIP items and maintain a sufficient operating budget. there is rarely money available in the CIP for projects to mitigate natural disasters.
2. Authority to levy taxes for specific purposes (fire districts only); and
3. Incurring debt through general obligation bonds and/or special tax bonds.

The Town’s annual revenue from taxes can be used to fund some mitigation actions, but other larger actions may need additional outside funding, such as from state and federal grant programs.

6.2 Existing Mitigation Measures

Before identifying new mitigation actions for the 2022 Lakeville Hazard Mitigation Plan, the HMPC discussed the status of the mitigation actions identified in the 2004 SRPEDD Region Natural Hazard Disaster Mitigation Plan and the incomplete 2017 Lakeville Hazard Mitigation Plan update process. One of the following status determinations was given to each mitigation action identified from these plans:

- Complete: The project was implemented and completed.

- Ongoing/Existing Capability: The project was implemented and completed, and it will continue to be implemented on an annual basis.
- In Process: The project was started since the previous plan and is still in progress.
- Deferred/Not Started: The project is important, but it was deferred because there was no funding available, or it was not feasible to complete the project in this timeframe.
- Deleted/No Longer Relevant: The project is no longer relevant to the community.

Many of the 2004 plan actions were regional in scope, and in 2017 the town added a number of town-specific actions. During this plan update, the HMPC assessed the Town's progress on the following actions.

Table 2. Previously Proposed Mitigation Measures

Hazard Addressed	Action and Description	Status
All hazards	Fund EMD and Planner staff time to convene annual HMP review and 5-yr HMP update process.	In process: Revise wording of strategy - Add Hazard Mitigation Planning and facilitating (or co-facilitating) the 5-year HMP update into the job descriptions for Lakeville Fire Chief, Deputy Fire Chief, and Town Planner.
All hazards	Incorporate budget for HMP actions and training in Capital Improvements Plan (CIP)	Not started - continue in 2022 Lakeville HMP actions.
All hazards	Generate exhibits highlighting past natural hazard events and current preparedness using story maps on town website (2017 HMP: Create and install signs e.g. marking past flood elevations and evacuation routes)	Not started: Revise wording of strategy - Generate exhibits highlighting past natural hazard events and current preparedness using story maps on town website and/or flood markers in highly visible public locations
All hazards	Utilize e-Billboards to promote public awareness of potential hazards or events	Not started: This needs to be portable. Evacuation routes are often blocked depending on the type of storm event. Roadway flooding is somewhat predictable, but we don't know where a fallen tree will shut down a major route. This action should be coordinated with actions to update the Town CEMP and increase public education about how the town will share information during an emergency. Revise wording of strategy - Utilize tailorable electronic signs (portable) to promote public awareness of potential hazards or events, and to communicate evacuation routes and emergency detours.
All hazards	Increase training opportunities around hazard mitigation. Target Vulnerable Populations with training – e.g. elderly, young, disabled, mobile home parks. Also provide more training opportunities for first responders; work with non-profits, APC, etc.	Not started - continue in 2022 Lakeville HMP actions.
All hazards	Update Community Emergency Management Plan (CEMP) with Local Emergency Planning Committee (LEPC)	Not started – Funding and staff resources were not available to complete the action. Continue in 2022 Lakeville HMP actions.
Dam failure, drought, flooding	Improve communications processes and protocols b/t LEPC for all Assawompset Pond Complex communities: regional emergency management plan, discuss water rights and access during drought	In process: Ongoing work on APC Management Plan with SRPEDD and Taunton River Watershed Council. Estimated completion 2022.

Hazard Addressed	Action and Description	Status
	and other emergencies, collaborative preparation for predicted weather events	
Hurricanes/ Tropical Storms	Pursue Storm Ready designation https://www.weather.gov/stormready/	In process: Working with local meteorologist. Revise wording of strategy - Finalize process to become a Storm Ready community.
Inland Flooding (riverine and urban drainage/ localized)	Regulatory actions for flood mitigation: 1. Conduct a review of town Subdivision Regulations and other regulations and update to require Green Infrastructure Strategies 2. Create and adopt a wetlands protection bylaw. Begin with educating residents. 3. Pass CPA to establish new funding source for targeted land conservation 4. Adopt an open space residential design (OSRD) bylaw. 5. Promote creation of a Low-Impact Development by-law for flood resilience and water quality. 6. Investigate a transfer of development rights (TDR) bylaw.	In process: Comprehensive Plan and Open Space and Recreation Plan identified and advanced many of these regulatory needs. CPA passed at 2021 Town Meeting, will go on the ballot for a vote in 2022. Continue in 2022 Lakeville HMP actions.
Inland Flooding (riverine and urban drainage/ localized)	Maintain drainage facilities by retaining or increasing the town's MassDOT inspection schedule and extending the order of conditions so that it does not lapse	Not started
Multiple hazards	Investigate an expansion of/upgrade to the existing fire station. Hire a consultant to update the 2007 feasibility study.	No longer relevant - In 2021, the Town awarded a contract for a feasibility study to update a previous feasibility study addressing renovation and increased capacity needs of the Town Hall and Fire Station. The study will document deficiencies in existing Fire Station and Town Hall, and show how these deficiencies currently inhibit officials from performing critical functions and emergency operations
Brushfire/wildfire	Conduct a town-wide fire vulnerability assessment and consider siting a new Fire Dept. sub-station near Howland Road School campus to increase area resilience	No longer relevant - Additional sub-stations are unnecessary due to redundancy in fire response by neighboring town departments near Lakeville town borders.

Chapter 7: Hazard Mitigation and Climate Adaptation Strategy

The purpose of the Lakeville Hazard Mitigation Plan is to preserve the quality of life and protect the town's natural, cultural, and infrastructural resources by mitigating the impacts of current and future natural hazards. Implementation of this HMP will reduce vulnerabilities to the built and natural environment, support the town in adapting to the impacts of climate change, and improve the Lakeville's resilience.

7.1 Goals

Mitigation goals are general guidelines that explain what the community wants to achieve with the plan. They are usually broad policy-type statements that are long-term, and they represent visions for reducing or avoiding losses from the identified hazards. The following six (6) goals align with the 2004 Regional HMP, the 2018 SHMCAP, and Lakeville's 2020 Master Plan and 2019 MVP summary of Findings Report, and were endorsed by the HMPC for this Multi-Hazard Mitigation Plan:

Goal 1: Reduce the loss of life, property, infrastructure, and cultural resources and minimize economic losses from natural disasters and the impacts of climate change.
Goal 2: Enhance Lakeville's resiliency to natural hazards and climate change by protecting and enhancing natural resources.
Goal 3: Utilize effective zoning practices and other regulations to minimize new development in hazard-prone areas.
Goal 4: Ensure that essential services can function during and after a hazard event.
Goal 5: Educate the public about natural hazards and mitigation measures.
Goal 6: Work regionally to mitigate impacts from natural hazards affecting multiple communities.

7.2 Hazard Mitigation and Climate Adaptation Actions

The final proposed mitigation strategy is composed of a total of 20 actions developed during the planning process. Mitigation actions reduce or eliminate long-term risk and are different from actions taken to prepare for or respond to hazard events. The actions proposed below address risks due to the natural hazards presented in Chapter 5, as some address multiple hazards. Specific actions range from those that increase public education and awareness to those that propose modification of existing infrastructure to protect it from a hazard. While some of the actions are also preparedness actions, true mitigation activities lessen or eliminate the need for preparedness or response resources in the future. As the Town tracks the progress of actions in the coming years, it will continue to place emphasis on mitigation rather than preparedness.

For each action identified below, a brief description is provided, as well as the responsible department(s), potential funding sources, priority, and anticipated timeline.

Implementation Responsibility: The designation of implementation responsibility was done based on a general knowledge of what each municipal department is responsible for. It is likely that most mitigation

measures will require that several departments work together and assigning staff is the sole responsibility of the governing body of each community.

Potential Funding Sources: This column attempts to identify the most likely sources of funding for a specific measure. The information on potential funding sources in this table is preliminary and varies depending on a number of factors. These factors include whether or not a mitigation measure has been studied, evaluated, or designed, or if it is still in the conceptual stages.

The Town of Lakeville will coordinate with MEMA and SRPEDD to review the potential eligibility of the proposed actions for hazard mitigation funding. Each grant program and agency has specific eligibility requirements that would need to be taken into consideration. In most instances, the measure will require a number of different funding sources. Identification of a potential funding source in this table does not guarantee that a project will be eligible for, or selected for, funding. Upon adoption of this plan, the local team responsible for its implementation should begin to explore the funding sources in more detail.

The best way to determine eligibility for a particular funding source is to review the project with a staff person at the funding agency. The following websites provide an overview of programs and funding sources.

> Army Corps of Engineers (ACOE) – The website for the North Atlantic district office is http://www.nae.usace.army.mil/. The ACOE provides assistance in a number of types of projects including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services.
>
> Massachusetts Emergency Management Agency (MEMA) – The grants page https://www.mass.gov/hazard-mitigation-assistance-grant-programs describes the various Hazard Mitigation Assistance Program.

Priority: As part of developing the Town of Lakeville mitigation strategy, the HMPC assigned a level of priority to each mitigation measure so as to guide the focus of the Town's limited resources towards those actions with the greatest potential benefit. At this stage in the process, the HMPC has limited access to detailed analyses of the cost and benefits of any given mitigation measure, so prioritization is based on the members' understanding of existing and potential hazard impacts and an approximate sense of the costs associated with pursuing any given mitigation measure.

The HMPC employed a mitigation strategy prioritization process that considers potential benefits and estimated project costs, as well as other factors in FEMA's STAPLEE (Social, Technical, Administrative, Legal, Economic, and Environmental) analysis. The method used for this HMP focuses on four key themes as follows:

- Benefits: Determine whether the proposed mitigation measure will improve property protection, natural resource protection, technical capacity, public awareness, or post-hazard emergency response;

- Feasibility: Determine whether the proposed mitigation measure is feasible in terms of Town staffing, public and Town support, and whether it is technically feasible;
- Economic: Evaluate each mitigation measure in terms of estimated cost and potential funding sources; and
- Regulatory: Evaluate each mitigation measure for consistency with local, state, and federal permitting/ regulatory requirements and goals.

Each proposed mitigation action presented in this section was given a score based on 13 subcategories within these four larger categories documented above (i.e., Benefits, Feasibility, Economic, Regulatory). For each of these subcategories, the proposed action was given a score of 3 if the action was thought to be a "good" fit with a particular category (likely to provide the benefit under consideration, required little additional training or funding, feasible, etc.), 2 if it was "average", or 1 if it was "poor" (did not provide the benefit under consideration, difficult to permit, costly, etc.). For a detailed overview of how each action was scored, please see Appendix G.

Time Frame: The time frame is estimated based on the priority for a mitigation action, the complexity of the action and whether or not it is conceptual, in design, or already designed and awaiting funding. Because the horizon for this HMP is five years, all mitigation measures proposed here can be implemented, at least in part, within 5 years.

Table 3. Lakeville 2022 Proposed Mitigation Actions

No.	Description	Hazard Addressed	Responsibility	Potential Funding	Priority	Time Frame
1	Increase mitigation and preparedness training for vulnerable populations and first responders.	Multi-hazard	FD Support from COA, PD, APC, LEPC, MEMA	Operating Budget	Medium	< 2yrs
a. Increase public awareness of and familiarity with local emergency shelters (for people and pets). b. Target Vulnerable Populations with training – e.g. elderly, young, disabled, mobile home parks. c. Increase training opportunities for first responders; work with non-profits, APC, etc. The Lakeville COA can assist by running programs with coordination from police and fire, as well as MEMA instructing seniors and public on steps to follow during emergencies. This information could also be aired on LakeCam or sent on with tax bills / utility bills.						
2	Utilize CIP for HMP implementation.	Multi-hazard	Town Administer	Operating Budget	Medium	1 to 5 yrs
Incorporate budget for HMP actions and training in Capital Improvements Plan (CIP)						
3	Increase public awareness about natural hazards in Lakeville.	Multi-hazard	EMD, LEPC	Operating Budget	Medium	< 2yrs
Generate exhibits highlighting past natural hazard events and current preparedness using story maps on town website and/or flood markers in highly visible public locations.						
4	Use tailorable electronic signs for emergency communication.	Multi-hazard	FD, PD	Operating Budget, MVP Action Grant	Medium	1 to 5 yrs
Utilize tailorable electronic signs (portable) to promote public awareness of potential hazards or events, and to communicate evacuation routes and emergency detours.						
5	Include HMP functions in Town staff job descriptions.	Multi-hazard	Town Administrator, Select Board	Operating Budget	High	1 to 5 yrs
Add Hazard Mitigation Planning and facilitating (or co-facilitating) the 5-year HMP update into the job descriptions for Lakeville Fire Chief, Deputy Fire Chief, and Town Planner.						
6	Formalize training for Lakeville Public Information Officer (PIO)	Multi-hazard	EMD	Operating Budget, Emergency Management Performance Grant (EMPG)	Medium	<1 yr
Formalize training for Lakeville Public Information Officer (PIO) in a "train the trainer" format for the PIO to use during outreach and to help achieve Action 1, above. Coordinate protocols developed for local PIO with regional plans for public information.						
7	Improve emergency communications b/t all Assawompset Pond Complex communities	Dam Failure, drought, flood	EMD, LEPC	Operating Budget, FEMA Dam Safety Grants, MVP Action Grant	Medium	<1 yr
Improve communications processes and protocols b/t LEPC for all Assawompset Pond Complex communities: regional emergency management plan, discuss water rights and access during drought and other emergencies, collaborative preparation for predicted weather events						

No.	Description	Hazard Addressed	Responsibility	Potential Funding	Priority	Time Frame
8	Update Community Emergency Management Plan (CEMP)	Multi-hazard	EMD	Operating budget	High	<1 yr
Update Community Emergency Management Plan (CEMP) with Local Emergency Planning Committee (LEPC). Update should include inventory and deployment protocol for emergency shelters and warming and cooling stations/comfort centers around the town. Include note of which facilities are equipped with sufficient back-up power to maintain those critical services during a power outage.						
9	Become a Storm Ready community.	Hurricanes/ Tropical Storms	EMD, TA	Operating budget	High	<1 yr
Finalize process to become a Storm Ready community.						
10	Regulatory actions for flood mitigation:	Inland Flooding (riverine and urban drainage/ localized)	Town Planner, Conservation Commission	General Fund, CPA	Medium	1 to 5 yrs
1. Conduct a review of town Subdivision Regulations and other regulations and update to require stormwater system designs to be based on future projected rainfall amounts and to include Green Infrastructure Strategies wherever possible 2. Create and adopt a wetlands protection bylaw. Begin with educating residents. 3. Utilize CPA funds for targeted land conservation 4. Adopt an open space residential design (OSRD) bylaw. 5. Promote creation of a Low-Impact Development by-law for flood resilience and water quality. 6. Investigate a transfer of development rights (TDR) bylaw.						
11	Implement regional restoration and management plans.	Invasive species, Inland Flooding (riverine and urban drainage/ localized)	Town Planner, Conservation Commission, Highway Department	General Fund, MVP Action Grant, CPA, HMA Grant Program	Medium	5 yrs
Continue efforts with regional partners to develop and implement Nemasket River Restoration Plan and Assawompsett Pond Complex Management Plans.						
12	Conduct town-wide culvert assessment	Inland Flooding (riverine and urban drainage/ localized)	Highway Department Support from Town Planner, Conservation Commission	Operating Budget, MVP Action Grant	High	1 yr
Conduct a town-wide assessment of all culverts, prioritizing right-sizing and replacement in locations where flooding is already a serious issue						
13	Upgrade culverts of noted concern (see Chapter 5, Flooding)	Inland Flooding (riverine and urban drainage/ localized)	Highway Department	General Fund, Bond, HMA Grant	Medium	1 to 5 yrs
14	Improve drainage by increasing infiltration	Inland Flooding (riverine and urban drainage/ localized)	Highway Department	Operating Budget General Fund, HMA Grant	Medium	5 yrs
Freetown Street, County Road, Old Powder House Road, and Heritage Hill Dr						
15	Develop an at-risk property acquisition program	Inland Flooding (riverine and urban drainage/ localized)	Town Planner, Emergency Manager, SRPEDD	Operating Budget, HMA Grant	Low	1 to 5 yrs

No.	Description	Hazard Addressed	Responsibility	Potential Funding	Priority	Time Frame
Work with regional partners to develop a property acquisition program to increase flood storage in order to mitigate flood-related property damages and emergency risks. Program should target RL and SRL properties.						
16	Improve public education and outreach around flood risk and water quality	Inland Flooding (riverine and urban drainage/ localized)	Town Planner, Emergency Manager	General Fund, MVP Action Grant	High	2 yrs
Implementation steps include: • Proper well and septic maintenance, especially for new residents in town. (MVP) • Targeted mailings to residents with educational materials on the floodplain and floodways. (2004 HMP) • Share the Green Infrastructure Network Maps to realize flood control, improved water quality, and habitat retention ecosystem services (2017 HMP)(MVP) • Provide continuing education to local permitting and inspection official (including the Planning Board, Conservation Commission, Building Official and Floodplain Manager) to ensure developers are held to local stormwater requirements in project design as well as during construction and once a project is completed. Organize public programs educating residents on these subjects at local town buildings (Library, COA, ETC...), and recruit volunteers involved to help with outreach campaign. Utilize tax bill mailings, G.E., bill mailings and LakeCam for public outreach.						
17	Reduce vulnerability and risk of power outages.	Severe thunderstorms / Wind / Tornado / Microburst	Highway Department	Operating Budget	Medium	1 to 5 yrs
Coordinate with Eversource, Taunton Municipal Light Plant, and Middleborough Gas and Electric to implement proactive removal of hazardous trees and to expedite power restoration after outages.						
18	Design future municipal projects to account for climate change.	Severe thunderstorms / Wind / Tornado / Microburst	MassDOT District 5, DPW	General Fund, Bond	High	2 yrs
Integrate hazard mitigation measures into planned, ongoing, or routine road construction work. Include drainage improvements that consider increased precipitation, and undergrounding utilities to prevent power outages during severe storms.						
19	Regional forestry management	Wildfire, Severe thunderstorms / Wind / Tornado / Microburst	Fire Department	NRCS, MA DCR	Low	1 to 5 yrs
Develop and adopt a regional forestry management plan in light of multiple large landowners whose properties abut critical power infrastructure						
20	Promulgate a wetlands protection bylaw in Lakeville.	Inland Flooding (riverine and urban drainage/ localized)	Conservation Commission, Town Planner	Operating Budget	Medium	1 to 2 yrs

Acronyms

APC Assawompsett Pond Complex
COA Council on Aging
CPA Community Preservation Act
DPW Department of Public Works
EMD Emergency Management Director
FD Fire Department
LEPC Local Emergency Planning Committee
MA DCR Massachusetts Division of Conservation and Recreation
MassDOT Massachusetts Department of Transportation
MEMA Massachusetts Emergency Management Association
PD Police Department
NRCS USDA Natural Resources Conservation Service
SRPEDD Southeastern Regional Planning & Econ Development District
TA Town Administrator

Chapter 8: Plan Adoption and Maintenance

As required by FEMA, this Plan must outline a maintenance process to ensure the Plan remains active and relevant to the current conditions of the Town. The process must identify the following items:

- Plan Monitoring, Evaluation and Updates – Method and schedule for monitoring, evaluating and updating the plan once every five years;
- Incorporation of Mitigation Strategies – Explanation of how local governments will incorporate mitigation strategies into existing mechanisms; and
- Continued Public Involvement – Requirements that public participation continue throughout the plan maintenance process.

