

Hazard Mitigation Plan

Town of Paxton

2025

CMRPC
Central Massachusetts Regional Planning Commission

Last updated 9/8/2026

TOWN OF PAXTON MASSACHUSETTS
INCORPORATED 1765

TOWN OF PAXTON

OFFICE OF THE SELECT BOARD
697 Pleasant Street, Paxton, MA 01612
Phone (508) 556-5743
Fax (508) 797-0966

Julia N. Pingitore, Chair
Jeffrey Wentzell, Vice Chair
Christopher M. Curtis, Clerk
Peter Bogren, Jr., Member
Steven Rebesco, Member

Robert Birkbeck
Town Administrator

Donna Graf-Parsons
Executive Assistant

RESOLUTION NO. _____

A RESOLUTION ADOPTING THE TOWN OF PAXTON HAZARD MITIGATION PLAN

WHEREAS, the Town of Paxton recognizes that natural hazards pose a significant threat to the safety, health, and property of its residents; and

WHEREAS, the Town of Paxton has developed a multi-hazard mitigation plan, hereinafter referred to as the **Paxton Hazard Mitigation Plan 6/29/2026**, in accordance with applicable federal law, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; and

WHEREAS, the Paxton Hazard Mitigation Plan identifies strategies and actions intended to reduce or eliminate long-term risk to people, property, and infrastructure from natural hazards and disasters; and

WHEREAS, adoption of this Plan by the Select Board demonstrates the Town's commitment to hazard mitigation and to implementing the goals and actions contained therein;

NOW, THEREFORE, BE IT RESOLVED THAT:

Section 1. The Select Board of the Town of Paxton hereby adopts the **Paxton Hazard Mitigation Plan 6/29/2026**.

Section 2. The Town acknowledges that portions of the Plan may require revisions to meet final approval requirements of state or federal agencies; however, such revisions shall not require the Plan to be re-adopted by the Select Board.

Section 3. The Town further recognizes that future updates to the Hazard Mitigation Plan, following the expiration of the current approval period, will require formal adoption by the Select Board.

ADOPTED by the Paxton Select Board on this 29th day of June, **2026**, by a vote of:
_____ in favor, _____ opposed, and _____ abstaining.

SELECT BOARD

Julia N. Pingitore, Chair

Jeffrey A. Wentzell, Vice Chair

Christopher Curtis, Clerk

Peter Bogren, Jr., Member

Steven Rebesco, Member

ATTEST:

Laurie Becker, Town Clerk

APPROVED AS TO FORM:

Town Counsel

This Certificate of Adoption helps meet:

- *F1. "For single-jurisdictional plans, has the governing body of the jurisdiction formally adopted the plan to be eligible for certain FEMA assistance?" (Requirement 44 CFR § 201.6(c)(5)).*

ACKNOWLEDGEMENTS

This Acknowledgements section helps meet:

- *A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))"*

This Hazard Mitigation Plan (HMP) update was funded in part by District Local Technical Assistance and in part by the Federal Emergency Management Agency (FEMA) via the Massachusetts Emergency Management Agency (MEMA). This Plan was prepared for the Town of Paxton by the Central Massachusetts Regional Planning Commission (CMRPC).

The Paxton Select Board extends its thanks to participants in the Local Hazard Mitigation Team for their time and hard work in participating in this timely project. Core Team members include:

- Carol Riches, Town Administration, Select Board Member
- Heather Munroe, Town Administration, Town Administrator
- Robert Birkbeck, Town Administration, Interim Town Administrator
- Travis Thibault, Department of Public Works, Superintendent
- Michael Pingitore, Fire Department, Fire Chief
- Jeff Olson, Fire Department, Fire Captain
- Forrest Thorpe, Paxton Police Department, Police Sergeant
- Mark Wilde, Wachusett Regional School District, Facilities Director
- Tara Rondeau, Paxton Light Department, Manager
- Timothy White, Paxton Light Department, Manager

In addition, thanks are extended to the staff of the Central Massachusetts Regional Planning Commission for process facilitation and preparation of this document.

- Marc Granato, Emergency Preparedness Planner
- Danielle Marini, Associate Resiliency Planner (former)
- Will Talbot, Assistant Resiliency Planner
- Sarah Plutnicki, Associate Resiliency Planner
- Rory Dickenson, Intern
- Benjamin Spencer, Resiliency Intern (former)
- Matthew Franz, GISP, Project Manager, GIS Specialist
- Andrew Loew, AICP, Director, Community Development & Resiliency Planning
- Trish Settles, AICP, Deputy Executive Director, Regional Collaboration & Community Planning

Thanks are also due to the Massachusetts Emergency Management Agency (MEMA) for guidance and feedback regarding this plan.

Contents

Acknowledgements 3
1.0 Introduction 6
1.1 Disaster Mitigation Plan 6
1.2 Plan Purpose 6
1.3 Planning Process 7
2.0 Community Profile and Development Trends 12
2.1 Regional and Community Profile 12
2.2 Development Trends 14
3.0 Critical Facilities and Vulnerable Populations 16
3.1 Critical Facilities Within Paxton 16
3.2 Category 1 – Emergency Response Facilities 17
3.3 Category 2 – Non-Emergency Response Facilities 19
3.4 Category 3 – Dams 20
3.5 Category 4 – Facilities/Populations to Protect 21
4.0 Hazard Profiles, Risk Assessment & Vulnerabilities 26
4.1 State-wide Overview of Hazards 27
4.2 Natural Hazard Identification and Analysis 31
4.3 Flooding 35
4.4 Severe Snowstorms / Ice Storms / Nor'easters 42
4.5 Hurricanes 50
4.6 Severe Thunderstorms / Wind / Tornado 56
4.7 Wildfires / Brush Fires 65
4.8 Earthquakes 72
4.9 Dam Failure 78
4.10 Drought 82
4.11 Extreme Temperatures 89
4.12 Invasive Species 95
4.13 Other Hazards 101
5.0 Existing Protection Measures 102
5.1 Existing Protection Matrix 104
6.0 Status of Mitigation Measures From 2017 Plan 111
7.0 Mitigation Strategy 115
7.1 Priority and Impact 115
7.2 Estimated Cost 116
7.3 Timeline 116
7.4 Strategy Types 117
7.5 Town of Paxton 2024 Hazard Mitigation Strategies 118
8.0 Plan Adoption, Implementation, And Maintenance 138
8.1 Plan Adoption 138
8.2 Plan Implementation 138

8.3 Plan Monitoring and Evaluation..... 140
8.4 Potential Federal and State Funding Sources..... 142

1.0 Introduction

1.1 Disaster Mitigation Plan

Congress enacted the Disaster Mitigation Act of 2000 (DMA 2000) on October 10, 2000. Also known as the Stafford Act Amendments, the bill was signed into law by President Clinton on October 30, 2000, creating Public Law 106-390. The law established a national program for pre-disaster mitigation and streamlined the federal administration of disaster relief. Specific rules on the implementation of DMA 2000 were published in the Federal Register in February 2002 and required that all communities must have a Hazard Mitigation Plan in place in order to qualify for future federal disaster mitigation grants following a Presidential disaster declaration. The Hazard Mitigation Plan emphasizes measures that can be taken to reduce or prevent future disaster damage caused by natural hazards. In the context of natural hazard planning, Pre-Disaster Mitigation refers to any action that permanently reduces or eliminates long-term risks to human life and property.