This section details how Lakeville will meet these Plan maintenance requirements.

8.1 Plan Monitoring, Evaluation and Updates

As required by FEMA, the written plan will be evaluated and updated at least once every five years; evaluation will be coordinated by the Town Planner, with the support of the Emergency Management Director, and involve all relevant authorities having jurisdiction. In the interim, the Town Planner, Emergency Management Director, and Town Administrator will conduct annual reviews of the progress of mitigation actions and update as necessary. If a major natural disaster occurs in the interim, the plan may be evaluated or updated if Town personnel feel that the plan failed in some way, or imminent changes are required to better respond to future events. As necessary, HMPC members and/or departments may be added or removed from the committee to obtain the most accurate and applicable information possible.

Evaluations and updates will take place in much the same way this updated plan was developed. The process will include meetings of the HMPC, review of goals and objectives, updating the community profile, review and modification of potential hazards and hazard related data, review of existing hazard-prone areas and the addition of any new areas, updating existing and planned hazard mitigation measures, and an evaluation as to the effectiveness of the plan to date. The next update will begin in year 4 of this plan, to ensure that the subsequent update is ready within the required 5-year window.

8.2 Incorporation of Mitigation Strategies

Mitigation strategies outlined in this Plan will be incorporated into existing municipal plans, bylaws and regulations as feasible. During future HMP updates, existing and proposed mitigation actions will be evaluated for effectiveness, level of completion, and continued appropriateness. Upon approval of this HMP, the HMPC will provide all interested parties and implementing departments with a copy of the plan and will initiate a discussion regarding how the plan can be integrated into that department's ongoing work. At a minimum, the plan will be reviewed and discussed with the following town staff and departments, many of whom were part of the HMPC:

- Highway Department/Department of Public Works
- Fire Department
- Police Department

- Planning Board/Town Planner
- Emergency Manager

After this plan has been approved by both FEMA and the Lakeville Select Board, links to the final plan will be emailed to all Town staff, boards, and committees, with a reminder to review the plan periodically and work to incorporate its contents, especially the proposed mitigation actions presented in Chapter 7: Hazard Mitigation and Climate Adaptation Strategy, into other planning processes, documents, and plans. In addition, during annual review meetings for the HMP implementation process, the HMPC will review whether any other relevant municipal plans are in the process of being updated. If so, the committee will remind staff working on these plans, policies, etc., of the HMP, and urge them to incorporate the HMP data, findings, and actions into their respective efforts.

8.3 Continued Public Involvement

During the periodic five-year update process, the HMPC will hold at least one public workshop or similar meeting to solicit feedback from the general public on the progress made to date. Concerned citizens will also be invited to review the revised Plan and submit any additional comments or recommendations for improving the Plan. All events will be publicly advertised in the local newspaper and/or similar method. Copies of the Plan will be provided in public places such as the Town Hall and/or the Library. The Plan will also be made available to the general public via the Town's website.

8.4 Plan Adoption

At the conclusion of planning efforts conducted by the HMPC, the draft of the Lakeville HMP was reviewed by the HMPC, stakeholders and the general public, and informally approved by all applicable Town departments, boards, and other agencies identified as members of the HMPC. The plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for review and approval. If approved by MEMA and FEMA, the plan will be brought before the Lakeville Select Board of Select for adoption, and the Plan will enter the five year "maintenance" phase. The certificate of adoption is provided in Appendix D – Plan Adoption (Certificate of Adoption Template).

Chapter 9: References

APC and Nemasket Watershed Management and Climate Action Plan, Existing Conditions and Anticipated Climate Change Impacts Overview, 2021

Boston Globe, 2021. https://www.bostonglobe.com/2021/08/26/metro/its-official-fourth-heat-wave-summer-hits-mass/

EPA, Flood Resilience Checklist, Checklist, 2014

EPA, Tools Strategies and Lessons Learned from EPA Green Infrastructure Technical Assistance Projects, Office of Wastewater Management, Report, 2015

FEMA, Flood Insurance Rate Maps for Plymouth County, MA, 2020

FEMA, Hazards U.S. Multi-Hazard

FEMA, Local Mitigation Plan Review Guide, October 2011

Fourth National Climate Assessment, 2018

Massachusetts Flood Hazard Management Program

Massachusetts Office of Dam Safety, Inventory of Massachusetts Dams 2018

Massachusetts State Hazard Mitigation Plan, 2013

Massachusetts State Hazard Mitigation and Climate Adaptation Plan, 2018

National Weather Service (NWS)

New England Seismic Network, Boston College Weston Observatory, http://aki.bc.edu/index.htm

NOAA National Climatic Data Center, http://www.ncdc.noaa.gov/

Northeast Climate Adaptation Science Center

Northeast States Emergency Consortium, http://www.nesec.org/

Solitude Lake Management, Invasive Aquatic Plant Survey, Fall 2020, https://img1.wsimg.com/blobby/go/3ebc1aa3-5c9d-4551-849d-b11edab13531/Long%20Pond%20Lakeville%20-%20Task%201%20Survey%20Report-0001.pdf

Tornado History Project

Town of Lakeville Community Resilience Building Workshop Summary of Findings 2019

Town of Lakeville Open Space and Recreation Plan 2013

Town of Lakeville General By-Laws

Town of Lakeville Zoning By-Law

Town of Plympton Multi-Hazard Mitigation Plan, May 2021

US Census, 2010 and American Community Survey 2017 5-Year Estimates

USGS, Earthquake Hazards Program, https://earthquake.usgs.gov/earthquakes/eventpage/usp0001jbp/executive

USGS, Landslide Inventory Web App, https://usgs.maps.arcgis.com/apps/webappviewer/index.html?id=ae120962f459434b8c904b456c82669d

USGS, National Water Information System, http://nwis.waterdata.usgs.gov/usa/nwis

APPENDICES

Appendix A – Documentation of the Planning Process

- Committee Meeting Agendas, Sign-in sheets
- Public Meetings – Flyers, Press Releases, Agendas, etc.
- Public Comment on draft plan – Email and Letter Regarding Flooding Issues
- Public Survey Results

Appendix B – List of Acronyms

Appendix C – Critical Facilities MapsAppendix D – Plan Adoption (Certificate of Adoption Template

Appendix E – MVP Workshop Results

Appendix F - Capability Assessment/Community Existing Protection Measures

Appendix G - Mitigation Action Prioritization

Appendix A – Documentation of the Planning Process

Committee Meeting Agendas, Sign-in sheets

Hazard Mitigation Committee Meeting 1

Meeting type: Virtual
Date: July 30, 2021

Attendance: Michael P. O'Brien, Fire Chief & Emergency Management Director
Matthew Perkins, Lakeville Chief of Police
Franklin Moniz, DPW Director
Ari Sky, Town Administrator
Nathan Darling, Building Commissioner & Zoning Enforcement Officer
Kelly Howley - Council on Aging Director
Pamela Garant, Fire Deputy Chief
Jayme Viveiros, Librarian

Narrative: The purpose of the meeting was to layout the process of developing a hazard mitigation plan. The benefits of the program to the Town were discussed. The relevant history of Town planning activities and the MVP program were reviewed. Possible new members were identified.

Hazard Mitigation Committee Meeting 2

Meeting type: Virtual
Date: August 19, 2021

Attendance: Michael P. O'Brien, Fire Chief & Emergency Management Director
Matthew Perkins, Lakeville Chief of Police

Franklin Moniz, DPW Director
Ari Sky, Town Administrator
Nathan Darling, Building Commissioner & Zoning Enforcement Officer
Kelly Howley - Council on Aging Director
Pamela Garant, Fire Deputy Chief
Jayme Viveiros, Librarian
Christina Cotsoridis, Assistant to the Town Administrator
Bob Bouchard, Conservation Agent/Chairman
Ed Cullen, Health Agent

Narrative: The purpose of the meeting was to engage new members and to get those new members up to speed.
The content of a public outreach survey was discussed and a request for assistance with distribution of the survey.

Hazard Mitigation Committee Meeting 3

Meeting type: Virtual
Date: September 3, 2021

Attendance: Michael P. O'Brien, Fire Chief & Emergency Management Director
Matthew Perkins, Lakeville Chief of Police
Franklin Moniz, DPW Director
Ari Sky, Town Administrator
Nathan Darling, Building Commissioner & Zoning Enforcement Officer
Kelly Howley - Council on Aging Director
Pamela Garant, Fire Deputy Chief
Jayme Viveiros, Librarian
Christina Cotsoridis, Assistant to the Town Administrator
Bob Bouchard, Conservation Agent/Chairman
Ed Cullen, Health Agent

Narrative: Meeting was held to present documentation for review and instructions for remote commenting. Documents included the revised work plan, various planning maps, existing protection matrix, continuum of mitigation actions, and the 2004 Regional Mitigation Strategy. Individuals were instructed to review and reply with comment.

Hazard Mitigation Committee Meeting 4

Meeting type: Virtual with Lakeville Board of Selectmen
Date: October 25, 2021

Attendance: Lakeville Board of Selectmen
Emily Slotnick, Project Manager BETA Group, Inc.

Michael P. O'Brien, Fire Chief & Emergency Management Director
Matthew Perkins, Lakeville Chief of Police
Ari Sky, Town Administrator
Nathan Darling, Building Commissioner & Zoning Enforcement Officer
Jayme Viveiros, Librarian
Christina Cotsoridis, Assistant to the Town Administrator
Ed Cullen, Health Agent

Narrative: Emily Slotnick and EMD Mike O'Brien present the HMP process to the Lakeville Board of Selectmen. A review of past actions was provided, in addition to the plans for future activities. The BOS was also educated about the application requirements and processes.

Public Meetings – Flyers, Press Releases, Agendas, etc.

MEDIA RELEASE / NOTICE

CONTACT: Emily Slotnick, AICP, CFM, Climate Resiliency Manager at the BETA Group, (860) 513-1503 or eslotnick@beta-inc.com
Michael P. O'Brien, Fire Chief, (508) 947-4121or mobrien@lakevillema.org

FOR IMMEDIATE RELEASE

DATE

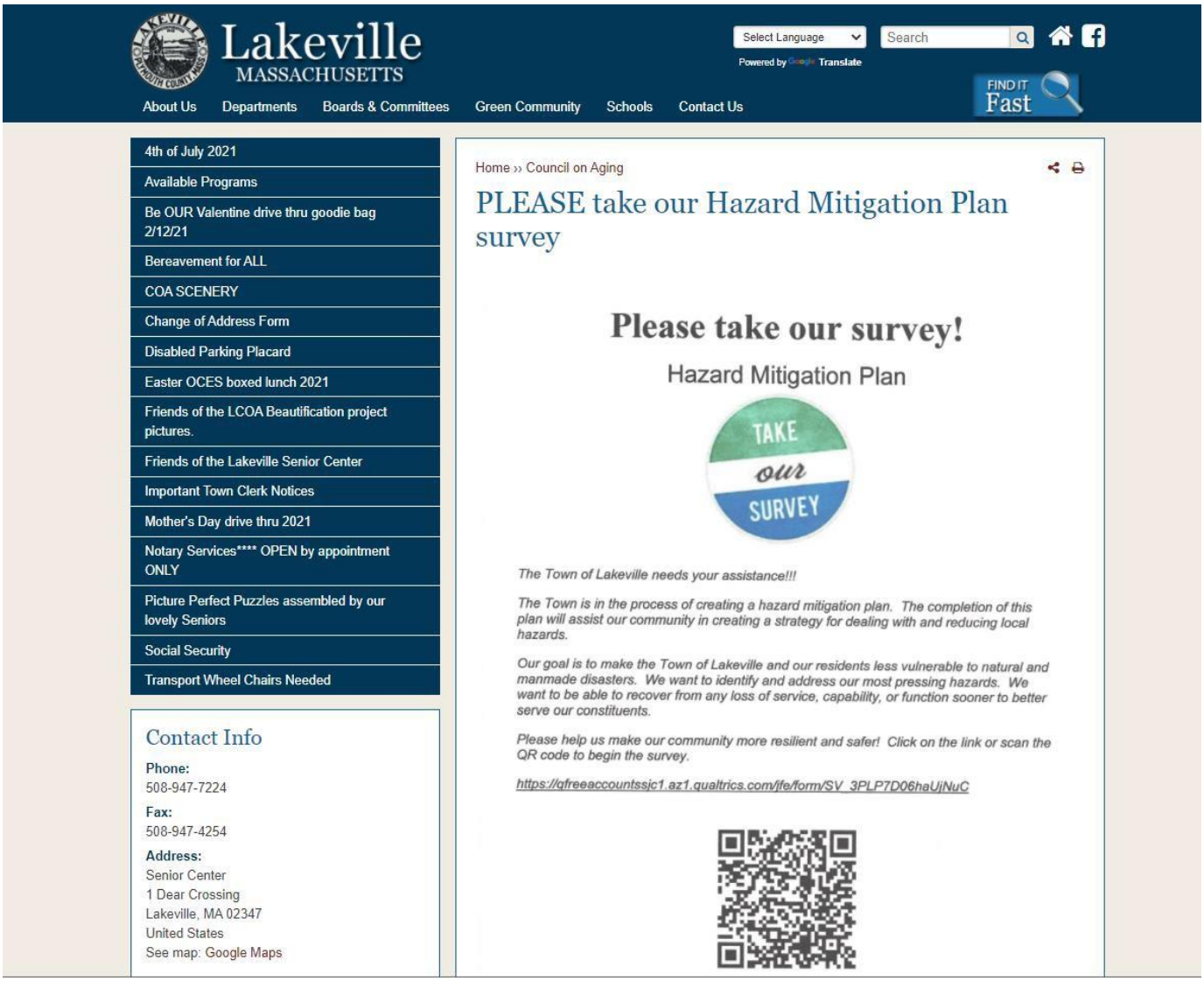
Town of Lakeville to Present on Hazard Mitigation Plan Update

Lakeville residents, businesses, and surrounding community representatives are invited to attend a presentation about the Town of Lakeville Hazard Mitigation Plan Update process, currently underway, on October 25, at 6:30 pm via Zoom. The Hazard Mitigation Plan is being updated by the Town with assistance from the BETA Group, Inc. and funding from the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA). All members of the public, representatives from surrounding communities and other interested parties are welcome to attend the event.

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

The presentation will be made at a regularly scheduled meeting of the Lakeville Select Board and will include an overview of the hazard mitigation planning process and a discussion of existing mitigation initiatives addressing natural hazards in Lakeville. Municipal officials and BETA staff will be available to answer questions and listen to comments and input on the impacts of natural hazards on the Town.

For more information, please contact BETA's Emily Slotnick at eslotnick@BETA-inc.org or (860) 513-1503.


Lakeville
MASSACHUSETTS
Select Language
Search
Powered by Google Translate
About Us
Departments
Boards & Committees
Green Community
Schools
Contact Us
FIND IT Fast
4th of July 2021
Available Programs
Be OUR Valentine drive thru goodie bag 2/12/21
Bereavement for ALL
COA SCENERY
Change of Address Form
Disabled Parking Placard
Easter OCES boxed lunch 2021
Friends of the LCOA Beautification project pictures.
Friends of the Lakeville Senior Center
Important Town Clerk Notices
Mother's Day drive thru 2021
Notary Services**** OPEN by appointment ONLY
Picture Perfect Puzzles assembled by our lovely Seniors
Social Security
Transport Wheel Chairs Needed
Contact Info
Phone:
508-947-7224
Fax:
508-947-4254
Address:
Senior Center
1 Dear Crossing
Lakeville, MA 02347
United States
See map: Google Maps
Home ›› Council on Aging
PLEASE take our Hazard Mitigation Plan survey
Please take our survey!
Hazard Mitigation Plan
TAKE our SURVEY
The Town of Lakeville needs your assistance!!!
The Town is in the process of creating a hazard mitigation plan. The completion of this plan will assist our community in creating a strategy for dealing with and reducing local hazards.
Our goal is to make the Town of Lakeville and our residents less vulnerable to natural and manmade disasters. We want to identify and address our most pressing hazards. We want to be able to recover from any loss of service, capability, or function sooner to better serve our constituents.
Please help us make our community more resilient and safer! Click on the link or scan the QR code to begin the survey.
https://qfreeaccountssjc1.az1.qualtrics.com/jfe/form/SV_3PLP7D06haUjNuC

AGENDA
Board of Selectmen and acting as the Wage &
Personnel Board as needed
Remote Location Meeting
October 25, 2021 – 6:30 PM

PLEASE ASK IF ANYONE IS RECORDING THE MEETING
AND ANNOUNCE CABLE TAPING (IF PRESENT)

1. In accordance with provisions allowed by Chapter 20 of the Acts of 2021, the October 25, 2021 public meeting of the Lakeville Board of Selectmen will be held remotely. **However, to view this meeting in progress, please go to facebook.com/lakecam (you do not need a Facebook account to view the meeting). This meeting will be recorded and available to be viewed at a later date at http://www.lakecam.tv/**

2. 6:30 PM Warrant Review for Special Town Meeting November 8, 2021

3. 7:00 PM Presentation from SRPEDD regarding Lakeville Americans with Disabilities Act Facilities Study

4. 7:30 PM Presentation by BETA Group on the Lakeville Hazardous Mitigation Plan

5. Board of Selectmen Announcements

6. Town Administrator Announcements

7. Discuss and possible vote regarding whether to exercise Chapter 61A Right of First Refusal for the purchase of the property located at Assessors Map 18, Block 1, Lot 2B (corner of Barstow and Montgomery Streets, Harold B. Card owner)

8. Discuss and possible vote to appoint John Viarella as Human Resources Director

9. Discuss and possible vote to appoint Jasmin Farinacci as Town Planner

10. Discuss and possible vote regarding Employee Holiday Schedule for 2022

11. Review and possible vote to approve Board of Selectmen Minutes of October 12, 2021

12. New Business

13. Old Business

14. Any other business that can properly come before the Board of Selectmen

Please be aware that this agenda is subject to change. If other issues requiring immediate attention of the Board of Selectmen arise after the posting of this agenda, they may be addressed at this meeting.