1.2 Plan Purpose

This plan identifies the natural hazards facing the Town of Paxton, assesses the vulnerabilities of the area's critical facilities, infrastructure, residents, and businesses, and presents recommendations to mitigate the adverse effects of typical natural hazards.

New England weather is renowned for its mercurial and dramatic nature. Late summer hurricanes, major winter blizzards, and summer droughts are all part of the climatic atmosphere in Central Massachusetts. These occur frequently enough to be familiar scenes to residents of Paxton. The intersection of these natural hazards with the built environment can transition these routine events into classified natural disasters. In addition, as climate change continues to progress, the severity and frequency of hazard risk will increase.

This planning effort has drawn on the knowledge of local municipal officials and residents. The recommendations presented in the following report are intended to be realistic and practical steps for mitigating natural hazards and preparing the community as best as possible for the effects of climate change. Implementation of these actions will translate into savings – fewer lives lost, less property destroyed, and less disruption to essential services and ecological systems.

1.3 PLANNING PROCESS

Section 1.3 helps meet:

- *A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?" (Requirement 44 CFR § 201.6(c)(1));*

- *A2. "Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process?" (Requirement 44 CFR § 201.6(b)(2)); and*

- A3. *"Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval?" (Requirement 44 CFR § 201.6(b)(1))*

This Hazard Mitigation Plan (HMP) update was funded in part by District Local Technical Assistance and in part by the Federal Emergency Management Agency (FEMA) via the Massachusetts Emergency Management Agency (MEMA). Funding through this program was provided by the Baker-Polito Administration and the Massachusetts General Assembly (Legislature). Technical assistance was administered by the Central Massachusetts Regional Planning Commission (CMRPC) for the update of this plan. This Plan was prepared for the Town of Paxton by the Central Massachusetts Regional Planning Commission (CMRPC).

The planning process was composed of two distinct but related phases – data collection and technical review, and public input and planning. Identification of natural hazards impacting the Town of Paxton was accomplished through review of available information from various sources. These included federal and state reports and datasets, existing plans, and in some cases engineering documents. An assessment of risks and vulnerabilities was performed primarily using geographic information systems (GIS) to identify the infrastructure (critical facilities, public buildings, roads, homes, businesses, etc.) at the highest risk for being damaged by hazards, particularly flooding. Local knowledge as imparted by town officials, staff, emergency management volunteers and others was a critical element of this phase.

The second phase of the process was focused on outreach, public participation and input, and planning. This phase was critical to ensuring awareness of the planning process among a wide range of local officials, coordinating plan elements with other sectors of the community, and providing opportunities for public comment and input from a representative base of residents and other stakeholders in each community. Through this engagement, CMRPC was better able to gauge community priorities for mitigation and to understand local resources and existing policies and procedures. With this information in hand, the planning team was able to develop an informed and community-specific list of mitigation strategies for each participating town.

In Paxton, a planning team of local staff and volunteers led by former Town Administrator Carol Riches met four times to discuss and assess natural hazards, critical infrastructure and facilities, and plan priorities and strategies. Those meetings were held on August 25, 2021, October 19, 2021, November 30, 2021, and December 14, 2021. Following supplemental funding for the plan in 2023 the Planning team now being led by Mike Pingitore of Paxton Fire department met 5 additional times to update the data previously collected and to realign the planning process with FEMA's updated HMP guidance. The meetings occurred on February 21, 2024, March 21, 2024, April 25th 2024, June 12, 2024 and July 18, 2024. The Paxton Hazard Mitigation Team members included the following:

Carol Riches, Town Administration, Select Board Member

Heather Munroe, Town Administration, Town Administrator

Travis Thibault, Department of Public Works, Superintendent

Michael Pingitore, Fire Department, Fire Chief

Jeff Olson, Fire Department, Fire Captain

Forrest Thorpe, Paxton Police Department, Police Sergeant

Mark Wilde, Wachusett Regional School District, Facilities Director

Tara Rondeau, Paxton Light Department, Manager

Timothy White, Paxton Light Department, Manager

Between meetings and during development of the draft and final plans, information and comments were shared among the local team and CMRPC. On March 29, 2024, the Hazard Mitigation Planning team launched a public survey to gauge resident, worker, visitor, and business owner concerns about and experiences with natural hazards in Town. The survey was distributed on the Town's website and social media pages, and flyers for and paper copies of the survey were distributed around Town. A total of 79 responses were collected. Survey responses were discussed by the local planning team at its July 18, 2024 meeting and helped inform the development and prioritization of mitigation strategies. Representatives from the surrounding communities of Holden, Worcester, Leicester, Spencer, Oakham and Rutland were invited to comment on the draft plan during the public comment period in an effort gather input from surrounding communities who might have shared interests or concerns. As planning activities progressed, a public presentation was made by CMRPC and the local planning team on September 23rd, 2024 at a Paxton Select Board meeting to provide a summary of key aspects of the draft plan report then being finalized. The presentation was televised on the local cable access channel and the opportunity for public comment was emphasized. Materials and notes from the presentation and subsequent public discussion are included in the appendix. A full draft plan was provided to the Town for distribution and made available online at CMRPC's website for public comment for four weeks starting on October 28th 2025. In addition, the final draft plan was distributed to officials in all neighboring communities for review and input regarding shared hazards. The plan received no feedback was provided during

the public forum or the public comment period.

The final draft plan was submitted to MEMA for review on December 19th, 2025, and was then relayed to FEMA for federal review. After receipt of FEMA's notice of approval pending adoption on May 6th, 2026, the plan was formally adopted by vote of the Board at the June 29th, 2026 meeting of the Select Board.

The Paxton Planning Board is the primary Town agency responsible for regulating development in town. Feedback to the Planning Board was ensured through the participation of the Town Administrator on the local hazard planning team. In addition, CMRPC, the State-designated regional planning authority for Paxton, works with all agencies that regulate development in its region, including the municipal entities listed above and state agencies, such as Department of Conservation and Recreation and MassDOT. This regular involvement ensured that during the development of the Paxton Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated. Engaging a diverse array of representatives, stakeholders, community lifelines, and organizations promoted the creation of mitigation strategies for local recovery and resilience efforts in town. Paxton's planning process exemplified engagement of stakeholders from a broad range of sectors whose inclusion in local government is critical for equitable, effective, and comprehensive risk reduction outcomes.

The following community lifelines were sent the full draft plan during the public comment period for their review and input. FEMA defines community lifelines as "the most fundamental services in the community that, when stabilized, enable all other aspects of society to function.[1]" In addition, these community lifelines were sent a survey in which they could describe any concerns related to natural hazards in Paxton they have as well as how they would like to participate in the Paxton HMP planning process. Nine of these community lifelines responded to this survey, and their input was considered by CMRPC and the HMP planning team in town during the planning process. The results of this survey are shown in Appendix B.

Safety and Security Lifelines:

- Local Planning Team
- Town Government - Holden
- Town Government - Worcester
- Town Government - Leicester
- Town Government - Spencer
- Town Government - Oakham
- Town Government - Rutland
- Paxton Fire Department
- Paxton Police Department

[1] FEMA, "Local Mitigation Planning Policy Guide," FEMA.gov, Federal Emergency Management Agency, April 19, 2022, page 17, https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf.