LAKEVILLE, MA HAZARD MITIGATION PLAN (HMP) UPDATE

OCTOBER 25, 2021

2019 PDM

1

TODAY'S TOPICS

- ☐ Overview and benefits of hazard mitigation planning
- ☐ Plan update process
- ☐ Identified hazards and risk elements
- ☐ Questions and discussion

2

WHAT IS HAZARD MITIGATION?

FEMA

"Any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards."

Examples:

- Limiting development in high-risk areas
- Retrofitting structures to protect them from floods, high winds, etc.
- Drainage improvements or other flood control projects in areas of localized flooding
- Fire safety education

3

3

BENEFITS OF HAZARD MITIGATION

A Local Mitigation Plan demonstrates the jurisdiction's commitment to reducing risk and serves as a guide for decision makers as they commit resources to minimize the effects of natural hazards.

The mitigation plan will:

- **Help prepare for and mitigate the effects of natural hazards**
- **Build a more resilient community**

NOAA

4

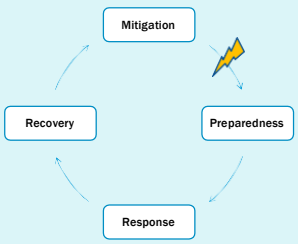
4

LAKEVILLE AND DMA 2000

- **Make Lakeville eligible for pre- and post-disaster recover y and mitigation funding - Hazard Mitigation Assistance (HMA) Programs**
  - **Building Resilient Infrastructure and Communities (BRIC) Grant, Flood Mitigation Assistance (FMA), and Hazard Mitigation Grant Program (HMGP)**
- **Support National Flood Insurance Program (NFIP) compliance and, potentially, policy rate reduction ef forts**

5

EMERGENCY MANAGEMENT CYCLE



6

MITIGATION VS. EMERGENCY PREPAREDNESS

Hazard Mitigation

- Planning and zoning
- Open space preservation
- Education and outreach
- Drainage improvements

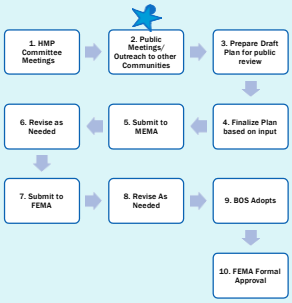
Preparedness

- Evacuation plans and emergency shelters
- Radio communications equipment
- Emergency response drills

7

7

PLANNING PROCESS



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PLANNING PROCESS

Planning Timeline	September	October
Task 1 - Plan review and data collection	Review existing related documents and data collected including the Lakeville MVP Summary of Findings Report, Master Pan, Open Space and Recreation Plan, Comprehensive Emergency Management Plan, and files from the SRPEDD hazard mitigation planning process. Generate an online public survey, if needed	
Task 2 - Stakeholder meetings/phone interviews, as needed (maximum of 5).		One presentation of plan process to town board and HMP committee to solicit feedback.
	Meetings with Mayor, EMA Dir. & Town Staff	
Task 3 - Draft Plan Update		
Task 4 - Public Meeting		
Task 5 - Final Draft Plan submitttal		
Task 6 - Final Plan		

9

9

PLANNING PROCESS

Project Timeline	October	November	December	February
Task 1 - Plan review and data collection				
Task 2 - Stakeholder meetings/interviews.				
Task 3 - Draft Plan Update	use information collected in the task above, as well as from the committee and public meetings to develop a first draft Lakeville Hazard Mitigation and Climate Adaptation Plan.			
Task 4 - Public Meeting		Prepare and attend one virtual public meeting to gather input on mitigation strategies.		
Task 5 - Final Draft Plan Submittal			Prepare Final Draft Plan, along with FEMA Mit. Plan. Review Tool, and submit to Town and MEMA for conditional approval	
Task 6 - Final Plan				Address FEMA conditional approval comments, present Final Plan to Town Officials for local adoption.

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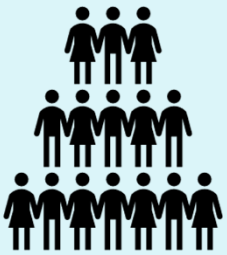
ORGANIZATION OF THE PLANNING GROUP

- Federal, State, Regional and Local Agencies: Southeastern Region Planning and Economic Development District, Lakeville FD, planning, public health, emergency management
- Business and Civic Groups
- Academic Institutions
- Other "local governments": utilities, neighbor municipalities
- Municipal Vulnerability Preparedness (MVP) program committee
- The Public

Engage a Wide Range of "Stakeholders"

11

LOCAL MITIGATION PLANNING TEAM



Michael P. O'Brien, Fire Chief
Robert (Bob) Bouchard, Conservation Agent/ Commission Chair
Pete Conroy, Planning Board
Edward Cullen, Health Agent
Nathan Darling, Building Commissioner and Zoning Officer
Pamela Garant, Fire Deputy Chief
Kelly Howley, Council on Aging Director
Christina Cotsoridis, Asst to the Town Administrator
Franklin Moniz, DPW Director
Matthew Perkins, Chief of Police
Ari Sky, Town Administrator
Jayme Viveiros, Library Director
New Town Planner

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COMPONENTS OF A HAZARD MITIGATION PLAN

- **Hazard Identification**
  - What are the hazards in Lakeville?
- **Capability Assessment**
  - What are your current mitigation capabilities, and how effective are they?
- **Vulnerability Analysis**
  - How do these hazards impact the town, and what populations are particularly vulnerable?
- **Critical Facilities Inventory**
  - What buildings, and infrastructure are critical for town operation?

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REQUIREMENTS FOR LOCAL MITIGATION PLANS

Mitigation Strategy

A blueprint for reducing losses identified in the risk assessment.

- What strategies have been implemented already?
- What new strategies should be pursued?

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CLIMATE CHANGE PROJECTIONS AND RELATED NATURAL HAZARDS

Climate Changes	Related Natural Hazards	Projections by the end of this century
Changes in precipitation	– Inland flooding – Drought – Landslide	– Annual precipitation: Increase up to 16% (+7.3 inches) – Days with rainfall accumulation 1+ inch: Increase by 4 days (from baseline of 8 per year) – Consecutive dry days: Increase of up to 4 days (baseline of 17) – Summer and Fall precipitation COULD decrease
Rising temperatures	– Average/extreme temperatures – Wildfires – Invasive species	– Average annual temperature: Increase up to 22% (+10.5 degrees Fahrenheit) – Days/year with daily minimum temperatures below freezing: Decrease up to 43% (-68 days) – Days/year with daily maximum temperatures over 90 degrees Fahrenheit: Increase more than 1,000% (+65 days) – Cooling degree days: increase by nearly 200% by 2100 – Growing degree days: Increase by more than 70% by 2100
Extreme weather	– Hurricanes/tropical storms – Severe winter storms/ nor'easters – Tornadoes – Other severe weather	– Frequency and magnitude: Increase

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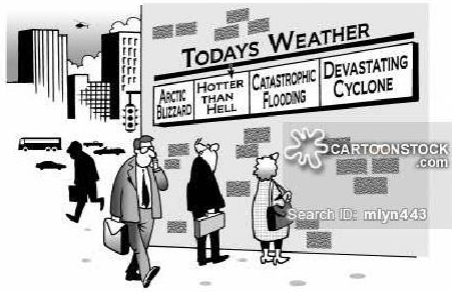

LET'S GET STARTED!

"Past flooding in Lakeville's shorefront communities has created concerns about dense development with inadequate septic management, and about water level control in local ponds."
– Lakeville MVP CRB Report

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ASSESSING NATURAL HAZARDS

Hazard Identification and Risk Analysis
(from SRPEDD Analysis and Results of HMP Survey)

Type of Hazard	Likelihood/Frequency of Future Events
Inland Flooding	Likely
Dam Overtopping/Failure	Possible
Drought	Likely
Landslide/ Sink Hole/ Subsidence	Possible
Wildfire/Brushfire	Possible
Average/ Extreme Temperatures	Likely
Invasive Species	Likely
Severe Snow/Ice Storms (Including Nor'Easter)	Likely
Hurricane/ Tropical Storm	Likely
Tornado/ Microburst/ Severe Wind (including thunderstorms)	Likely
Earthquake	Unlikely

Public Survey

- Top Hazards of Concern: Severe snowstorm, hurricane/ tropical storm, flooding
- "Droughts and power outages ef fect water supply"
- "The invasive weeds are a real problem for water flow and flood levels also."

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HAZARDS IDENTIFIED IN THE 2018 SHMCAP

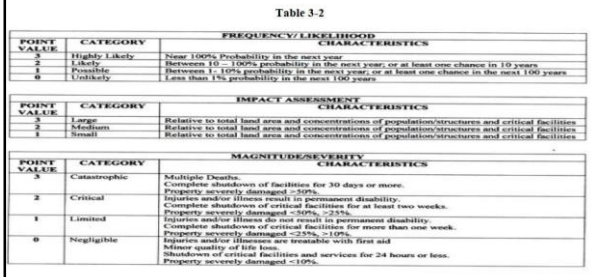

Table 3-2

POINT VALUE	CATEGORY	FREQUENCY/ LIKELIHOOD CHARACTERISTICS
3	Highly Likely	Near 100% Probability in the next year
2	Likely	Between 10 – 100% probability in the next year; or at least one chance in 10 years
1	Possible	Between 1 - 10% probability in the next year; or at least one chance in the next 100 years
0	Unlikely	Less than 1% probability in the next 100 years

POINT VALUE	CATEGORY	IMPACT ASSESSMENT CHARACTERISTICS
3	Large	Relative to total land area and concentrations of population/structures and critical facilities
2	Medium	Relative to total land area and concentrations of population/structures and critical facilities
1	Small	Relative to total land area and concentrations of population/structures and critical facilities

POINT VALUE	CATEGORY	MAGNITUDE/SEVERITY CHARACTERISTICS
3	Catastrophic	Multiple Deaths. Complete shutdown of facilities for 30 days or more. Property severely damaged >50%.
2	Critical	Injuries and/or illness result in permanent disability. Complete shutdown of critical facilities for at least two weeks. Property severely damaged >50%, >25%.
1	Limited	Injuries and/or illness do not result in permanent disability. Complete shutdown of critical facilities for more than one week. Property severely damaged <25%, >10%.
0	Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life loss. Shutdown of critical facilities and services for 24 hours or less. Property severely damaged <10%.

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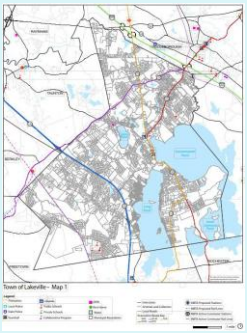
INVENTORY ASSETS AND CRITICAL FACILITIES

What is at risk?

People, Property, Economy, Environment

- Population and Demographics
- Building Stock
- Facilities (critical facilities, utilities, transportation, etc.)
  - Police, Fire, Emergency Services
  - Hospitals and Medical Care Facilities
  - Schools and Care Facilities
  - Sheltering Facilities
  - Infrastructure (Transportation, Utilities, MassDOT Roads)

What other facilities are critical to life in Lakeville?



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EXISTING MITIGATION CAPABILITIES

Zoning Ordinance	Maintenance of Drainage Facilities	Master Plan 2020	Open Space and Recreation Plan 2012 – due for update
Nemasket River Watershed 208 Plan (SRPEDD)	Assawompsett Ponds Complex Management Plan: Assawompset Ponds Committee (AP C	Mass Audubon/TRWA – Stream Continuity Assessment (517 culverts in watershed assessed, 8 in Lakeville flagged)	Capital Improvement Planning Committee in place
Local Stormwater Coordinator and Illicit Discharge Bylaw	Construction Site Run-off Control Bylaw (Erosion Control)	Routine Tree Maintenance Program	Green Infrastructure Network Maps and Assets (SRPEDD)
New FEMA Flood Maps effective 67/6/21 andfloodplain bylaw	MVP Planning Program	LakeCam	Other relevant Ordinances as identified (Code, etc.

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PUBLIC SURVEY

Where is the nearest Lakeville emergency shelter?"	Need wetlands bylaw and land protection focused on aquifer management.	Need more work on potential flooding issues. Also, more awareness to fire prevention in drought conditions.	Storm drains need to either be cleaned regularly or add more in flood prone areas.	Tackle the invasive weed problems in local streams, ponds, lakes, rivers to allow them to flow better during heavy rains to prevent flooding.

21

EXISTING MITIGATION CAPABILITIES

Existing Strategy	Description
Zoning Ordinances	

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22

EXISTING MITIGATION CAPABILITIES

Existing Strategy	Description
Subdivision Regulations	
National Flood Insurance Program Participation	As of 2006, there were 50 homeowners with flood insurance policies

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23

VULNERABILITY ASSESSMENT

Risk is the product of (the probability of) a hazard and its adverse consequences

- Where there are no people or values that can be affected by a natural hazard, there is no risk.
- An hazard event is only a *disaster* if people are harmed and/or property is damaged.

Estimating Our Losses

- Knowing our assets and capabilities, assess the vulnerability of the assets based on potential impacts, and estimating the losses from each hazard.

★ What do we predict our suffering to be if we do nothing to mitigate our risk?

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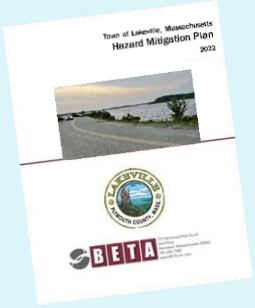
NEXT STEPS

- Additional Committee Meetings
- Virtual public meeting to strategies
  - November TBD
- After meetings, the plan will be revised with comments incorporated and submitted to MEMA and FEMA for comment
- Board of Selectmen/women will then adopt

25

THANK YOU!



Questions?

For more info, or to share photos of damage or hazardous conditions from past storms, contact:

Emily Slotnick
BETA Group, Inc.
eslotnick@BETA-inc.com

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Town of Lakeville, MA

Natural Hazard Mitigation Plan

Public Meeting

Saturday, December 4, 2021
9:00 – 11:00 am

Training room at the Lakeville Police Department

Come learn what the Town has accomplished and help us plan for the future.

About the Hazard Mitigation Plan Update

The Town of Lakeville is drafting it's first single-jurisdiction Natural Hazard Mitigation Plan (HMP), an over-due update to its part in the 2004 Regional Hazard Mitigation Plan. Maintaining an up-to-date HMP helps the Town plan and receive funding for projects that reduce the risk of injury or damage to property from future natural hazard events such as flooding and hurricanes.

The Disaster Mitigation Act of 2000 (DMA) places high priority on the continuation of the planning process after the initial submittal, requiring communities to seek and receive re-approval from FEMA every five years in order to remain eligible for assistance.