Food, Water, and Shelter Lifelines:

- WRSD Central Office
- Senior Center
- Big Y
- Wachusett Food Bank
- American Red Cross
- Worcester County Food Bank

Health and Medical Lifelines:

- St. Vincents
- UMass Medical

Energy Lifelines:

- Paxton Municipal Light Department
- Eversource
- National Grid

Communications Lifelines:

- Wachusett Regional Dispatch Center
- Paxton Public Access
- Verizon
- Charter

Transportation Lifelines:

- Paxton DPW
- MassDOT
- WRTA
- AA transportation (School Busses)
- Genessee and Wyoming
- Sterling Regional Airport
- Worcester Regional Airport
- Central Mass EMS AMBU Bus

Hazardous Materials Lifelines:

- MassDEP
- State Haz Mat Team

Water Systems Lifelines:

- DPW
- Upper Blackstone Clean Water

2.0 Community Profile and Development Trends

2.1 Regional and Community Profile

The Central Massachusetts Regional Planning Commission (CMPRC) region occupies roughly 1,000 square miles in the southern two-thirds of Worcester County, Massachusetts. The area surrounds the City of Worcester, the second-largest city in Massachusetts and New England, with a population of 206,518, according to the 2020 US Census. Nearly 580,016 people reside in the CMRPC Region; of those, 5,004 live in the Town of Paxton.[2]

The CMRPC area is framed on the west by the Central Massachusetts uplands, on the south by Rhode Island and Connecticut, on the east by the Boston metropolitan area, and on the north by the Montachusett region in northern Worcester County. The forty-community region has been divided for planning purposes into six sub-regions, determined by shared characteristics and roadway corridors. Paxton is located in the North sub-region, consisting of seven towns including: Barre; Holden; Oakham; Paxton; Princeton; Rutland; and West Boylston. Although Paxton lies within CMRPC's North sub-region, it is tied to towns in CMRPC's southeast region by being partially contained within the Blackstone River Valley. Paxton is part of three watersheds in Massachusetts, the least of which being the Nashua watershed to the north, then comes the Blackstone watershed in the southeast, and finally the Chicopee watershed, of which half of Paxton is a part on its west side. The Town of Paxton is most similar to its neighboring towns in the northwest, all of which are members of the Chicopee watershed. These Towns exhibit rural, forested, beautiful open space, and agricultural characteristics, with intermittent but thriving small businesses.

Massachusetts has a humid continental climate, with maritime influences increasing from northwest to southeast. According to National Oceanic and Atmospheric Administration (NOAA) National Weather Service data collected from 2000 through 2021 in nearby Worcester, MA, monthly average temperatures range from 25.0 degrees in January to 71.2 degrees in July. Precipitation is relatively high at 49.38 inches annually, including 73.9 inches of snowfall. With a temperate climate and a location some 40 miles from the Atlantic coast, Paxton and its neighboring communities are subject to a variety of severe weather, including hurricanes, nor'easters, thunderstorms, and blizzards.

The Town of Paxton, Massachusetts was incorporated in 1756. Paxton is located along Massachusetts Scenic Byway Route 122, and despite its proximity to the City of Worcester remains a rural community with a sparse population and a small village center. Route 122 provides a direct connection to the City of Worcester on its southeast side, and the remaining towns Paxton borders include: Leicester to the south, Spencer to the southwest, Oakham to the west, and Holden to the northeast. Its employment statistics are fair: as of July 2024, Paxton's workforce includes 2,760

[2] "P1: Race," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=Paxton%20town%20Massachusetts.

people, with an unemployment rate of 4.5%.[3]

Paxton has a total area of 15.5 square miles and a population of 5,004 according to the 2020 US Census. Paxton is a demographically stable community; according to CMRPC Long Range Transportation Plan, Mobility 2040, the Town of Paxton is expected to experience minimal population growth over the next 25 years: from 4,806 in 2010 to 5,493 in 2040; an increase of less than 1,000 people.[4] The number of residents has steadily grown from 4,047 in the 1990 US Census, to 4,386 in 2000, 4,806 in 2010, and to 5,004 in 2020.[5] Paxton is a largely white community, with 88.3% of residents identifying as white alone; the second largest racial/ethnic group was Hispanics or Latinos at 6.0%, followed by Black or African American at 3.5%, according to the 2020 US Census.[6] The Town of Paxton's age breakdown is as follows: persons under 5 years old is 4.8%, persons under 18 years old is 18.5%, and persons 65 and over is 16.3%. This is similar to the age breakdown for the State of Massachusetts, with persons under 5 years old at 5.2%, persons under 18 years at 19.6%, and persons 65 years and over at 17.0%.[7]

The median age in town, according to the 2020 US Census, is 36.9 years old, which is lower than the State's median age at 39.9.[8] At $130,787 median household annual income in Paxton (according to 2022 American Community Survey 5-year estimates) is significantly higher than the State at $96,505 and Worcester County at $88,524.[9] The poverty rate in town (according to 2022 ACS 5-year estimates) is 1.4%, well below the State's and Worcester County's rates of, respectively, 9.9% and 10.0%.[10] With a median value of owner-occupied housing units at $434700 according to 2022 ACS 5-year estimates, housing costs in Town are slightly higher compared to the State and to Worcester County, whose comparable numbers are $483,900 and

[3] Massachusetts Department of Economic Research, "Municipal Employment Data: Paxton - 2010," lmi.dua.eol.mass.gov, March 2024, https://lmi.dua.eol.mass.gov/lmi/MunicipalEmploymentData/LmiTown?A=000514.

[4] Central Massachusetts Metropolitan Planning Organization. "2050 Connections: 2024 Long Range Transportation Plan for the Central Massachusetts Metropolitan Planning Organization," Cmrpc.org, Central Massachusetts Regional Planning Commission, July 19, 2023, page III-5, https://cmrpc.org/wp-content/uploads/2024/05/2050-Connections-Endorsed-Document.pdf.

[5] "Paxton," Cmrpc.org, Central Massachusetts Regional Planning Commission, accessed August 28, 2024, https://cmrpc.org/data-center/community-snapshots/paxton/.

[6] "DP1: Profile of General Population and Housing Characteristics," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table/DECENNIALDP2020.DP1?q=dp1%20Paxton%20MA

[7] Ibid

[8] Ibid

[9] "S1903: Median Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars)," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=s1903%20Paxton%20MA

[10] "S1701: Poverty Status in the Past 12 Months," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table/ACSST5Y2022.S1701?q=ACS%20Massachusetts%20s1701&g=050XX00US25027_060XX00US2502746820.

$363,200, respectively.[11] According to 2022 ACS 5-year estimates, 88.2% of occupied homes are single-family homes (detached or attached), and 11.8% are multi-unit structures.[12] With a 4.3% vacancy rate according to the 2020 US Census, vacancies in Paxton are relatively lower than the State and Worcester County with 8.3% and 5.7% vacancy rates respectively.[13] The majority of houses in Paxton were built between 1940 to 1959 (31.4%), between 1960 to 1979 (25.9%), and between 1980-1999 (17.7%). Only 13.8% of houses in Paxton were built in 1939 or earlier, compared to 31.6% for Massachusetts, and 28.5% for Worcester County.[14]

2.2 Development Trends

Section 2.2 helps meet:

E1. "Was the plan revised to reflect changes in development?" (Requirement 44 CFR § 201.6(d)(3))

Town of Paxton Development Projects between 2017 - 2024

Name	Status	Year	Housing Units	Commercial SQ Feet	Project Type
1 & 2 family	complete	2017-2024	7	NA	Single & 2 Family Homes[15]

Despite its proximity to Worcester, the Town of Paxton is a sparsely developed rural/ semi-rural community.

The Town and various responsible boards and commissions should ensure that new development processes take potential and known hazards into account and ensure mitigation of hazards occurs when needed. Paxton utilizes various methods to ensure new development conforms with current Massachusetts General Laws and the Town's Bylaws. The Planning Board, Conservation Commission

[11] "DP04: Selected Housing Characteristics," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=DP04%20Paxton%20MA

[12] "S2504: Physical Housing Characteristics for Occupied Housing Units," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=S2504%20Paxton%20MA

[13] "DP1: Profile of General Population and Housing Characteristics," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table/DECENNIALDP2020.DP1?q=dp1%20Paxton%20MA.

[14] "DP04: Selected Housing Characteristics," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=DP04%20Paxton%20MA.

[15] SOCDS Building Permits Database. "Housing Unit Building Permits for: PAXTON TOWN, MA", United States Department of Housing and Urban Development, Accessed August 26th, 2024, https://socds.huduser.gov/permits/output_monthly.odb

and Zoning Board of Appeal (ZBA) consider water resource and open space preservation in decision making and, in the case of the ZBA, when hearing and deciding on appeals. This consideration includes specific evaluation criteria that are relevant to natural hazards – including requirements for preventing and mitigating flooding and stormwater impacts. The Town's Bylaws are amended and updated on an as needed basis to adapt to the needs and shifting forces that affect the Town. As of writing this plan the town of Paxton has completed a comprehensive bylaws review that does take natural hazards into account.

Paxton has had very little development in the past years between the previous plan and this one, and what has been developed has not been located within identified hazard areas or FEMA flood hazard areas. It is not anticipated that the developments within Paxton have significantly increased the vulnerability of the town to natural hazards.

New development in Paxton needs to be in line with the state building code. Paxton currently has adopted the Base Code for the state. As the population of Paxton continues to grow and additional development occurs, officials should seek to further integrate hazard mitigation practices into its planning and development processes. In 2008, the Town of Paxton updated its Master Plan, and this was a process which gave the Town an opportunity to identify threats and prioritize strategies to address them. Future updates to this Master Plan should take climate change into account; according to current predictions, will lead to an increase in extreme storm events, including more rain in shorter amounts of time. Planning for the future impacts of climate change is imperative to protecting the citizens of Paxton.

3.0 Critical Facilities and Vulnerable Populations

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.

3.1 Critical Facilities Within Paxton

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

- Emergency Response Facilities needed in the event of a disaster
- Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event but are considered essential for the everyday operation of Paxton.
- Dams
- Facilities/Populations that the Team wishes to protect in the event of a disaster

Critical infrastructure and facilities are mapped in Appendix A.

3.2 Category 1 – Emergency Response Facilities

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

Type	Name	Address	Details	Has Emergency Generator?
Emergency Operations Center	Paxton Public Safety Building	576 Pleasant Street	The local planning team notes that the Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage.	Yes
Fire Station	Paxton Public Safety Building	576 Pleasant Street	See above.	Yes
Communications/Power Facilities	Paxton Town Hall	697 Pleasant Street	The local planning team notes that the Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage.	Yes, but it is undersized for the needs of the facility.
	Communications/Radio/Cell & Microwave Tower	Asnebumskit Road	The local planning team notes that all of the communication	No

			towers are vulnerable to lightning strikes.	
	Communications/Radio/Cell & Microwave Tower	Maple Street	The local planning team notes that this facility has experienced lightning strikes.	No
	Communications/Radio/Cell & Microwave Tower	Pleasant Street	There are no noteworthy concerns regarding natural hazard impacts on this facility.	No
	Wentworth Power Station	Marshall Street	Located within locally identified hazard area for lightning strikes.	No
DPW Facilities	DPW Headquarters	107 Holden Road	The local planning team notes that the DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.	Yes
Emergency Shelter Sites	Paxton Center School	19 West Street	The local planning team identified this as a dispensing site in addition to being a shelter. This facility is unsprinklered,	No
	Anna Maria College	50 Sunset Lane	Primary shelter facility for the town	Yes
	Congregational Church	1 Church Street	Identified as a potential site for sheltering by planning Team	No

	St. Columbia Church	10 Richards Avenue	Identified as a potential site for sheltering by planning Team	No
Primary Evacuation Routes	Route 122	N/A		N/A
	Route 56	N/A		N/A
	Route 31	N/A	The local planning team notes that the water table is high on part of this route,	N/A
	Marshall Stret	N/A	Locally identified evacuation route.	N/A

3.3 Category 2 – Non-Emergency Response Facilities

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton

Type	Name	Address	Details	Has Emergency Generator?
Water Supply	Water Department	107 Holden Road	The local planning team notes that the town Purchases 100% of its water from Worcester Water. The Local Planning Team is also concerned about damage that falling trees could cause on these pre-fab buildings (high winds, hurricanes, snow load, lightning strikes	Yes
	Asnebumskit Water Tank	Maple Street	Maple Street Tank renamed to Asnebumskit Tanks in 2020	Yes

	Asnebumskit Pond	N/A	Included in Dam Section Below	Yes
	Kettle Brook Reservoir #3	N/A	Included in Dam Section Below	Yes
	Kettle Brook Reservoir #4	N/A	Included in Dam Section Below	Yes
	Pine Hill Reservoir		Included in Dam Section Below	Yes
	Pump Station	Sits Lane	The Local Planning Team notes that the town has aging water infrastructure that is in need of upgrading.	Yes
Utilities	Distribution Lines	N/A	Runs SE -NW through Town	N/A
	Asnebumskit Hill Radio Towers	N/A		Yes
	PMLD Battery Storage Site	Paxton, MA	Paxton Municipal Light Department (PMLD) partnered with Lightshift Energy to deploy a 3 MW battery storage system. This allows for advantageous rates for Paxton's electricity as well as emergency power in Paxton.	N/A

3.4 Category 3 – Dams[16]

The third category is a listing of dams in and around Paxton.

National ID	Dam Name	Owner	Regulatory Authority	Hazard Code	Notes
MA00676	Eames Mill Pond Dam	Public	Office of Dam Safety	Significant	Had work done recently
MA00677	Kettle Brook Reservoir	Public	Office of Dam Safety	High	MA00677

[16] "MassGIS Data: Dams," Mass.gov, Massachusetts Bureau of Geographic Information, February 2012, https://www.mass.gov/info-details/massgis-data-dams.

	#4 Dam				
MA00678	Streeter Pond Dam	Private	Office of Dam Safety	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Office of Dam Safety	Significant	Considered a High Hazard by local planning team.
MA01962	Small Pond Dam	Private	N/A	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	N/A	
MA01965	Cournoyer's Dam	Private	N/A	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	N/A	Had work done recently

For additional information on dams and the dam failure hazard in Paxton, also see Chapter 4.