Contact: Michael P. O'Brien, Lakeville Fire Chief, 508-947-4121, Michael P. O'Brien, mobrien@lakevillema.org, or Emily Slotnick, BETA Group, Inc. Project Manager, eslotnick@beta-inc.org


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Natural Hazard Mitigation Plan
NOVEMBER 15, 2021 - 11:29AM
The Town of Lakeville is holding a public meeting at the Lakeville Police Station on Saturday, December 4, 2021 from 9 AM to 11 AM... more ››
TAX DEADLINE AHEAD
2ND QUARTER TAX BILLS DUE 11/1/2021
OCTOBER 4, 2021 - 3:41PM
The Tax Collectors Office would like to remind residents that the FY 2022 2nd Quarter RE and PP bills are due on Monday, November 1st. ... more ››
Vacancies
Vacancies on Lakeville Town Committees
JULY 26, 2021 - 7:58PM
Have you always wanted to get involved with the Town but didn't know how? Here is your opportunity! The Board of Selectmen are looking... more ››


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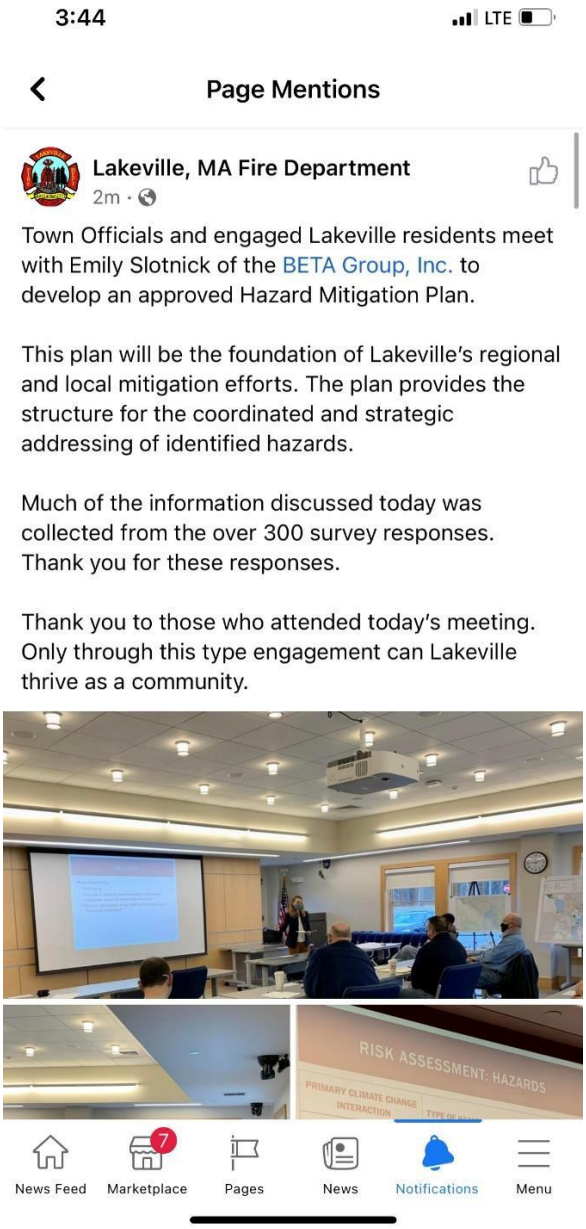
COMMUNITIES
Town of Lakeville-MA Natural Hazard Mitigation Plan Public Meeting
« All Events
Town of Lakeville-MA Natural Hazard Mitigation Plan Public Meeting
December 4 @ 9:00 am - 11:00 am
This meeting will be held at the Lakeville Police Station, Training Room 323 Bedford St, Lakeville, MA 02347.
Lakeville Public Meeting Hazard Mitigation 120421
+ Google Calendar
+ iCal Export
DETAILS
Date:
December 4
Time:
9:00 am - 11:00 am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LTE
Page Mentions
Lakeville, MA Fire Department
2m ·
Town Officials and engaged Lakeville residents meet with Emily Slotnick of the BETA Group, Inc. to develop an approved Hazard Mitigation Plan.
This plan will be the foundation of Lakeville's regional and local mitigation efforts. The plan provides the structure for the coordinated and strategic addressing of identified hazards.
Much of the information discussed today was collected from the over 300 survey responses. Thank you for these responses.
Thank you to those who attended today's meeting. Only through this type engagement can Lakeville thrive as a community.
RISK ASSESSMENT: HAZARDS
PRIMARY CLIMATE CHANGE INTERACTION
News Feed
Marketplace
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Pages
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Notifications
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BETA
IMPROVING COMMUNITIES TOGETHER

MEETING SIGN-IN SHEET

Date: December 4, 2021 **Client:** Town of Lakeville, MA

Time: 9:00 am – 11:00 am **Meeting Location:** Lakeville Police Department

Meeting Topic: **Hazard Mitigation Plan Public Meeting** Sheet **1** of **1**

NAME	ADDRESS / AFFILIATION	EMAIL	PHONE
Mike OBrien	Fire Dept	mobrien@lakevillema.gov	774-766 0247
Bob Marshall	16 Barstow St	Rmarsh1098@aol.com	508-947-6846
Ed Cullen	Board of Health	ecullen@lakevillema.org	5089463473
Kelly Howley	COA	KHowley@lakevillema.ORG	508-947-7224
Franklin Moniz	DPW	FMONIZ@Lakevillema.org	(774)260-1727
Matthew J. Perkins	Police	mperkins@lakevillema.org	508-858-6034
JOSEPH CHAMBERLAIN	Cap Com	BMWJOE7@YAHOO.COM	508 930-2365
Ann Sisk	TOWN ADMINISTRATOR	ASISK@LAKEVILLEMA.ORG	508-946-8803
Chris Spratt	Board of Health	cspratt@lakevillema.org	508-728-5928
Bill Napolitano	SRPEDD	bnap@srpedd.org	508 824-1367 X35

LAKEVILLE, MA HAZARD MITIGATION PLAN (HMP)

DECEMBER 4, 2021

Emily Slotnick, AICP, CFM
Project Manager, BETA Group, Inc.

2019 PDM

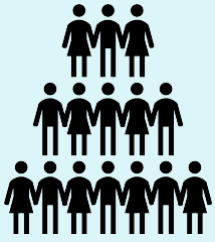
1

WELCOME!

- Introductions
  - Full name
  - Are you a resident, business owner, municipal employee, board or committee member?
  - Did you participate in the MVP or Comprehensive Planning processes?

3

TOWN OF LAKEVILLE LOCAL MITIGATION PLANNING COMMITTEE



Michael P. O'Brien, Fire Chief
Robert (Bob) Bouchard, ConservationAgent/ Commission Chair
Pete Conroy, Planning Board
Edward Cullen, HealthAgent
Nathan Darling, Building Commissionerand Zoning Officer
Pamela Garant, Fire Deputy Chief
Kelly Howley, Council onAging Director
Christina Cotsoridis, Asst to the Town Administrator
Franklin Moniz, DPW Director
Matthew Perkins, Chiefof Police
Ari Sky, Town Administrator
Jayme Viveiros, Library Director
New Town Planner

4

WHAT IS HAZARD MITIGATION?

FEMA

"Any sustained action taken to reduce or eliminate long - term risk to people and property from natural hazards."

Examples:

- Limiting development in high-risk areas
- Retrofitting structures to protect them from floods, high winds, etc.
- Drainage improvements or other flood control projects in areas of localized flooding
- Fire safety education

5

5

BENEFITS OF HAZARD MITIGATION

A Local Mitigation Plan demonstrates the jurisdiction's commitment to reducing risk and serves as a guide for decision makers as they commit resources to minimize the effects of natural hazards.

The mitigation plan will:

- Help prepare for and mitigate the effects of natural hazards
- Build a more resilient community
- Qualify Lakeville for future federal disaster mitigation grants

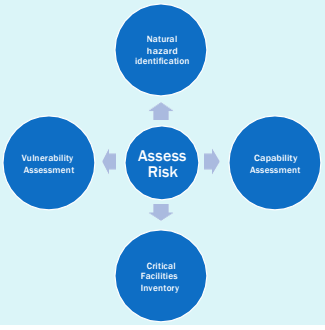
NOAA

6

6

MITIGATION PLANNING PROCESS

- Assess Risks
- Establish Goals
- Identify Projects/ Actions
- Update/ Maintain Plan



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RISK ASSESSMENT: HAZARDS

PRIMARY CLIMATE CHANGE INTERACTION	TYPE OF HAZARD
Changes in Precipitation	Flooding
	Dam Failure
	Drought
	Landslide
Rising Temperatures	Extreme Temperatures
	Invasive Species
	Wildfire/ Brushfire
Extreme Weather	Hurricane/ Tropical Storm
	Severe Winter Storm/ Ice Storm/ Nor'easter
	Severe thunderstorms / Wind / Tornado / Microburst
Non-Climate-Influenced Hazards	Earthquake

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OUTREACH AND COORDINATION

2017 – Present!

- SRPEDD
  - 4 HMP Committee Meetings
  - 2 SRPEDD/LEPC meetings
  - 3 APC meetings
  - 4 regional stream continuity project meetings
- 2019 MVPCRB Workshop
- HMP Project webpage
- Local Hazard Mitigation Committee Meetings
- Public Presentation #1
  - October 25, 2021
- Community online survey
  - 325 responses

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Type of Hazard	Likelihood/ Frequency	Impact Area	Severity/ Magnitude	Hazard Risk Index Rating
Changes in Precipitation				
Flooding	Likely 2	Medium 2	Critical 2	6
Dam Failure	Possible 1	Medium 2	Critical 2	5
Drought	Likely 2	Medium 2	Limited 1	5
Landslide	Possible 1	Small 1	Minor 0	2
Rising Temperatures				
Extreme Temperatures	Highly Likely 3	Medium 2	Limited 1	6
Wildfire/ Brushfire	Likely 2	Medium 2	Limited 1	5
Extreme Weather				
Hurricane/ Tropical Storm	Likely 2	Medium 2	Limited 1	5
Severe Winter Storm/ Ice Storm/ Nor'easter	Highly Likely 3	Medium 2	Limited 1	6
Severe thunderstorms / Wind / Tornado / Microburst	Highly Likely 3	Medium 2	Limited 1	6
Non-Climate-Influenced Hazards				
Earthquake	Unlikely 0	Large 3	Limited 1	4
Invasive Species	Highly Likely 3	Medium 2	Minor 0	5

HAZARD RISK INDEX

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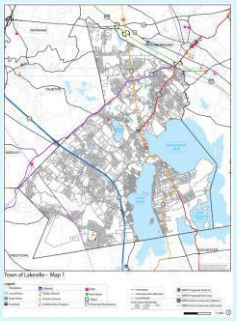
INVENTORY ASSETS AND CRITICAL FACILITIES

What is a risk?

People, Property, Economy, Environment

- Population and Demographics
- Building Stock
- Facilities (critical facilities, utilities, transportation, etc.)
  - Police, Fire, Emergency Services
  - Hospitals and Medical Care Facilities
  - Schools and Care Facilities
  - Shelter ing Facilities
  - Infrastructure (Transportation, Utilities, MassDOT Roads)

What other facilities are critical to life in Lakeville?



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VULNERABILITY

- Public infrastructure and Emergency Lifelines
  - Drinking water systems
  - Wastewater systems
  - Stormwater systems
  - Transportation systems
- Evacuation/ Population at Risk
- Environmental Impacts
  - Habitat loss
  - Threats to ecosystems and species
  - Contamination of potable water

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EXISTING MITIGATION CAPABILITIES

- Planning and Regulatory
- Administrative and Technical
- Financial

Zoning Ordinance	Local and regional plans	MA Audubon/TRWA – Stream Continuity Asmnt (517 culverts assessed, 8 in Lakeville flagged)
Capital Improvement Planning Committee in place	Local Stormwater Coordinator and Illicit Discharge Bylaw	Construction Site Run-off Control Bylaw (Erosion Control)
Routine Tree Maintenance Program	Green Infrastructure Network Maps and Assets (SRPEDD)	New FEMA Flood Maps effective 67/6/21 and updated floodplain bylaw
	LakeCam	

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2022 Lakeville MHP Goals

GOAL 1: Reduce the loss of life, property, infrastructure, and cultural resources and minimize economic losses from natural disasters and the impacts of climate change.

Goal 2: Enhance Lakeville's resiliency to natural hazards and climate change by protecting and enhancing natural resources.

Goal 3: Utilize effective zoning practices and other regulations to minimize new development in hazard-prone areas.

Goal 4: Ensure that essential services can function during and after a hazard event.

Goal 5: Educate the public about natural hazards and mitigation measures.

Goal 6: Work regionally to mitigate impacts from natural hazards affecting multiple communities.

2004 REGIONAL GOAL

Reduce local risk and loss of life, property, infrastructure, and cultural resources from natural disasters.

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MITIGATION STRATEGY

Mitigation Actions identified from

- 2004 SRPEDD HMP
- 2018 SHMCAP
- MVP Report
- APC Reports
- Various Plans, reports, studies
- 2021 Public Survey

Mitigation Action Categories

- Planning and Prevention
- Property Protection
- Natural Resource Protection
- Structural Projects
- Emergency Services, and
- Public Education and Awareness

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MITIGATION ACTIONS

- Time Frames
  - Short Term: 0 – < 6 months
  - Medium Term: > 6 – < 18 months
  - Long Term: 18 months – 5 years
- Cost Ranges
  - Staff Time: Municipal personnel time
  - Low: < $10,000
  - Medium: > $ 10,000 but < $100,000
  - High: > $100,000

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PROPOSED MITIGATION STRATEGIES

#	Type	Description	Primary Hazard Addressed
1	PR	Fund EMD and Planner staff time to convene annual HMP review and 5-yr HMP update process.	All hazards
2	PR	Incorporate budget for HMP actions and training in Capital Improvements Plan (CIP)	All hazards
3	PR	Consider Tax Abatements for HM related Improvements	All hazards
4	PEA	Improve local digital communications capabilities to keep all resident informed	All hazards
5	PEA	Improve evacuation route signage and communicate relevant evacuation routes to residents based on location within town (2017 HMP: Create and install signs e.g. marking past flood elevations and evacuation routes)	All hazards
6	PEA	Generate exhibits highlighting past natural hazard events and current preparedness using story maps on town website	All hazards
7	PEA	Utilize e-Billboards to promote public awareness of potential hazards or events	All hazards
8	PEA	Increase training opportunities around hazard mitigation. Target Vulnerable Populations with training - e.g. elderly, young, disabled, mobile home parks. Also provide more training opportunities for first responders; work with non profits, APC, etc.	All hazards
9	ES	Increase coordination with Eversource to expedite power restoration after outages	All hazards
10	ES	Update CEMP with LEPC	All hazards
11	ES	Improve communications processes and protocols b/t LEPC for all Assawompset Pond Complex communities: regional emergency management plan, discuss water rights and access during drought and other emergencies, collaborative preparation for predicted weather events	Dam failure

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PROPOSED MITIGATION STRATEGIES

12	PR	Pursue Storm Ready designation https://www.weather.gov/stormready/	Hurricanes/ Tropical Storms
13	PR	Develop and implement a Nemasket River Restoration Plan to address issues of silting, invasive species, water quality, dams an herring passage. (2013 Impaired Streams/SPCFMP: Draft an APC Management Plan with recommendations for land conservation, recreation, water quality, habitat management, haz mat management, and coordination for dam operation)	Inland Flooding (riverine and urban drainage/ localized)
14	NRS	Develop Nemasket River Dam / Sediment and vegetation removal dam removal, and floodplain reclamation plan. Management plan must anticipate the widest range of climate change scenarios (MVP: Conduct a feasibility study to assess invasive species removal in the pond complex and Nemasket River) (OSRP: Establish some measure of control over invasive exotic plants within Lakeville)	
15	PR	Apply for priority project status with the division of ecological restoration to remove/replace dams and culverts along the river	
16	PR	Conduct a town-wide assessment of all culverts, prioritizing right-sizing and replacement in locations where flooding is already a serious issue	

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PROPOSED MITIGATION STRATEGIES

17	SP	Upgrade culverts of noted concern: Taunton Street (Poquoy Brook), Cross Street, Pickens St., Route 18, Snake River (Long Pond River), Main Street (Route 105 and Bates Brook), Pierce Avenue and unnamed stream at Bittersweet Road, and County Road by the Eagles Freetown Street and Cedar Swamp River - Severe stream constriction (2013) Harding Street (Route 44) and Poquoy Brook - Poor or damaged condition (2013) Southworth Street and Unnamed stream - Severe stream constriction (2013) Bedford Street and Unnamed stream - poor or damaged condition (2013)	Inland Flooding (riverine and urban drainage/ localized)
18	NRS	Improve drainage on Freetown Street, County Road, Old Powder House Road and Heritage Hill Dr by increasing infiltration	
19	PP	Consider strategic property acquisition for flood storage in order to mitigate flood-related property damages and emergency risks, particularly to shoreline properties	
20	PR	Regulatory actions for flood mitigation: 1. Conduct a review of town Subdivision Regulations and other regulations and update to require Green Infrastructure Strategies 2. Create and adopt a wetlands protection bylaw. Begin with educating residents. 3. Pass CPA to establish new funding source for targetted landconservation 4. ADOPT AN OPEN SPACE RESIDENTIAL DESIGN (OSRD) BYLAW. 5. Promote creation of a Low-ImpactDevelopment by-law for flood resilience and water quality. 6. INVESTIGATE A TRANSFER OF DEVELOPMENT RIGHTS (TDR) BYLAW.	

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PROPOSED MITIGATION STRATEGIES

21	PEA	Improve public education and outreach around flood risk and water quality including: Proper well and septic maintenance, especially for new residents in town. Targeted mailings to residents with educational materials on the floodplain and floodways.(2004 HMP) Share the Green Infrastructure Network Maps to realize flood control, improved water quality, and habitat retention ecosystem services (2017 HMP)	Inland Flooding (riverine and urban drainage/ localized)
22	PR	OPEN SPACE & RECREATION STRATEGY 6-1-1: HIRE A FULL-TIME CONSERVATION AGENT TO HELP IDENTIFY AND PROTEC T IMPORTANT AREAS IN LAKEVILLE.	
23	SP	Explore elevating Bedford Street	
24	PR	Maintain drainage facilities by retaining or increasing the town's MassDOT inspection schedule and extending the order of conditions so that it does not lapse	
25	PR	Explore feasibility of buy-outs / managed retreat in Clark Shores and along Freetown Street and Highland Road, and in the RL properties on Shore Ave	

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PROPOSED MITIGATION STRATEGIES

26	NRS	Request a boat washing station for Long Pond from DCR to reduce spread of invasives througout Lakeville's waterways	Invasive species
27	PR	Coordinate with Eversource, Taunton Municipal Light Plant, and Middleborough Gas and Electric to implement proactive removal of hazardous trees	Severe thunderstorms / Wind / Tornado / Microburst
28	SP	Underground powerlines wherever feasible in onjunction with ongoing road construction work.	Severe thunderstorms / Wind / Tornado / Microburst
29	PR	Adopt a regional forestry management plan in light of multiple large landowners whose properties abut critical power infrastructure	Severe thunderstorms / Wind / Tornado / Microburst
30	PEA	Improve public education and outreach around mosquito spraying an vector-borne illness risks to public health, especially for vulnerable (elderly and schoolaged) populations	Unknown
31	PR	Conduct a tow-wide fire vulnerablity assessment and consider siting new Fire Dpt sub-station near Howland Street School campus to increase area resilience	Wildfires / Brushfires
32	PR	SERVICES AND FACILITIES STRATEGY 7-1-1: INVESTIGATE AN EXPANSION OF/UPGRADE TO THE EXISTING FIRE STATION. Hire a consultant to update the 2007 feasibility study.	Wildfires / Brushfires

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PRIORITIZATION OF ACTIONS

- Social: is the action socially acceptable?
- Technical: is the action technically feasible and provide appropriate level of protection?
- Administrative: does the Town have the capability to complete the action?
- Political: will the Town support or oppose the project?
- Legal: does the Town have the legal authority to complete the action?
- Economic: is the action cost-effective?
- Environmental: will the action affect the natural environment?

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NEXT STEPS

- Additional Committee Meetings
- Post draft plan for public review and comment. Request review from Planning Board and Select Board
  - Early 2022
- Revise draft based on public comment, submit to MEMA and FEMA for comment
- Lakeville Select Board adopts Final Plan

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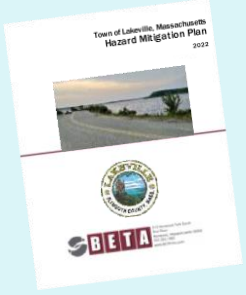
THANK YOU!