3.5 Category 4 – Facilities/Populations to Protect

Type	Name	Address	Details
Special Needs Population/Apartment Complexes/Assisted Living/ Housing Authority	John Bauer Senior Center	Heritage Lane	Affected by Snow Load and Flooding
	Group Home	420 Pleasant Street	Affected by Snow Load and Flooding
	Group Home	54 Streeter Road	Affected by Snow Load and Flooding
	Group Home	270 Pleasant Street	Affected by Snow Load and Flooding
	Group Home	2 Pine Street	Affected by Snow Load and Flooding
	Group Home	260 Grove Street	Affected by Snow Load and Flooding

	Group Home	157 Suomi Street	Affected by Snow Load and Flooding
	Group Home	132 Marshall Street	Affected by Snow Load and Flooding
	Group Home	60 Marshall Street	Affected by Snow Load and Flooding
	Group Home	33 Camp Street	Affected by Snow Load and Flooding
	Devereaux Group Home	461 Pleasant Street	Affected by Snow Load and Flooding
Schools/Daycares	Paxton Elementary School	19 West Street	Affected by Snow Load and Flooding
	Tiny Explorers Daycare/ Early Childhood School	75 MAIN ST	There are no noteworthy concerns regarding natural hazard impacts on this facility.
Historic Buildings/Sites[17]	According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in August 2024, there are 4 Areas, 99 Buildings, 2 Burial Grounds, 19 Objects, and 5 Structures listed for Paxton. 1 of these historic areas, 3 of these structures, and 1 of these objects lie within regulated or locally identified flood areas within town. The three structures being Eams Pond Dam, 2 Bridges, and the object being a historic plaque outside the Paxton Town Water Pumping Station.		

Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD),[18] the following table shows the largest employers in Paxton:

[17] "Search Results," Mhc-macris.net, Massachusetts Historical Commission, accessed June 21, 2024, https://mhc-macris.net/queryresults.

[18] "Largest 100 Employers in Paxton," Lmi.dua.eol.mass.gov, Massachusetts Department of Economic Research, accessed June 21, 2024, https://lmi.dua.eol.mass.gov/lmi/MunicipalEmploymentData/LmiTown?A=000514.

Company name	Address	Number of Employees
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton..[19] Although there are no EJ populations in town, it is still important for the Town to consider EJ populations and other vulnerable community members in the hazard mitigation planning process. In Paxton, according to the 2020 US Census, 22.8% of the population is under the age of 18 and 19.1% of the population is 65 years and over.[20] According to 2022 ACS 5-year estimate data, approximately 8.7% of the population in town speaks a language other than English at home.[21] Approximately 8.7% of the population in Paxton has a disability according to this same data.[22] This 2022 ACS 5-year estimate data also shows that people without health insurance account for about 0.9% of Paxton's

[19] "Massachusetts 2020 Environmental Justice Populations," Mass-eoeea.maps.arcgis.com, Massachusetts Executive Office of Energy and Environmental Affairs, November 12, 2022, https://mass-eoeea.maps.arcgis.com/apps/webappviewer/index.html?id=1d6f63e7762a48e5930de84ed4849212.

[20] "DP1: Profile of General Population and Housing Characteristics," Data.Census.gov.

[21] "S1601: Language Spoken at Home," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=s1601%20paxton%20masachusetts%20town.

[22] "S1810: Disability Characteristics," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=s1810%20paxton%20massachusetts.

population[23] and about 8% of the Town's population is living in poverty.[24]

Outreach to vulnerable community members was a vital part of the public outreach strategy for the Paxton Hazard Mitigation Plan. Paper HMP surveys were available at the Tow Hall, library, and senior center and CMRPC staff conducted a presentation at a hybrid Select Board meeting in Town during the planning process; these measures allowed residents who lack access to reliable Internet service and/or who have difficulty using the Internet to have a chance to complete the survey and provide their feedback on the planning process. The public presentation for the draft plan was televised on local cable access TV.

[23] "S2701: Selected Characteristics of Health Insurance Coverage in the United States," Data.Census.gov, United States Census Bureau, accessed June 21, 2024, https://data.census.gov/table?q=s2701%20paxton%20massachusetts.

[24] "S1701: Poverty Status in the Past 12 Months," Data.Census.gov.

4.0 HAZARD PROFILES, RISK ASSESSMENT & VULNERABILITIES

Sections 4.0-4.13 help meet:

- B1. "Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events?" (Requirement 44 CFR § 201.6(c)(2)(i);
- *B2. "Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods?" (Requirement 44 CFR § 201.6(c)(2)(ii));*
- *C1. "Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?" (Requirement 44 CFR § 201.6(c)(3)); and*
- *E1. "Was the plan revised to reflect changes in development?" (Requirement 44 CFR § 201.6(d)(3))*

The following section includes a summary of natural hazards that have affected or could affect Paxton in the future. Natural hazards are weather, climate, or environmental threats to lives, property, or other valuable assets to human society. By examining historical data on natural hazard occurrences, and future projections of how climate change will interact with natural hazards, it is possible to approximate the future risk of natural hazards. Historical research, discussions with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to develop this list.

The most significant identified hazards are the following:

- Flooding
- Severe Snowstorms / Ice storms/ Nor'easters
- Hurricanes
- Severe Thunderstorms / Wind / Tornadoes
- Wildfires / Brushfires
- Earthquakes
- Dam failure
- Drought
- Extreme Temperatures
- Invasive Species
- Other hazards

4.1 State-wide Overview of Hazards

4.1.1 Massachusetts State Hazard Mitigation and Climate Adaptation Planning

The Commonwealth of Massachusetts and Governor Healy's administration has updated the 2018 State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) pursuant to Executive Order 569. The 2023 ResilientMass Plan updates and expands upon the previous SHMCAP and outlines how the Commonwealth of Massachusetts must prepare strategies to prevent, respond, and mitigate natural hazards.[25] The plan is the first of its kind to incorporate climate change adaptations into the mitigation plan. The plan also makes Massachusetts eligible for federal disaster recovery and hazard mitigation. The plan is effective under FEMA from September 12, 2023, to September 13, 2028. The Massachusetts SHMCAP is a useful model for incorporating climate change interactions into the natural hazard mitigation planning process.

4.1.2 Climate Change Interactions

As part of the creation of the SHMCAP planning process, the state of Massachusetts performed a statewide analysis that detailed the effects of climate change on the cities and towns of Massachusetts. This culminated with the release of the 2022 Climate Change Assessment, which details the impacts of climate change to the Central Region of Massachusetts (which includes 55 cities and towns spanning the middle of the State) among the other regions of the state. This report refocuses climate change impact assessment away from the specific hazards and towards how the most urgent of those hazards would affect the region in the following Sectors: Human, Infrastructure, Natural Environment, Governance and Economy. The hazards identified as having the most urgent impacts for Central Massachusetts are **Extremes in Temperature and Precipitation**, with wide fluctuations in both precipitation extremes (including both flooding and droughts) as well as extremes in temperatures (both in high heat days becoming more prevalent, as well as extreme lows in temperature) as having the greatest future risk to the central region across these sectors.
The State plan, while being comprehensive, places different priorities on the impacts of climate change and natural hazards than the local planning team. This is based more on the local conditions rather than any contradictions with the State's Analysis, and the local hazard mitigation planning effort was informed by the state planning process.

- **Human Impacts**: The assessment identified a **Reduction in Food Safety and Security**, and **Health and Cognitive Effects** from extreme heat being the most urgent human sector impacts for the central region. The reduction in food safety and security is likely to be affected at all levels of production and distribution by both extremes in temperature causing spoilage, power outages as well as extremes in precipitation creating a more unpredictable environment for the growth of produce. According to the report Reduction in crop yields across the state and within the region plays a role in this impact with key commodity crop

[25] "2023 ResilientMass Plan," Mass.gov, Massachusetts Executive Office of Energy and Environmental Affairs, accessed June 10, 2024, https://www.mass.gov/info-details/2023-resilientmass-plan.

yields in the Central region could decline by 12 percent by 2030[26]. These impacts to the supply chain for food regionally are expected to be reflected in state and national crop yields and distribution, and while currently our food supply networks are anticipated to be able to withstand these shocks, the subsequent increases in food prices will correspondingly see an increase in food insecurity within our region.

The impacts of Extreme Temperatures are also projected to have a significant impact on health and cognition within our region, particularly in our more urbanized areas. Currently, three annual premature deaths are attributable to extreme temperatures in the region, but approximately 35 additional premature deaths per year are expected as a result of climate change by the end of the century[27], assuming that no mitigation measures are taken to reduce the threat of temperature extremes beyond what our regions current capabilities are. Even short of mortality, the impacts of heat on cognition could cause a further decline in learning outcomes, workplace productivity, and see an increase in usage and strain upon emergency rooms dealing with heat related illnesses and injuries.

Additional Human Sector impacts include **Increases in Mental Health Stressors; Increases in Vector Borne Diseases Incidence and Bacterial Infections; Damage to Cultural Resources; Health Effects from Aeroallergens and Mold; Emergency Service Response Delays and Evacuation Disruptions; Health Effects of Extreme Storms and Power Outages; and Health Effects from Degraded Air Quality** as human impacts to the region.

- **Infrastructure Impacts**: The most urgent impacts to the infrastructure sector are the **Loss of Urban Tree Cover** and **Damage to Electric Transmission and Distribution Infrastructure**. Urban Trees face a broad range of climate impacts and stressors: from a projected increase in extreme event activity, increased threats from invasive pests and diseases, and reduced water and soil quality all correspond to an increased rate of tree mortality and associated costs of urban forest management for towns. Central Massachusetts features both urban and suburban centers where projected temperature increases make urban tree coverage particularly valuable at reducing the Heat Island Effect. A prime example of this is the City of Worcester, which is the state's second most populous city. 75 percent of the city's area falls within state-designated environmental justice block groups, but it has relatively low

[26] Estimates derived from application of data from the following two sources:

USEPA, "Multi-Model Framework for Quantitative Sectoral Impacts Analysis: A Technical Report for the Fourth National Climate Assessment," U.S. Environmental Protection Agency, 2017, EPA 430-R-17-001; Robert H. Beach et al., "Climate change impacts on US agriculture and forestry: benefits of global climate stabilization," *Environmental Research Letters* 10, no. 9 (2015). doi:10.1088/1748-9326/10/9/095004.

[27] Estimates derived from application of David Mills et al., "Climate change impacts on extreme temperature mortality in select metropolitan areas in the United States.," *Climatic Change* 131 (2014): 83-95. https://doi.org/10.1007/s10584-014-1154-8.

canopy coverage and is at disproportionate risk for urban tree loss.[28]

Regionwide Damage to Electric Transmission and Distribution is projected to have increasing costs by orders of magnitude in the coming decades, with additional annual costs growing to $6 million by 2030; $12 million by 2050; $19 million by 2070; and $28 million by 2090.[29] These costs are based on the need for repair activities in response to climate related damages and failures, and take into account a wide range of climate stressors beyond extremes in temperature and precipitation.

Additional Infrastructure Sector Impacts include **Damage to Roads and Loss of Road Service; Reduction in Clean Water Supply; Increased Risk of Dam Overtopping or Failure; Loss of Energy Production and Resources; Damage to Inland Buildings; and Damages to Rails and Loss of Rail/Transit Service.**

- **Natural Environment Impacts**: The State Plan identified **Freshwater Ecosystem Degradation** and **Forest Health Degradation** as the most urgent impacts on this sector in the Central region. Increased nutrient load and harmful algal bloom growth from increased precipitation runoff, and increased concentrations of contaminants when drought conditions occur are all exacerbated by climate extremes. Shifts in habitat caused by increased average air and water temperatures threaten the cold water habitats and fisheries of the Central region.

  The effect on the region's forests that climate change will have is harder to predict, however the potential for significant ecosystem loss from climatological changes cannot go understated. Statewide, a third of tree species are classified by the U.S. Forest Service as having low capacity for adapting to projected climate changes, and an increased frequency of extreme events poses an additional threat to forests in the Central region.[30]
  Additional impacts to the natural environment include **Shifting Distribution of Native and Invasive Species and Soil Erosion.**

[28] "2022 Massachusetts Climate Change Assessment," Mass.gov, Massachusetts Executive Office of Energy and Environmental Affairs and Massachusetts Emergency Management Agency, December 2022, https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-iii-regional-reports/download, pages RS36-RS37.

[29] Estimates derived from application of Charles Fant et al., "Climate change impacts and costs to U.S. electricity transmission and distribution infrastructure," *Energy*, 195 (2020). https://doi.org/10.1016/j.energy.2020.116899.

[30] Estimates derived from application of US Forest Service Tree Atlas for Massachusetts.

Northern Research Station Landscape Change Research Group: Iverson, Peters, Prasad, Matthews. "Massachusetts - Climate Change Atlas Tree Species: Current and Potential Future Habitat, Capability, and Migration," Fs.usda.gov, United States Department of Agriculture Forest Service, September 2022, https://www.fs.usda.gov/nrs/atlas/combined/resources/summaries/states/Massachusetts.pdf; "Climate Change Atlas," Fs.usda.gov, United States Department of Agriculture Forest Service, accessed June 10, 2024, https://www.fs.usda.gov/nrs/atlas/combined/resources/summaries/states.

- **Governance Impacts**: The most urgent impacts of climate change on the Governance Sector, as is true with the rest of the statewide impacts in this sector, are an **Increase in Costs of Responding to Climate Migration**; an **Increase in Demand for State and Municipal Government Services**; and a **Reduction in State and Municipal Revenues** caused by climate change. Climate Migration, whether forced or voluntary, is already being felt by Massachusetts Communities, and has been identified in the state plan as having a major consequence in addition to having the largest adaptation gap for our region. Urban centers, particularly in and around Worcester as well as towns serviced by state and regional transit services, are likely to become receiving zones for climate migration based on a relative assessment of climate hazards nationwide. This new influx of population is expected to increase demand for government services. The need to increase government expenditures to maintain the current level of service for the existing population in addition to climate refugees represents a significant stressor to local government. Increased needs for MassHealth, food security support, and emergency services are expected, as are the effects on those systems due to climate change beyond rapid population growth.

  Many of these impacts are expected to be concentrated in low-income areas, as existing inequalities may become exacerbated by an influx of climate refugees that will require additional expenditure if steps are not taken to prepare for these impacts.

  Disruptions to State and Municipal revenue generation through property tax losses as well as the loss of sales taxes from interruptions to business and the economy from natural hazards is expected to increase over time.