Questions?

For more info, or to share photos of damage or hazardous conditions from past storms, contact:

Emily Slotnick
BETA Group, Inc.
eslotnick@BETA-inc.com

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Fwd: Seeking comments on Lakeville's Natural Hazard Mitigation Draft Plan

MP Michael P. O'Brien, Fire Chief <mobrien@lakevillema.org>
To Emily Slotnick

Reply | Reply All | Forward | ...
Mon 2/28/2022 2:02 PM

You replied to this message on 4/4/2022 3:24 PM.
If there are problems with how this message is displayed, click here to view it in a web browser.
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

Get Outlook for iOS

From: Lakeville MA <cmsmailer@civicplus.com>
Sent: Monday, February 28, 2022 1:39 PM
To: Michael P. O'Brien, Fire Chief
Subject: Seeking comments on Lakeville's Natural Hazard Mitigation Draft Plan

Seeking comments on Lakeville's Natural Hazard Mitigation Draft Plan

The Town of Lakeville, working with BETA Group, has created a draft Natural Hazard Mitigation Plan. Hazard Mitigation is defined as sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards, such as flooding, storms, high winds, hurricanes, wildfires, earthquakes, etc.

As part of the plan process, the Town is seeking comments from Lakeville residents on the content of the plan. To view the draft plan, please **click here.** If you are unable to access the plan electronically, paper copies are available at the Fire Station.

If a resident has any comments, please submit them to Fire Chief Michael O'Brien by email at mobrien@lakevillema.org prior to **March 28, 2022**.

Read more

Public Response – Email and Letter Regarding Flooding Issues

Email message regarding review of the plan, dated February 28, 2022:

From: [redacted]
Sent: Monday, February 28, 2022 6:10 PM
To: [redacted] Fire Chief
Cc: [redacted] Building Commissioner & Zoning Enforcement Officer; [redacted] Fire Deputy Chief; [redacted] Council on Aging Director; [redacted] DPW Director; [redacted] Lakeville Chief of Police; [redacted]
Subject: Barstow Street Mitigation Request
Attachments: 004-BoSCORRESPONDENCE RE BARSTOW FLOOD MITIGATION.docx

Dear Chief,

Thank you for sending this Mitigation Report and seeking my input.

Attached, is a copy of a letter I sent to the Select Board last fall. I ask that you include it as part of my response to the Mitigation Report. As you may recall from our more recent meeting with Ms. Slotnick of BETA, I have many flooding concerns in the Barstow Street area, many of which are noted in the attachment. I am CCing this email and attached correspondence to other members of your committee and town boards that may have some responsibility to help with such mitigation, so they can be aware of my and my neighbors' concerns.

As your committee moves forward, I ask that, where appropriate, you consider our concerns and try to create mitigation plans where possible. I will respond to your request for input as soon as I can review the report. Again, thank you and your committee for taking the time to evaluate our potential hazards and seeking mitigation methods so we can prevent unnecessary damage.

Be well,

[redacted]

Letter mentioned within the February 2022 email, dated October 30, 2021:

[redacted]

Lakeville Board of Selectmen

346 Bedford St.

Lakeville, MA 02347

October 30, 2021

Dear Lakeville Select Board Members:

I found your meeting on Monday, October 25, 2021 very informative, especially one item: flooding. After listening to Emily Slotnick from BETA present her Mitigation Report, I was encouraged to learn that flooding was actually considered a hazard in need of such mitigation ***planning*** ahead of time. Previously, when I thought of such a hazard, I usually thought of hazardous chemicals, etc. I was happy to learn that is not the case.

It is my understanding that [redacted], the present owner of the property behind [redacted] Barstow St. plans to have some thirty or so acres behind other Barstow Street properties removed from Chapter 61A protection to sell for development. This causes me great concern IF the drainage plans are not ***properly investigated, planned, inspected, and enforced*** ahead of time. I seek your help in preventing a great deal of future difficulty in this regard.

To these points and the issue I raised at your meeting, ***I am writing to formally request that you forward my concerns*** to our Building Commissioner and other appropriate officials/departments before work begins on the lot behind [redacted] Barstow Street and, ultimately, behind other properties along our street. Specifically, I am concerned that any plans for handling drainage/run-off for any building behind the Barstow Street properties be heavily scrutinized before/after they are approved. I further request that, once any plans are approved, they be inspected often to insure that they are adequate to handle potential drainage/run-off that might create flooding.

Having lived at [redacted] since 1973, I have witnessed a great deal of run-off travelling through these properties, especially from [redacted] to [redacted]. While investigating a well problem when I first moved into my house, I found the well-driller, [redacted], who had already drilled two artesian wells on my property. After consulting his drilling diaries, he revealed that there is bedrock under my property at twenty-five feet, which creates a smaller "sponge" to soak up any excess water travelling across the land. [redacted] went on to say that the bedrock surfaced

further out back, behind my property line, and, according to his records, dropped to 160 feet at the properties on Precinct Street. I think it makes sense to conclude that there is likely a similar depth to the bedrock along other Barstow St. properties, especially since I paid [redacted] to drill two more artesian wells of 500 and 200 feet, where he found the same bedrock structure.

As Ms. Slotnick noted in her BETA presentation, climate change's impact on our weather will certainly require Lakeville to be ***more*** diligent in our attempts to avoid preventable future emergencies. Clearly, our storms have been stronger and longer over the last ten to twenty years. ***We must prepare*** for them by making sure we incorporate adequate and sensible mitigation plans down to the grass-roots level by making certain that home and street development plans clearly provide for our realistic future needs, including flooding.

It should also be noted that some years ago, the "culvert" that travelled under Barstow St. (from 24 to 17) had to be completely reconstructed to mitigate serious flooding that commonly occurred at that point. It helped, but was not totally successful, based on my forty-eight years, observing flooding and freezing at that location. Furthermore, in the 1970s and 80s, the lot next to me ([redacted]) was empty, and it carried much of the backwoods run-off through it and across the street to another (then) empty lot, which is now [redacted] Barstow. Once a house was built at [redacted], the owners had difficulty with water in their cellar and convinced the town to build a catch basin in front of their house. I do not know if it is successful in keeping their cellar dry now, but I do know that the basin often overflows into their yard when accepting run-off from the [redacted] and [redacted] Barstow properties and the rest of the street. In short, I believe our drainage mitigation on Barstow is sadly lacking at present.

Given the above information, it makes sense to me to conclude that these properties are much more sensitive to drainage and run-off issues, ***IF potential properties behind us are not properly investigated, planned, inspected, and enforced, moving forward!*** I am asking your board (and any other appropriate boards/departments) to do everything possible to ***prevent*** further drainage/flooding problems on our street. It is my hope to prevent future flooding/drainage problems and not have to litigate a solution after the fact. In that effort, I seek your help and thank you in advance. "An ounce of prevention ***is*** worth a pound of cure."

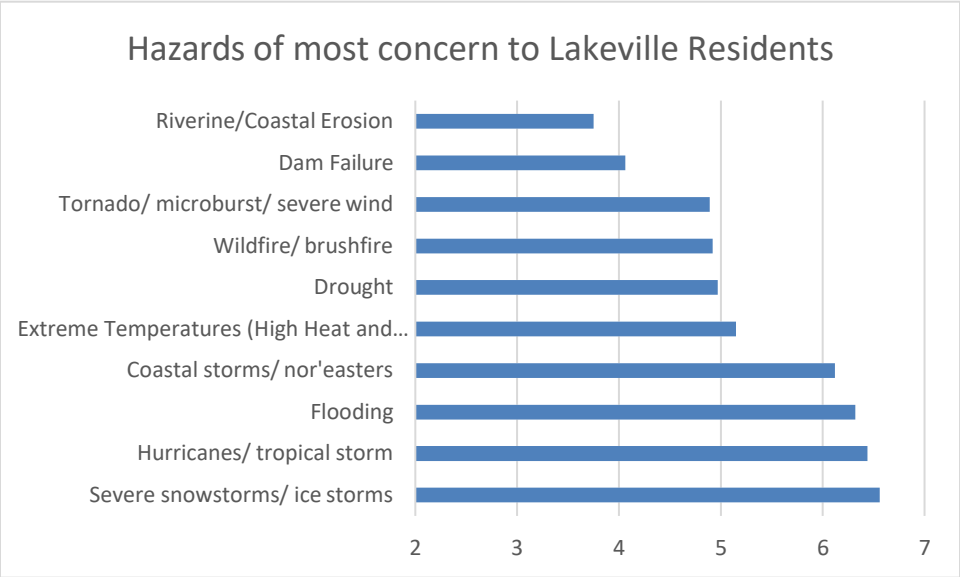
Sincerely yours,

[redacted]

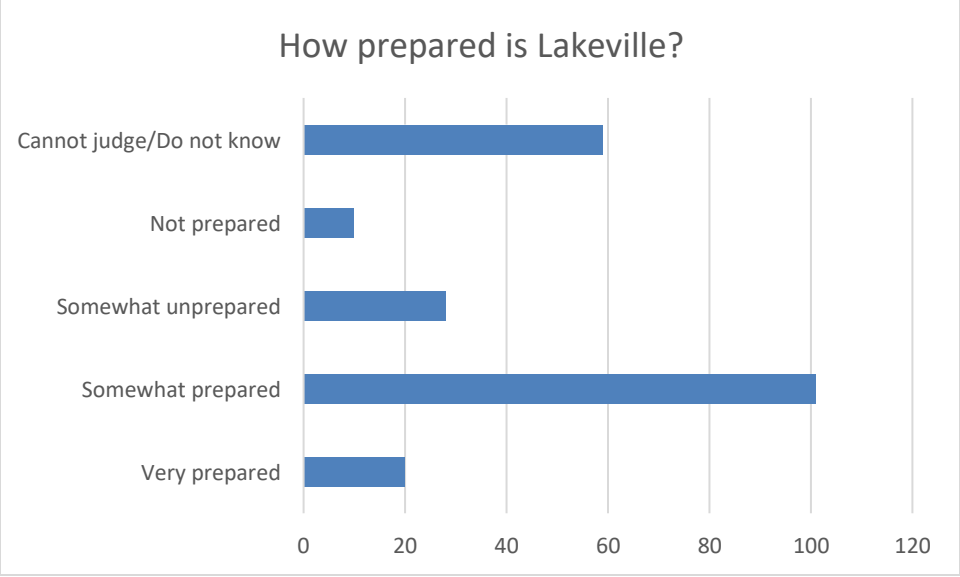
[redacted]

Public Survey Results

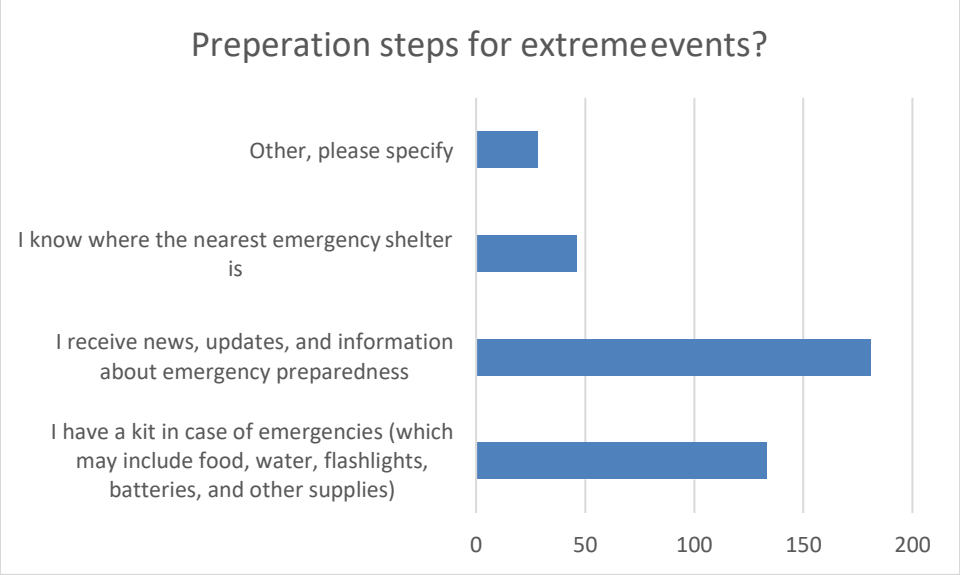
1. **The MA Hazard Mitigation and Climate Adaptation Plan (SHMCAP) identified the following hazards as being particularly relevant to the Town of Lakeville. What hazard are you most concerned about? Please rank from 1 to 10, with "10" being of highest concern.**



2. **How prepared do you feel Lakeville is for future extreme events?**



3. **What steps have you already taken to prepare for extreme events? Please check all that apply.**



Other comments:

- I have a generator
- Backup generator
- Small generator, wood stoves, spare propane
- Emergency generator
- Remove trees that might hit house
- Have a generator
- Generator and gas in approved containers on hand
- The government does not need to know.
- I'm not
- Have bag of needs ready to go
- Home generator, pantry stock
- Have a Generator that will power essentials
- Extensive reinforcement of roof against excessive weight and high winds. Back-up whole house generator. Special flooding kit (pre-sized boarding-up materials, sand bags, high capacity pump)
- Generator
- Sump pump
- Have precut plywood to cover vulnerable windows; have emergency food supply and lanterns, have redundant heating systems (
- Keep important documents in zip close bag
- I moved to Georgia

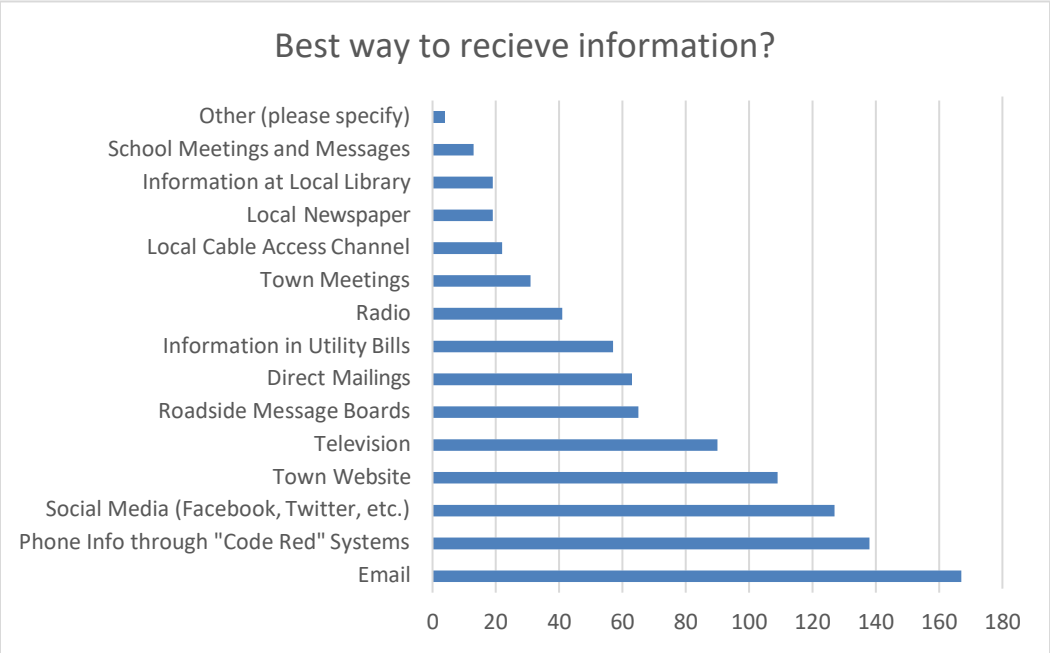
- I have some emergency supplies but not conveniently located together in a kit or something similar
- Have a generator
- Generator
- Have other preparations like generator for power outages; chainsaws ready before storms; neighborhood phone/email/social media trees in place to check w neighbors.
- Always have supplies
- Check with Neighbors, Front end loader Chain saws.
- Generator
- Generator
- Install household mitigation, such as drainage pipes to prevent flooding at foundation

4. **What resources do you need to feel more prepared?**
   - Does the town have stock of water and supplies that can be handed out?
   - Does the town/fire department have air conditioners or cooling fans to loan out during high heat events?
   - An electric generator
   - We plan to remove large trees from around the house. Otherwise we are in good shape
   - Power outages
   - Active storm and event tracking
   - Generators
   - I would like to know that the town has a plan in place and the manpower and resources to react quickly to any major event. Good or Bad.
   - Strong police, fire, dpw departments.
   - The government does need to know.
   - Where is the nearest Lakeville emergency shelter?
   - Mostly I would like to see more first responders. if you are unable to evacuate your home on your own.
   - I live on Long Pond and feel there should be a group/each town etc. that does a better job of monitoring the water levels in real time not after the fact. The invasive weeds are a real problem for water flow and flood levels also.
   - A generator
   - Knowing what the town's plans are and what residents should do to prepare.
   - None
   - Specific real time news/weather accessible for Lakeville. TV news forecasts are too generic. Never know whether it applies to us or not. Even the tornado warning the other day talked about southern Plymouth County but did not show specific list of towns to know whether or not that was us
   - I really don't know.
   - I wouldn’t object to a text warning to inform us of local emergencies