  Additional impacts to the Governance Sector are **an Increased Need for State and Municipal Policy Review and Adaptation Coordination and Damage to Inland State and Municipal Buildings were identified in the state's assessment**.

- **Economic Impacts**: The impacts to this sector identified as having the most urgency are a **Reduced Ability to Work** and a **Decrease in Agricultural Productivity** caused by climate change. In both of these areas an increase in temperature extremes corresponds to a decrease in workers' ability to work in dangerous conditions in addition to other natural hazards affecting workers' ability to get to the job safely and increases in illnesses caused by primary or secondary effects of natural hazards and climate change. Workers in the region in high-risk industries (those exposed to outdoor conditions) are projected to lose 31 hours per worker each year by 2050 and 128 hours per worker each year by 2090, the highest in the Commonwealth by the end of the century.[31]

  While agriculture represents a smaller role in the Central region's economy, impacts to this

[31] Estimates derived from application of Matthew Neidell et al., "Temperature and work: Time allocated to work under varying climate and labor market conditions," *PloS One*, 16, no. 8 (2021), https://doi.org/10.1371/journal.pone.0254224.

sector of the economy through lower crop yields have the potential to severely disrupt the local economy and regional food systems. Key commodity crop yields in the Central region could decline by 12 percent by 2030, and by 14 percent by 2070 and carry potentially disproportionate impacts on the local economies that rely on agricultural production for both farm workers and employers.[32]

Additionally, though not identified as the one of the most urgent impacts to the Central region in the state's assessment, the expected **Reduction in Availability of Affordably Priced Housing** has become more prevalent since the assessment was released. As affordable properties are typically situated in more hazard-prone areas creating a decrease in supply over time and as increases in demand for housing continue, a disproportionate economic impact on working families is already decreasing the overall resiliency of the region to shocks.

Additional impacts to this sector include **Damage to Tourist Attractions and Recreation Amenities and Economic Losses from Commercial Structure Damage and Business Interruptions.**

During the local Hazard Mitigation Planning process, the Town noted that their chief concerns were also Extremes in Temperature and Precipitation in the form of rain or snow, in concurrence with the state assessment. The towns community survey concurs with this, with the chief concerns of the residents being Extreme cold temperatures and snowfall.

4.2 Natural Hazard Identification and Analysis

This section examines the hazards in the Massachusetts SHMCAP which are identified as likely to affect Paxton. The analysis is organized into the following sections: Hazard Description, Location, Extent, Previous Occurrences, Probability of Future Events, Impact, and Vulnerability. A description of each of these analysis categories is provided below.

4.2.1 Hazard Description

The natural hazards identified for Paxton are: Flooding, Severe snowstorms / Ice storms / Nor'easters, Hurricanes, Severe thunderstorms / Wind / Tornadoes, Wildfire / Brushfire, Earthquakes, Dam Failure, Drought, Extreme Temperatures, and Invasive Species. Many of these hazards result in similar impacts to a community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

4.2.2 Location

[32] Estimates derived from application of USEPA (2017) and Beach et al. (2015)

Location refers to the geographic areas within the planning area that are affected by the hazard. Some hazards affect the entire planning area universally, while others apply to a specific portion, such as a floodplain or area that is susceptible to wildfires. Classifications are based on the area that would potentially be affected by the hazard, on the following scale:

Table 1: Percentage of Town Impacted by Natural Hazard

Land Area Affected by Occurrence	Percentage of Town Impacted
Large	More than 50% of the town affected
Medium	10 to 50% of the town affected
Small	Less than 10% of the town affected

4.2.3 Extent

Extent describes the strength or magnitude of a hazard. Where appropriate, extent is described using an established scientific scale or measurement system. Other descriptions of extent include water depth, wind speed, and duration.

4.2.4 Previous Occurrences

Previous hazard events that have occurred are described. Depending on the nature of the hazard, events listed may have occurred on a local, state-wide, or regional level.

4.2.5 Probability of Future Events

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

Table 2: Frequency of Occurrence and Annual Probability of Given Natural Hazard

Frequency of Occurrence	Probability of Future Events
Very High	70-100% probability in the next year
High	40-70% probability in the next year
Moderate	10-40% probability in the next year
Low	1-10% probability in the next year
Very Low	Less than 1% probability in the next year

4.2.6 Impact

Impact refers to the effect that a hazard may have on the people and property in the community, based on the assessment of the extent described above. Impacts are classified according to the following scale:

Table 3: Impacts, Magnitude of Multiple Impacts of Given Natural Hazard

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

4.2.7 Potential Climate Change Effects

Each natural hazard is influenced by one or more of the climate change interactions listed in Section 4.1.2 Climate Change Interactions. Climate change interactions can modify the location, extent, and probability of future events depending on the hazard. The section of the hazard risk assessment lists climate change interactions as described by the 2023 ResiliantMass Plan.

4.2.8 Vulnerability

Based on the above metrics, a hazard index rating was determined for each hazard. The hazard index ratings are based on a scale of 1 through 5 as follows:

1 – Highest risk

2 – High risk

3 – Medium risk

4 – Low risk

5 – Lowest risk

The ranking is qualitative and is based, in part, on local knowledge of past experiences with each type of hazard. The size and impacts of a natural hazard can be unpredictable. However, many of the mitigation strategies currently in place and many of those proposed for implementation can be applied to the expected natural hazards, regardless of their unpredictability.

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Potential Climate Change Effects	Hazard Risk Index Rating
Flooding, Including Changes in Groundwater	Small	Moderate	Minor	Increase extent; increase probability	3
Severe Snowstorms / Ice Storms/ Nor'easter	Large	Very High	Limited	Increase extent	2
Hurricanes	Large	Low	Limited	Increase extent; increase probability	4
Severe Thunderstorms/Wind	Small	Moderate	Minor	Unclear	2
Tornadoes	Small	Very Low	Limited	Unclear	4
Wildfire / Brushfire	Medium	Moderate	Minor	Increase extent; increase probability	3
Earthquakes	Large	Very Low	Moderate	None	5
Dam Failure	Small	Very Low	Limited	Indirect effects related to flooding	4
Drought, Including Changes in Groundwater	Large	Very Low	Minor	Increase extent; increase probability	3
Extreme Temperatures	Large	Moderate	Moderate	Increase in average temperature; increase in probability of extreme heat	2
Invasive Species	Medium	High	High	Increase in range and severity of invasive species	2

Source: based on Massachusetts Resilient Mass Plan 2023; modified to reflect conditions in Paxton.

4.2.9 Mitigation Strategies

Based on meetings with the local planning team, a selection of mitigation strategies that address the specific hazard will be included at the end of each hazard analysis section.