- Would love to have that generator that I still haven't bought after 22 years.
- A nonemergency News source (in the absence of a newspaper or frequently updated town website)
- something like the schools one call to residence would be helpful
- info on where to go
- Better communication system for Town for adverse events
- Maybe just some general emergency preparedness info. Also because most of us depend on our wells for water, some people may not know, especially those new to Lakeville, how droughts and power outages (especially) effect water supply.
- Improved infrastructure (roadways, drainage, etc.)
- Proper civil engineering for flooding
- Confidence that the water level in Long Pond is being monitored and controlled.
- Local food and energy supply
- Independent power supply
- Info on how to be prepared for different types of emergencies
- Power
- It might be a good idea if the fire department produced a video about what the average homeowner should have on hand for an emergency kit...and broadcast it on LakeCAM channels.
- Need able bodied person I can call to install hurricane window covers
- Need arborist to evaluate trees and remove those that endanger house
- Water supply and treatment for pollutants
- Know the town's emergency protocols, including designated shelters
- Have a town based volunteer corps for emergency to assist with manpower surge capacity during emergencies/disasters
- As a town I feel the mass gathering disaster mitigation preparedness could be further developed. We currently have 1 morgue with a normal capacity of 2 and an expanded capacity of 4. Ife a mass event occurred a challenge that occurs once the victims have been retrieved is the safe handling and management of multiple dead bodies including patient tracking and providing temporary and long-term storage. Local morgues would be insufficient to handle the sudden sheer volumes of deceased people. The expanded scope of an MFI would require multiple emergency resources and personnel. The Lakeville town resource inventory has not been recently updated to provide an accurate count for personnel, vehicles, equipment or facilities.
- Knowledge that the town is aware of the emergency and is prepared to assist.
- Greater connectedness between residents who live alone.
- Information and funds
- None that come to mind
- Assured method of communication so we don’t become another New Orleans after Ida
- The rest of my family and friends to move here.
- Knowing the locations of possible emergency shelters would be helpful.
- This is New England, we've been prepared for all this all our lives

- Storm proof windows would be nice.
- Whatever it takes to keep the fire dept, police dept, EMS, and DPW funded and fully staffed in order to handle individual and community emergencies.
- None
- The best way to get emergency alerts
- More communication from the town in regards to weather events and environmental happenings.
- Gasoline for my generator.
- Need more work on potential flooding issues. Also, more awareness to fire prevention in drought conditions.
- Emergency generators
- More presence on social media would help alert the town of news.
- Food, water, gasoline
- Terrorism now that Biden has played his failed strategy in Afghanistan
- More info on how prepared the Town is, and good communication on what the Town wants citizens to do in case of each of these emergencies.
- Shelter information
- Modern facilities for firest responders.
- I think we are in good shape to weather many difficulties. Please focus on the elderly and disabled.
- Let the citizenry know when you need our help.
- I need to see the Nemaskett River dredged so the dam can work properly, and we won't be flooded out. This should be the top priority for the Town of Lakeville.
- Other than the fat that I don't have an electric start generator, I am preetty much prepared. I do wish the many branches/trees hanging over the electrical wires were better trimmed since that would reduce the likelihood of electrical outages in the area.
- Information should be readily available and easily accessible on various sources.
- Use reverse 911 for localized events / updates and Social media.
- Not sure
- Information about the town. There is a real lack of information and transparency regarding the rapid development of the town and preservation of natural resources.
- Better Generator
- Every year the town of Plymouth sends a calendar with all emergency preparedness info, including evacuation routes, emergency shelters, etc. I'd love to have something like that for Lakeville.
- Town emergency communication plan
- Official flood maps, expert recommendations for trees to remove to prevent extreme wind damage to household.

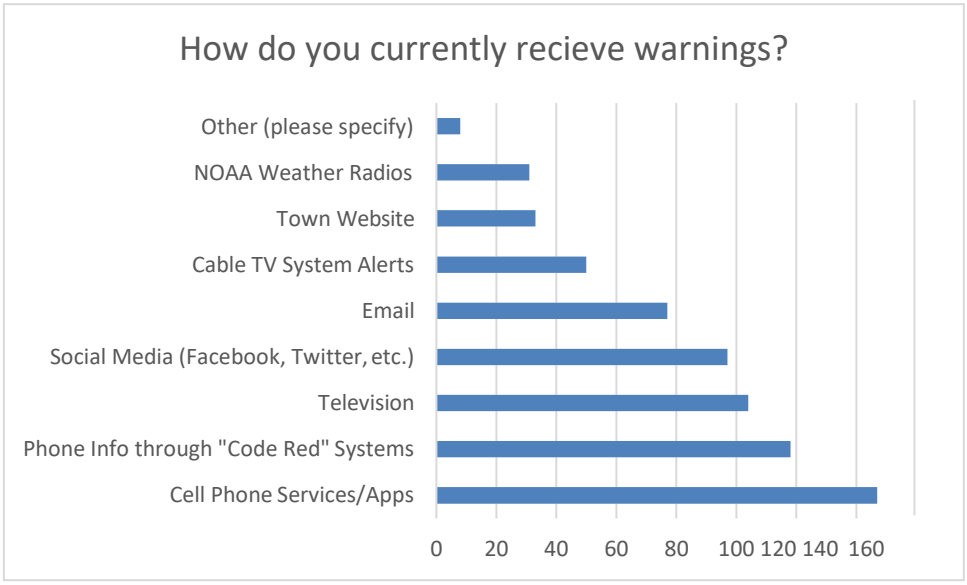
5. **What is the most effective way for you to receive information about how to make your home, business and neighborhood more resistant to natural hazards? Please check all that apply.**



Other:

- text messages
- Text

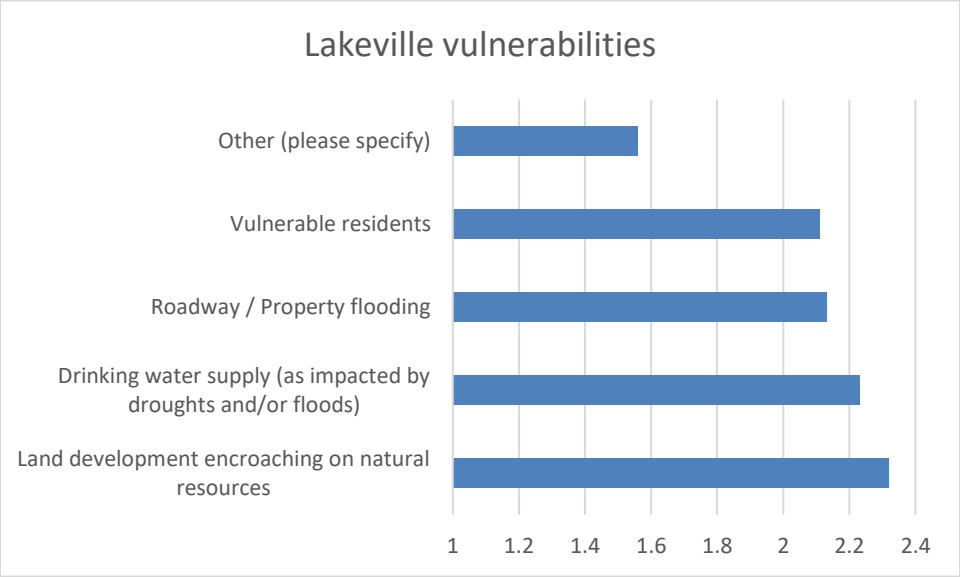
6. **How do you currently receive warnings regarding severe weather or other emergency events? Please check all that apply.**



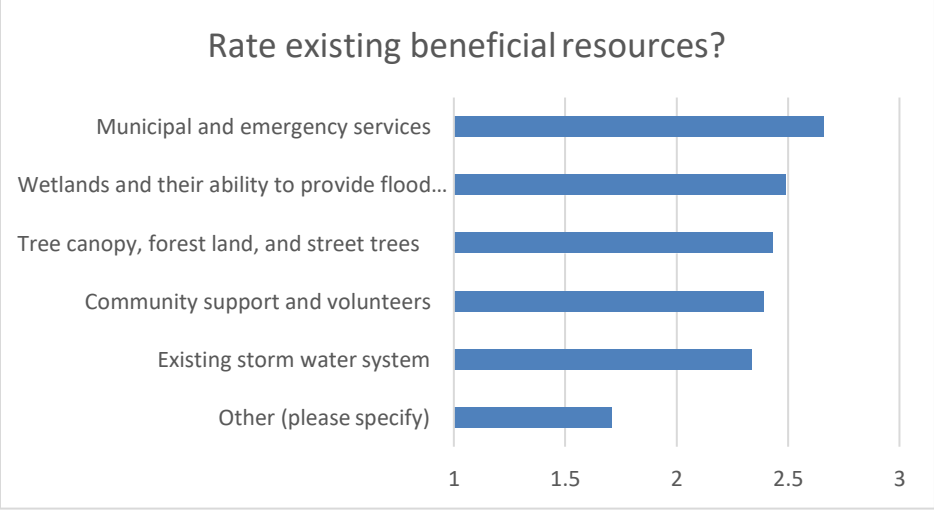
Other:

- App on smartphones
- Internet (the sites I normally read)
- Radio
- I watch the weather radar daily and have my own weather station
- Weather apps
- Radio
- MEMA, HHAN

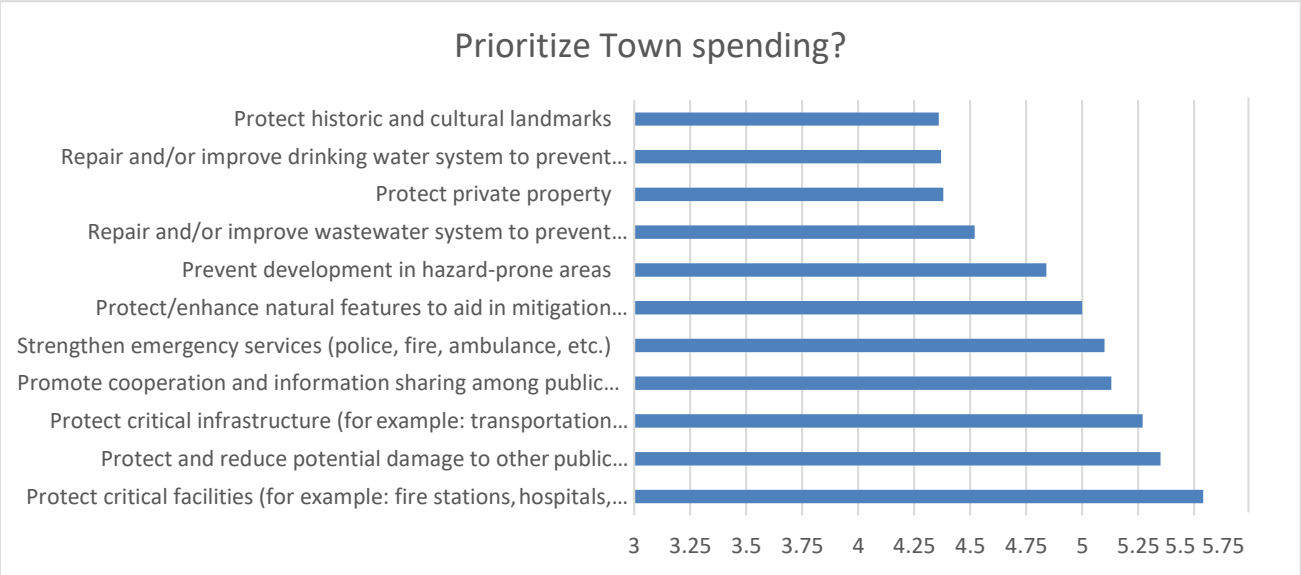
7. Considering these Lakeville's vulnerabilities, please rate the threat of each.



8. When considering climate resilience, please rate these existing beneficial Lakeville resources.



9. **How important are each of the following items for the Town to prioritize spending its resources for hazard mitigation?**



10. **What other climate adaptation or hazard mitigation measures should be taken in Lakeville in the next five years?**
    - Climate change will effect the water table/private wells/septic systems - flooding is the most probable scenario, though droughts are also predicted. How that will impact the town's infrastructure/emergency response should be addressed/looked at.
    - Flooding response and extreme heat and cold aid
    - Need to adapt a CPA program
    - nothing
    - Storm drains to either be cleaned regularly or add more in flood prone areas. Tackle the invasive weed problems in local streams, ponds, lakes, rivers to allow them to flow better during heavy rains to prevent flooding.
    - stop cluster housing
    - Possibly public instruction, in person or on LakeCAM/YouTube to educate people about how to prepare for inclement weather (emergency kit/location) or how to recover (safely open roof dams)
    - Adding more catch basins
    - Street drainage
    - Limit commercial building
    - Wetlands Bylaw and land protection focused on aquifer management.
    - stop allowing builders to clear cut all land before building and fine them if they do not comply
    - Increased full time fire fighter positions
    - Not sure
    - I'm not sure.

- Prevent development in flood prone areas, buy back properties in very flood prone areas such as Clark Shores
- Sirens
- Sure up the shoulder of the roads with more than just packed sand that washes away in the first rainstorm...
- exreme heat seems to be an increasing danger. I fear the electric grid locally might not be up tot he challenge
- Promote inter-town collaboration for a pro-active action plan to mitigate high water conditions in the Assawompsett Pond Complex (APC) - particularly on the shores of Long Pond. Details of such a plan can be found in a 2019 study STRATEGIC FLOOD PLAIN (SFP) CONCEPT, presented at a joint meeting of Lakeville and Middleboro selectmen on January 14, 2019.
- Road drainage needs massive improvements all over Lakeville.
- snow emergencies, extreme conditions as well... hurricanes ets
- choping of trees over utility lines
- Our police and fire departments should receive additional staffing and funding as necessary for the growing town population.
- Working with the NB Waterworks to have them better maintain properties. There are so many large dead trees that are just waiting to come down in streets and properties. Accident waiting to happen. The fire roads used to be maintained many years ago to prevent fire from jumping into the forests and they no longer are.
- Supporting local food production and education
- Severely limit building additional homes
- Pass the Community Preservation Act (CPA
- none
- Prepare for increased storm events in frequency and intensity
- I think we should pass the CPA initiative coming up at the next town meeting and at the ballot box.
- Tree cover should be maintained as much as possible, even increased in any new development. Impervious surface should be minimized as much as possible in any new development.
- Remove dead trees, leaves and brush from woods. Improve road accessability and identification ie, streetsigns. Improve overall planning and preparedness measures.
- Community outreach, forming coalitions between agencies for accurate and efficient implementation of services.
- Restore natural resources and foliage surrounding railroad tracks
- Limit building/development in town, plant more trees and improve Long Pond
- Re-open Lakeville Recreation
- Add electric vehicle charging stations. Monitor more agressively and adjust reservoir water level to mitigate flooding.
- None
- Stop destroying forest and long pond
- more control over the dams in town

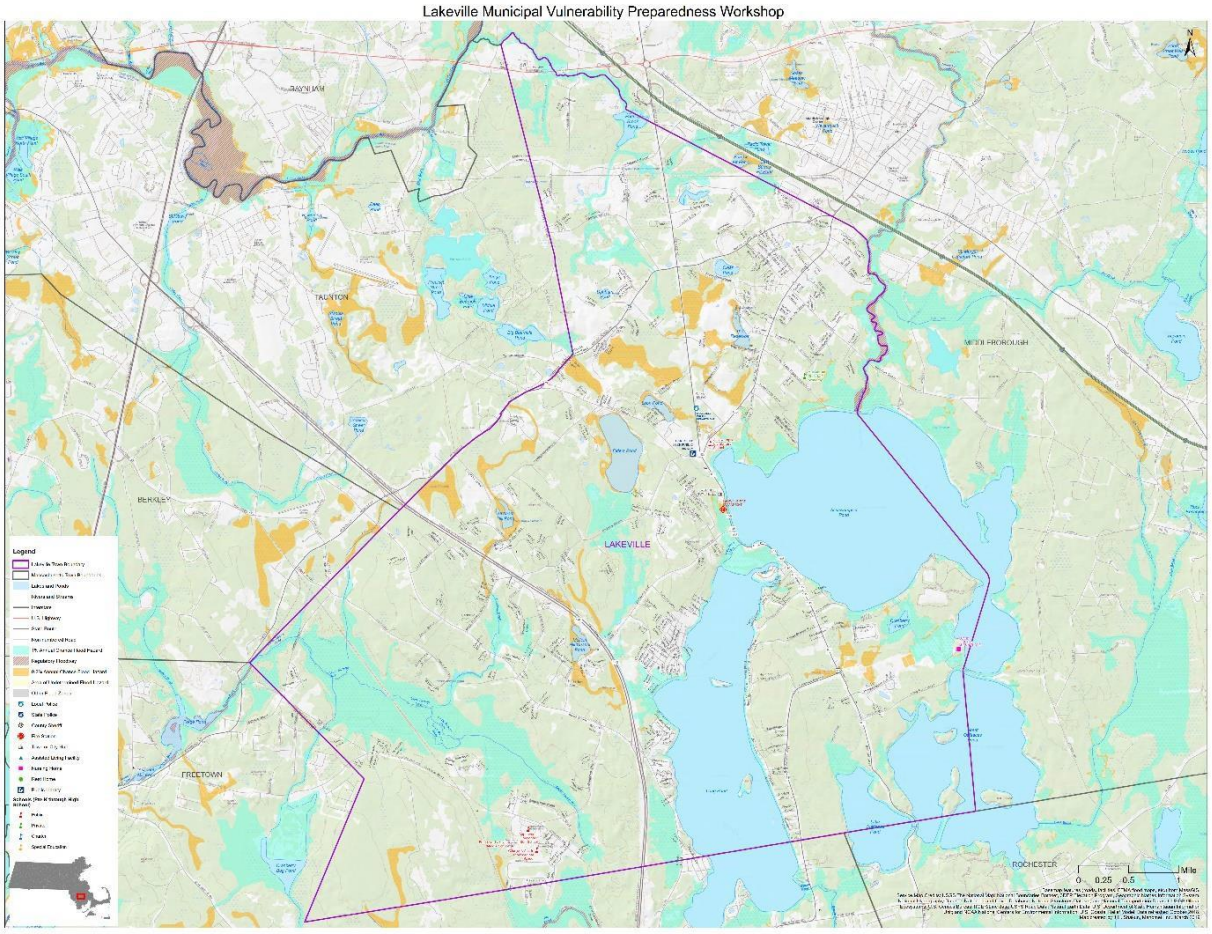
- Protect our aqua firs and our drinking water
- REGULATE THE NEMASKET RIVER DAM LOCATED AT THE MOUTH OF THE RIVER AT ASSAWOMPSETT POND TO REDUCE FLOOD RISK
- I'm not sure
- None
- Protecting wildlife by halting any new building.
- Flood mitigation
- Tree triming primarily and consistently.
- Not dure
- Maintain fire roads in heavily wooded areas.
- Lakeville Hospital
- Weeds and overuse of ponds
- Nothing that I can think of.
- Residents are unaware of the extent that climate change could endanger them, and few have taken appropriate precautions to mitigate risk. An "expert mitigator" should offer prevention tips to each willing household, similar to how Energy Star offers energy saving tips. We need to ensure preparedness, not just hope for it.
- Improve flood storage
- Are there any additional comments or questions you would like to share?
- Stop commercial and residential development in areas of historically poor drainage.
- Keep an eye on trees as thats the largest threat to power loss during storms
- Protect our small town feel by registering local historic properties/houses and not zoning commercial/general use etc in residential areas. Provide more/keep more open space/natural parks available.
- Thank you for recognizing the importance of our current climate difficulties and being pro-active about town and citizen preparedness
- Clean the weeds out of Long Pond
- Look out for the safety and best interest of the town and its people despite complaints.
- No
- Given the latest weather, maybe some sirens placed on poles around town just in case a large amount of people need to be notified about an impending emergency. Not everyone has a cell phone or social media.
- We could learn about Wildland Fire Urban Interface Zones, and better prepare our properties against damage from forest fires. (firewise.org)
- At its core, the SFP concept is forward looking, low cost, relatively easy to implement, has minimal risk and can be put into practice without delay.
- Good luck. Libertarian Lakeville will stop any improvements for the common good, until THEIR home is under water.
- none
- In the past people have been told to leave the "fire trails" when walking. I know this is off topic, but I think we should be allowed to walk there

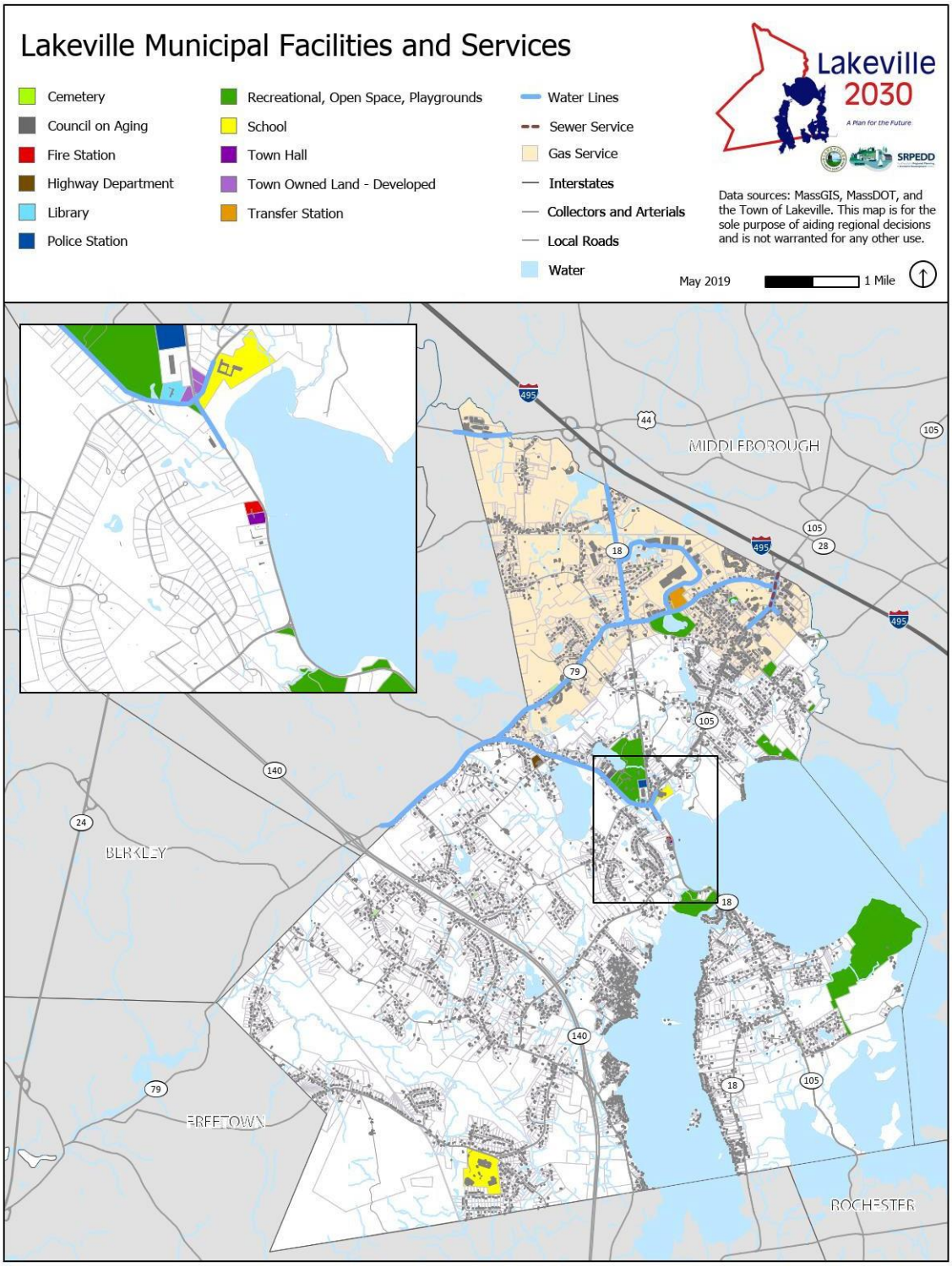
- Limit the expansion of business zones. There are too many properties already zoned business and are available for development ie deweys, old bowling alley, Lakeville hospital, the old Lakeville pharmacy etc. more business does not mean lower razes. We are already paying twice for garbage disposal in town budget and at the dump for stickers etc
- Stay away from the fake science of climate change.
- Stop all the developments.
- I think we need more and younger volunteers to get involved on boards and committees...especially to get some experience and understanding of how our town works. Volunteerism seems to be waning, and we need more people to fill in important positions.
- Water and waste removal are generally not as important in Lakeville because they are mostly handled on site. However along the ponds flooding of septic systems is a serious issue.
- have a town based volunteer corps for emergency to assist with manpower surge capacity during emergencies/disasters
- The orderly line of succession should be updated. Update the critical facilities section on the CEMP. (Island Terrace is still listed.)
- Lakeville is a very special community. Let's preserve it, conserve it, and maintain the rural atmosphere that has drawn people to live here over the years. While it is rural, it is attractive because it is close to major highways, plus access to the train. What can be better than that?!
- Stop spending money
- Thank you for taking it seriously and starting the process to make Lakeville a resilient, prepared and informed community.
- Best way for flood mitigation is to hold water companies responsible for maintaining Assawompset Pond target levels. These levels should be mandatory and not just suggestions. There should be financial penalties if these mandated levels are exceeded. The Town should also work with the state, and the water companies to secure Federal Infrastructure funds to dredge the Nemaskett River so the dam would work properly and target levels could be maintained.
- Climate will change and there is very little we can do. Focus on maintaining open space and smart development.
- Very happy living in Lakeville. We have the best Fire Department and LPD
- The more the development the less the buffer for disasters in my opinion.
- CPA vote so money would be available if needed to help support where possible these needs
- I have no idea what my property's true flood risk is. This information is important and should be easy to find.
- I think maybe creating informational hand outs for emergency procedures directing residents on what to do in case of each type of emergency we identify would be helpful, especially for our seniors as they don't all utilize social and other types of media that warnings and instructions for emergencies are broadcast through. Our residents knowing what is expected of them and how to keep themselves safe helps to ease panic in an actual emergency. Also, continuing to identify the most vulnerable residents of all ages that may need extra help in an emergency situation.

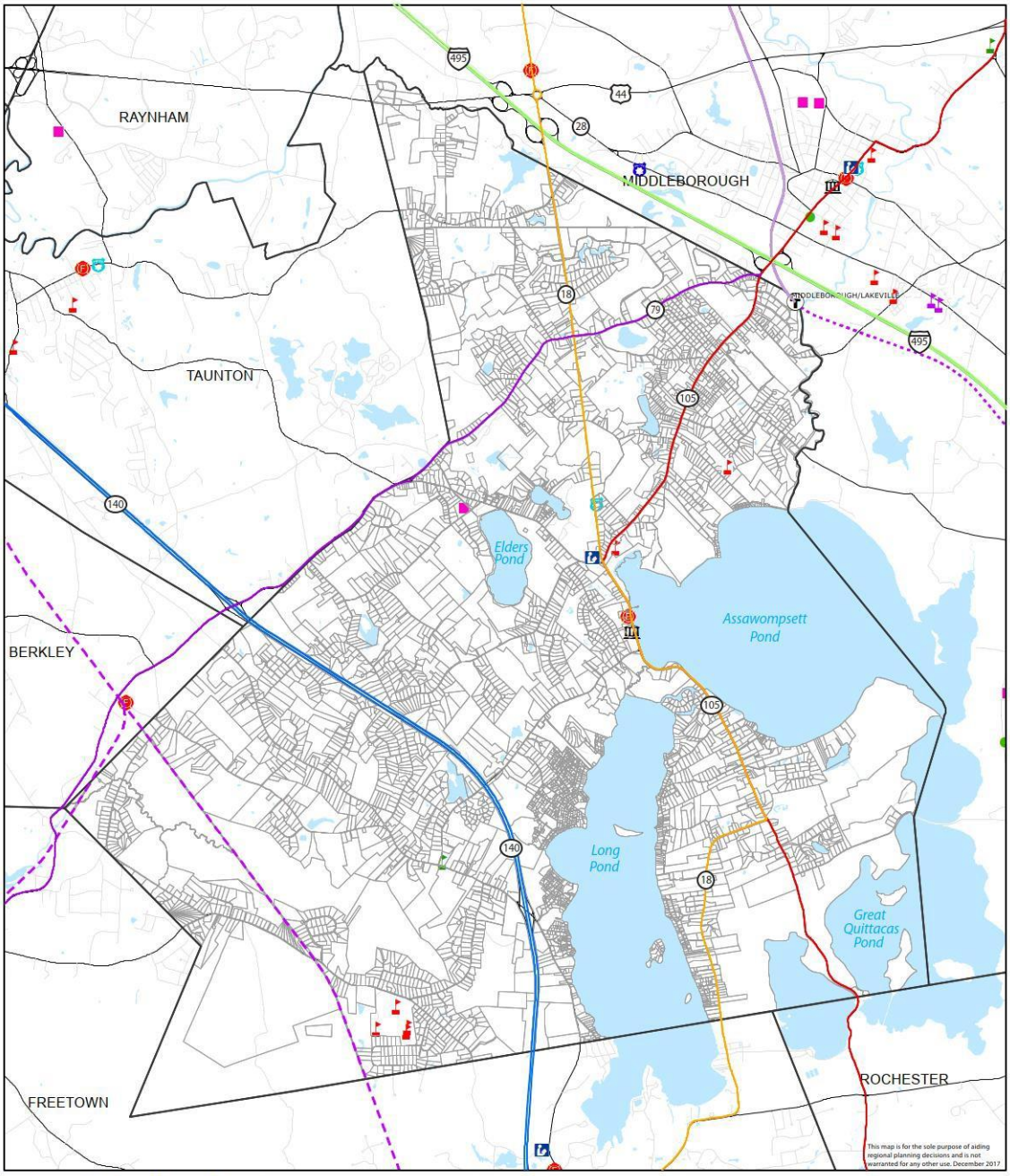
Appendix B – List of Acronyms

ASDSO - Association of State Dam Safety Officials
CIS - Community Information System
CFR - Code of Federal Regulations
COA - Council on Aging
CRB - Community Resilience Building
DCR - Department of Conservation and Recreation
EEA - Energy and Environmental Affairs
EOEEA - Executive Office of Energy and Environmental Affairs
FEMA - Federal Emergency Management Agency
GATRA - Greater Attleboro-Taunton Regional Transit Authority
HMP - Hazard Mitigation Plan
HMPC - Hazard Mitigation Plan Committee
LPT - Local Planning Team
MEMA - Massachusetts Emergency Management Agency
MIPAG - Massachusetts Invasive Plant Advisory Group
MVP - Municipal Vulnerability Preparedness
NCDC - National Climactic Data Center
NFIP - National Flood Insurance Policy
NOAA - National Oceanic and Atmospheric Administration
NRI - National Risk Index
NWS - National Weather Service
PDM - Pre-Disaster Mitigation
RTWN - Resilient Taunton Watershed Network
SFHA - Special Flood Hazard Area
SHMCAP - State Hazard Mitigation and Climate Adaptation Plan
SHMO - State Hazard Mitigation Officer
SRL - Severe Repetitive Loss
SRPEDD - Southeastern Regional Planning and Economic Development District

Appendix C – Critical Facilities Maps




Lakeville Municipal Facilities and Services
Cemetery
Council on Aging
Fire Station
Highway Department
Library
Police Station
Recreational, Open Space, Playgrounds
School
Town Hall
Town Owned Land - Developed
Transfer Station
Water Lines
Sewer Service
Gas Service
Interstates
Collectors and Arterials
Local Roads
Water
Lakeville 2030
A Plan for the Future
SRPEDD
Data sources: MassGIS, MassDOT, and the Town of Lakeville. This map is for the sole purpose of aiding regional decisions and is not warranted for any other use.
May 2019
1 Mile
MIDDLEBOROUGH
BERKLEY
ROCHESTER
495
44
105
28
18
79
140
24



Town of Lakeville - Map 1

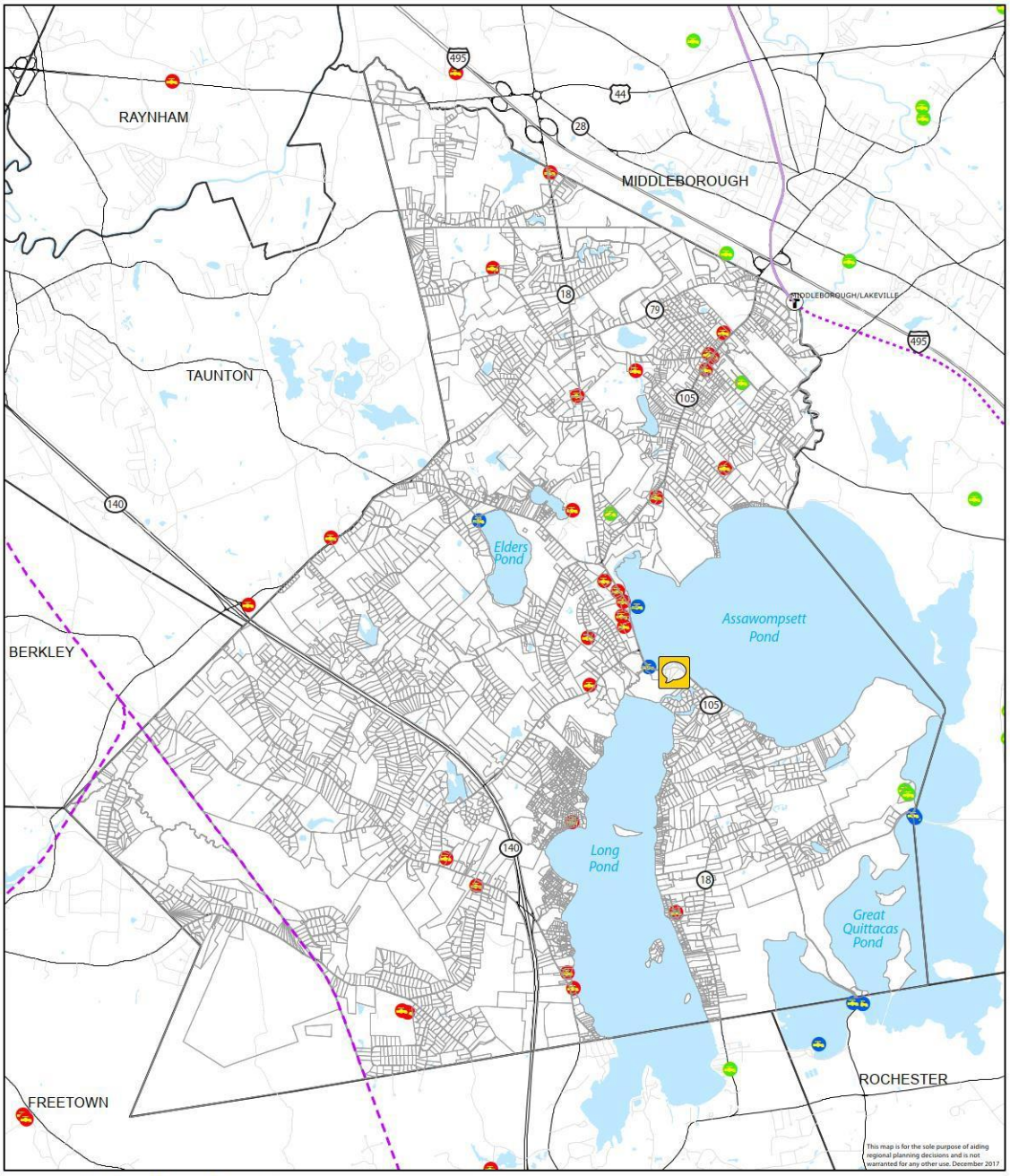
Legend

- Firestation
- Local Police
- State Police
- Townhall
- Libraries
- Public Schools
- Private Schools
- Collaborative Program
- DPW
- Rest Home
- Water
- Municipal Boundaries
- Interstates
- Arterials and Collectors
- Local Roads

Evacuation Route Key
I495 R140 R18
R105 R79

- MBTA Proposed Stations
- MBTA Proposed Rail Lines
- MBTA Active Commuter Stations
- MBTA Active Commuter Rail Lines

1 mile

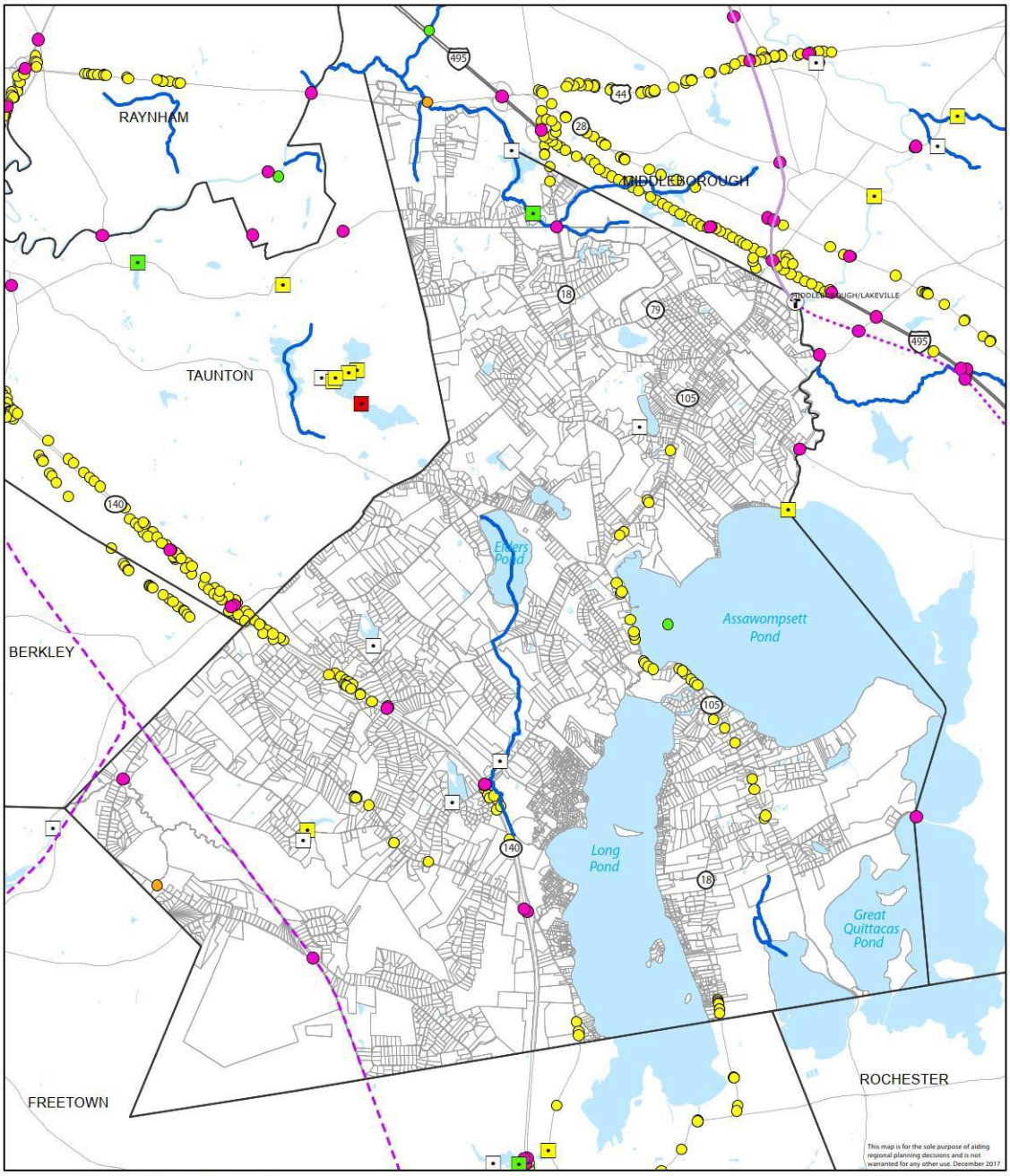


Town of Lakeville - Map 2

Legend

- Community Goundwater Source
- Surface Water Intake
- Non-Community Groundwater Source
- Water
- Municipal Boundaries
- Interstates
- Arterials and Collectors
- Local Roads
- MBTA Proposed Stations
- MBTA Proposed Rail Lines
- MBTA Active Commuter Stations
- MBTA Active Commuter Rail Lines

1 mile



Town of Lakeville - Map 3

Legend

- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- Drainage Outfalls
- Bridge (NBI)
- Culvert
- Short Span Bridge
- Cold Water Streams
- Water
- Municipal Boundaries
- Interstates
- Arterials and Collectors
- Local Roads
- MBTA Proposed Stations
- MBTA Proposed Rail Lines
- MBTA Active Commuter Stations
- MBTA Active Commuter Rail Lines

1 mile

Appendix D – Plan Adoption (Certificate of Adoption Template)

<COMMUNITY LETTERHEAD>

CERTIFICATE OF ADOPTION

Town of Lakeville, MASSACHUSETTS

BOARD OF SELECTMEN

A RESOLUTION ADOPTING THE TOWN OF LAKEVILLE 2022 NATURAL HAZARD MITIGATION PLAN

WHEREAS, the Town of Lakeville established a Committee to update the Town's local Hazard Mitigation plan; and

WHEREAS, the Town of Lakeville participated in the update of the Town of Lakeville 's local Hazard Mitigation Plan;

and WHEREAS, the Town of Lakeville Hazard Mitigation Plan update contains several potential future projects to mitigate potential impacts from natural hazards in the Town of Lakeville, and

WHEREAS, a duly-noticed public meeting was held by the Board of Selectmen ON_____for the public and municipality to review the Town of Lakeville Hazard Mitigation Plan update prior to consideration of this resolution; and

WHEREAS, the Town of Lakeville authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Lakeville Board of Selectmen formally approves and adopts the Town of Lakeville Hazard Mitigation Plan Update, in accordance with M.G.L. c. 40.

ADOPTED AND SIGNED this_____,_____

ATTEST

Appendix E – MVP Workshop Results

The workshops' three emergent themes centered around stewardship ofLakeville's water resources, including integrated water resources planning for the Assawompset Pond Complex and Nemasket River, town-wide infrastructure (culvert, dam and power line) assessment and priority removal or replacement, and communications best practices to ensure that all Lakeville residents are prepared for emergencies and informed about local hazards, emergency infrastructure, and resources for resilience.

The Lakeville, MA Municipal Vulnerability Preparedness (MVP) and Community Resilience Building (CRB) Workshop Summary of Findings, March 2019, can be viewed in full at https://www.lakevillema.org/sites/g/files/vyhlif751/f/uploads/lakeville_crb_report.pdf

Appendix F - Capability Assessment/Community Existing Protection Measures

SUMMARY OF EXISTING PROTECTIONS/NEEDS MATRIX: TOWN OF LAKEVILLE				
Category of Protection Measure	***Description***	***Yes/No; Area Covered***	***Effectiveness and/or Enforcement***	***Improvements or Changes Needed***
Capital Improvement Planning/ Structural Improvements	Capital Improvement Planning Committee in place. Prepares CIP on an annual basis covering a 5-year cycle.	Yes. Town- wide	Funding on as possible basis (there is currently no money available in the CIP for projects to mitigate natural disasters).	The town has, at times, struggled to fund CIP items and maintain a sufficient operating budget.
	TIP projects (roads, bridges, culverts, drainage facilities).	Yes. Town- wide	As programmed in the TIP	Additional funding required to complete waiting projects.
Regulations/ Bylaws/Codes	Floodplain Zoning	Yes. NFIP defined areas	As of 2021, there are 3 repetitive loss structures, all of which are single family residential structures located in the Special Flood Hazard Area (SFHA), and no Severe Repetitive Loss (SRL) properties. Each of the RL properties have incurred two losses - the most recent event to generate a RL claim was in 2018, however there were multiple RL losses recorded in 2010.	None. USGS revised Digital Flood Insurance Rate Maps (DFIRMs) for Lakeville-Middleboro-Taunton-Rochester area and Base Flood Elevations (BFEs) for Great Quitticas Pond area, effective 7/16/15. Annual Town Meeting approved these map updates on May 10, 2021 and they went into effect July 6, 2021
	Storm water treatment/MS4 areas;	Yes. Census urbanized areas (MS4)	Yes. Town has appointed a local storm water coordinator and adopted an Illicit Discharge Bylaw.	Look at solutions for the other eight (8) culverts identified as severely constricted or in poor or damaged condition (by SRPEDD as part of the Mass Audubon Stream Continuity Survey of the Taunton River Basin; this work also involved Save the Bay and the Taunton River Watershed Alliance). Additional staff training needed. Ensure stormwater

SUMMARY OF EXISTING PROTECTIONS/NEEDS MATRIX: TOWN OF LAKEVILLE				
Category of Protection Measure	***Description***	***Yes/No; Area Covered***	***Effectiveness and/or Enforcement***	***Improvements or Changes Needed***
				management requirements are met in design, during construction, and upon final inspection.
	Upland requirements for residential lots- a minimum of 30,000 of lot must be upland.	No.	N/A	Should be looked at in the course of the Master Plan and Open Space Plan updates.
	Subdivision Regulations- are underground utilities required?	Yes. Except power lines	Yes (Subdivision Regulations).	Regulations could be improved
	TDR Bylaw	No.	N/A	Study. Educate. Adopt.
	Wetland Protection Bylaw	No.	Developed a bylaw with assistance from SRPEDD – failed at Town Meeting.	Educate. Adopt.
	Cluster or Conservation Subdivision	No.	Discussion is occurring amongst appropriate boards and commissions.	Study. Educate. Adopt.
	Construction Site Run-off Control Bylaw (Erosion Control)- sites that could impact sedimentation build up in waterways because of run-off from construction activities.	Yes. Town-wide	Conservation Agent has a site inspection program in place.	This could be strengthened by the adoption of a local Wetlands protection Bylaw and increased construction and as-built monitoring of stormwater measures.
Operations, Administration, and Enforcement	Routine Tree Maintenance Program	Yes. Town-wide within public street ROW	Yes. As funding permits within Highway Department workload; the power company utilizes subcontractors to complete work on a regular basis. Height limit of bucket truck limits what town crews can accomplish.	More funds; work with foresters, land owners, utilities to assess conditions of trees and establish a protocol for the pruning or removal of diseased, compromised trees, particularly in vulnerable areas (wind, flood zones)
	Inter-department Emergency Coordination on the administration	Yes. Town-wide	Yes. Meets on as needed basis.	Better radio equipment; permit tracking and compliance software; training

SUMMARY OF EXISTING PROTECTIONS/NEEDS MATRIX: TOWN OF LAKEVILLE				
Category of Protection Measure	***Description***	***Yes/No; Area Covered***	***Effectiveness and/or Enforcement***	***Improvements or Changes Needed***
	of measures aimed at disaster mitigation			for staff as first responders for regional and state facilities.
	Disaster Warning System	Yes. Town-wide	Yes. Cable TV; radio stations, also use door-to-door – often most effective.	Mobile apps for residents
	Evacuation Routes signed	No.	No.	NEED ROUTE SIGNS.
	Radio Communication	Town-wide	Adequate – would like redundancy capability	Pursue a DFG grant to establish redundancy for communications for emergency purposes (ideally a system like a Wireless Light Communications –WLC – system which uses fiber optic cable and above ground devices.
	Have all publicly-owned buildings undergone and passed a safety audit?	No.	Not all facilities completed	Complete safety audits where needed.
	Maintenance of Drainage Facilities	Town-wide in public ROW by Town Highway Dept.; Mass DOT along state highways that provide primary evacuation routes within town and on the perimeter	On an as needed basis, routine annual program followed as permitted within the Highway Department workload; Mass DOT has a three year Order of Conditions with the Conservation Commission for routine repairs and maintenance of drainage systems on Routes 18, 44, 105, 140, and County Road	Retain or increase the town's inspection schedule as needed due to storm events. Usually an extension of the order of Conditions (OOC) for Mass DOT prior to the three (3) year expiration date. This must be monitored by the Conservation Commission and Mass DOT to avoid OOC expiration (as it did in January of 2016).
	Animal Shelter located outside of disaster-prone area	Yes.	Next to the Town Highway Dept.	Currently developing improvement plans.

SUMMARY OF EXISTING PROTECTIONS/NEEDS MATRIX: TOWN OF LAKEVILLE				
Category of Protection Measure	***Description***	***Yes/No; Area Covered***	***Effectiveness and/or Enforcement***	***Improvements or Changes Needed***
Planning	Comprehensive Plan addresses flooding issues and acquisition of sensitive areas?	Town-wide	Considers needs and potential priority actions/allocations in such areas as infrastructure and facilities.	Master Plan is current, but is scheduled to be updated beginning in 2017-2018 (staring with housing, land use, and economic development elements)
	Open Space Plan addresses acquisition priorities?	Town-wide	Includes objectives and actions relative to purchasing land in critical natural landscape areas and restoring habitat.	None; the Open Space Plan is current and is scheduled to be updated in 2019
	Nemasket River Watershed 208 Plan (being finalized by The Nature Conservancy and Horsley Witten Group – projected final report in 2018)	Nemasket River Watershed	Recommendations for actions to be taken to improve water quality in the Nemasket River Watershed, including the Assawompset Ponds and significant tributaries; incorporating nature-based solutions when and where appropriate feasible.	Study. Educate. Enact recommendations as feasible (partner with regional groups to pursue funding and technical assistance).
	Green Infrastructure Network Maps and Assets (developed by the Resilient Taunton Watershed Network partnership, including SRPEDD, Manomet, Mass Audubon, and The Nature Conservancy)	Town-wide and Region-wide	Green Infrastructure analysis includes a network of lands of highest conservation value due to the multiple ecosystem services that they provide, including: flood control, improved water quality, habitat retention, and improved resiliency.	Study. Educate. Work with regional partners to address recommendations.
	Assawompsett Ponds Complex Management Plan; Assawompset Ponds Committee (APC)	Assawompset Ponds watershed area	Recommendations for land conservation, recreation, water quality, habitat management, hazardous materials management	The APC facilitates good education programs and special events; quarterly meetings; Lakeville Conservation Agent is the APC Ranger for the six municipalities involved. More

SUMMARY OF EXISTING PROTECTIONS/NEEDS MATRIX: TOWN OF LAKEVILLE				
Category of Protection Measure	***Description***	***Yes/No; Area Covered***	***Effectiveness and/or Enforcement***	***Improvements or Changes Needed***
				funding would be very helpful.
	Mass Audubon/TRWA – Stream Continuity Assessment of the Taunton River Watershed.	Town-wide; Region-wide	517 culverts in the watershed were assessed by trained, supervised, volunteer teams. A list of culverts with severe constrictions and/or in poor or damaged condition was established for each of the 27 cities and towns surveyed. A list of eight (8) culverts fitting these conditions was established for Lakeville.	Educate. Implement. Restoring stream continuity to impaired areas can help to control flooding, improve local resiliency, and maintain natural ecosystem functions.
Education & Training	Training for staff and volunteers	Town-wide	As required or feasible.	Plan to integrate training into the appropriate municipal programs, committees, sanctioned or required activities.
	Public workshops, cable TV presentations, flyers, etc., to educate the public.	To various groups/issues as requested or offered by government, professional and, non-profit agencies	Adequate	Need to do more and need to encourage greater municipal participation
	Wide range of materials available at town hall on preparedness.	Town-wide	Adequate	Try to widen distribution – consider mailing with tax bill, utility bill, annual town census.

Appendix G - Mitigation Action Prioritization

3=Best/Most Benefit/Least Cost/Easy or no permitting; **2**=Some benefit/Moderate Cost/Some potential permitting complications; **1**=Little to no benefit/Expensive/Complicated permitting required

		Benefits					Feasibility				Economic		Regulatory		
No.	**Description**	Protects Properties and Structures	Protects Natural Resources	Technical/Capacity Improvement (Training, Evaluations, Regulations, etc)	Improves Public Awareness	Improves Emergency Response or Public Protection After an Emergency	Appropriate Staffing Available	Technically Feasible	Public Support	Town/ Political Support	Cost	Funding Available / Attainable	Permitting/Regulatory Feasibility	Consistent with Local, State, & Federal Goals	Total Score
All-hazards															
1	Increase mitigation and preparedness training for vulnerable populations and first responders.	2	1	1	3	3	3	3	3	3	3	3	3	3	34
2	Utilize CIP for HMP implementation.	2	2	2	1	2	1	2	2	1	2	2	2	2	23
3	Increase public awareness about natural hazards in Lakeville.	2	1	2	3	3	3	3	3	3	3	3	2	3	34
4	Use tailorable electronic signs for emergency communication.	1	1	1	3	2	3	3	2	2	2	2	2	3	27
5	Include HMP functions in Town staff job descriptions.	3	3	3	2	3	3	3	3	3	3	3	3	3	38
6	Formalize training for Lakeville Public Information Officer (PIO)	2	2	3	3	3	3	3	3	3	3	3	3	3	37
Dam failure, Drought, Flood															
7	Improve emergency communications b/t all Assawompset Pond Complex communities	3	3	2	3	3	2	2	3	3	2	2	2	3	33
8	Update Community Emergency Management Plan (CEMP)	3	3	3	3	3	3	3	3	3	3	3	3	3	39
Hurricanes/ Tropical Storms															
9	Finalize Storm Ready community status.	3	2	3	3	3	3	3	3	3	3	3	3	3	38
Inland flooding (riverine and urban drainage/ localized)															
10	Regulatory actions for flood mitigation:	3	3	2	1	3	2	2	3	2	3	3	3	3	33
11	Conduct town-wide culvert assessment	3	3	3	1	3	3	3	3	3	3	3	3	3	37
12	Upgrade culverts of noted concern (see Chapter 5, Flooding)	3	3	3	1	3	2	3	2	3	2	1	2	2	30

13	Improve drainage by increasing infiltration at Freetown Street, County Road, Old Powder House Road, and Heritage Hill Dr	3	3	2	1	3	2	3	2	3	2	2	2	3	31
14	Develop an at-risk property acquisition program	3	3	2	2	2	2	1	2	2	1	1	2	2	25
15	Improve public education and outreach around flood risk and water quality	3	3	3	3	3	3	3	3	3	3	3	3	3	39
16	Try to pass the wetland protection bylaw again	2	3	3	2	1	2	3	2	3	2	2	2	3	30
17	Implement regional restoration and management plans. **(**also addresses **Invasive species)**	2	3	3	2	1	2	3	2	3	2	2	2	3	30
Severe thunderstorms / Wind / Tornado / Microburst															
18	Reduce vulnerability and risk of power outages.	3	2	3	2	2	2	3	3	3	1	1	2	2	29
19	Design future municipal projects to account for climate change.	3	3	3	1	3	3	3	3	3	3	3	3	3	37
Wildfire, Severe thunderstorms / Wind / Tornado / Microburst															
20	Regional forestry management	3	3	3	2	2	2	1	2	2	1	1	1	2	25