4.3 Flooding, Including Changes in Groundwater

Flooding, including flooding caused by changes in groundwater, was one of the most prevalent natural hazards identified by local officials in Paxton. Flooding is generally caused by hurricanes, nor'easters, severe rainstorms, and thunderstorms. Global climate change has the potential to exacerbate these issues over time with the potential for more severe and frequent storm and rainfall events. There are several different types of flood hazards – from stormwater inundation and poor drainage infrastructure to riverine flooding and storm surges to dam failures to flooding caused by an elevated water table. Riverine and stormwater flooding both occur in Paxton, though stormwater flooding is more common. Riverine flooding occurs when the surge of water comes from the top of streams, ponds, and rivers. Stormwater flooding occurs when the amount of precipitation in a storm is greater than the volume that the stormwater management system can handle. Within Worcester County, severe flooding generally occurs as a result of hurricanes or melting snows and spring rains, with more localized flooding caused by summer thunderstorms. Heavy thunderstorms can result in rapid runoff and flooding in the downstream portions of the small streams. Flood elevations in this region can also be raised by ice jams or by the accumulation of uprooted trees and other debris at bridges.[33]

FEMA Flood zones

FEMA creates and manages Flood Insurance Rate Maps (FIRMs) that identify local flood hazard areas. These Special Flood Hazard Areas (SFHA) are locations that will be inundated by a flood event with a 1% or greater chance of occurring in any year. These areas are also referred to as the base flood, or 1% flood zone. These areas are considered at high risk of flooding and have around a 1 in 4 chance of flooding during a 30-year mortgage.

FEMA FIRMs also identify areas with a "moderate" flood risk, defined as locations between the 1% annual chance flood and a 0.2% annual chance flood. These areas are also known as the 0.2% flood zone.

Location

Flooding and flood-prone areas in Paxton are closely associated with the 100-year flood areas, identified by FEMA. According to a GIS analysis performed by CMRPC, there are 89 parcels in Paxton that are susceptible to 100-year floods, with 46 of them containing structures. Much of Paxton is upland, away from rivers and ponds – as a result, the location of this hazard is relatively "small". Map 2 in Appendix A illustrates the FEMA FIRM 100-year flood zones in town, as well as locally identified flooding areas. See below for discussion of previous flood occurrences and their locations. Building footprints that overlap with these flood zones may be impacted by flooding of that magnitude, especially if homeowners have not taken action to mitigate their personal flood risk. Despite Paxton having numerous flooding problems, most of Paxton is upland and built away from rivers and ponds. Paxton's affected area from this hazard, or, its location, is considered "small" (10% or less of the Town). Map 2 in Appendix A illustrates the FEMA FIRM 1% flood zones in town, as well as locally identified flooding areas.

[33] Worcester County Flood Insurance Study 2023

According to the 2023 Flood Insurance Study Paxton's primary flooding sources come from miscellaneous streams and ponds designated as Zone A.[34]

As of September 2022, the Town of Paxton has no repetitive loss structures as defined by FEMA's NFIP. As defined by the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see https://www.fema.gov/repetitive-flood-claims-grant-program-fact-sheet. The Town of Paxton does have 1 NFIP policy holder in town, insuring up to $350,000.00 of property, and NFIP has paid out no claims in total to policy holders in Paxton[35].

EXTENT

The average annual precipitation for the closest weather station to Paxton (located at Worcester Regional Airport) has been 53.64 inches for the period from inches for the period from 2017 to 2024[36]. Over the past five years, Paxton has received an average of 15 days annually with precipitation over 1 inch[37]. Water levels in Paxton's rivers, streams, and wetlands rise and fall seasonally and during high rainfall events. High water levels are typical in spring, due to snowmelt and ground thaw. This is the period when flood hazards are normally expected. Low water levels occur in summer due to high evaporation and plant uptake (transpiration). Monthly precipitation levels are highly variable but for the period between 2017 and 2024 Paxton received on average the most precipitation in the months of July, September, October, and December, with July being uncharacteristically rainy in 2021 and 2023 causing this deviation from expected norms. At any time, heavy rainfall may create conditions that raise water levels in rivers and streams above bank full stage, which then overflow adjacent lands. More severe flooding occurrences in town will lead to more impactful changes in the levels and quality of groundwater. The United States Geological Survey National Groundwater Conditions web application measures groundwater levels by monthly percentiles as compared to historic levels at each particular site.[38] In Massachusetts, the quality of drinking water, including from groundwater sources, is assessed by measuring maximum containment levels (MMCLs) from a number of inorganic and organic chemical, radionuclide, and biological

[34] Ibid.

[35] NFIP Community Overview – Paxton, generated 11/06/2023

[36] Temperature and precipitation data were obtained from the Applied Climate Information System (ACIS) provided by the NOAA Regional Climate Centers.

"Climate," Weather.gov, National Oceanic and Atmospheric Administration National Weather Service, accessed June 10, 2024, https://www.weather.gov/wrh/Climate?wfo=box.

[37] Ibid.

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

contaminants.[39] Shallow flooding caused by changes in groundwater system is measured with the same classification systems as other types of flooding.

Based on past records and the knowledge and experience of members of the Paxton Hazard Mitigation team and residents, the extent of the impact of localized flooding would be "minor".

Previous Occurrences

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

- Indian Hill Road
- Rasvall Pond Dam
- Nanigan Road
- Thompsons Pond
- Black Hill Road
- Streeter Pond and Asnebumskit Dam
- Route 31

The local planning team noted that they primarily get their flooding events from poor drainage and saturation of the soil. This has affected a number of facilities in town which were noted above in the critical infrastructure section, but bears repeating here:

- Paxton Public Safety Building
- Department of Public Works Facility

Most of the flood hazard areas listed here were identified due to known past occurrences in the respective area. There are other areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff. Additionally, some areas have experienced erosion and stormwater drainage failures. It is important to note that many of these areas are near or on evacuation routes, causing a concern for evacuation from affected parts of town.

In the past 10 years, there have been a number of flooding events that have occurred in and around the Paxton community. Major events are listed below:

- 7/01/2013 – Flash Flood: A series of shortwaves moved along a stationary boundary to the west of Southern New England, igniting showers and thunderstorms. An atmosphere characterized by low CAPE and decent deep layer shear resulted in

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

showers and thunderstorms producing heavy rain and rotating thunderstorms. One of these storms produced a microburst in Agawam.

- 7/27/2014 – Flash Flood: An upper level disturbance moving out of the Great Lakes initiated showers and thunderstorms over New York and New England. Enough instability was present in the region for some of these storms to become severe, producing strong to damaging winds and at least one funnel cloud.
- 08/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 10/21/2016 – Flash Flood: Low pressure tracking toward southern New England tapped into a plume of tropical moisture and produced torrential rainfall over parts of central and northeast Massachusetts in the matter of a few hours. This resulted in prolific urban flash flooding in the greater Worcester area and significant urban flooding in greater Boston. The highest single rainfall total from this event was within the City of Worcester, where a Skywarn Spotter reported 5.24 inches of rainfall.
- 06/27/2017 – Flood: A disturbance at mid-levels in the atmosphere moved from the Great Lakes across New England during the afternoon and evening. This along with daytime heating through partly sunny skies allowed afternoon and evening thunderstorms to develop.
- 7/17/2018 – Flash Flood: A cold front moved east from the Great Lakes, crossing Massachusetts during the night of the 17th. The thunderstorms brought strong wind gusts and wind damage during the afternoon and evening. Thunderstorms also brought downpours in Western, Central, and Northeast Massachusetts. Two to four inches of rain fell from Westfield through Worcester to Boston.
- 08/11/2018 – Flood: A cold front stalled over Southern New England on the 11th. Low pressure from the Midwest then moved slowly east along the front. The weather system drew upon warm and very humid air to create showers with local downpours, resulting in rainfall amounts of two to five inches in Northern Massachusetts on August 11th and 12th. An exceptionally powerful downpour left 8.15 inches in the city of Lynn.
- 8/23/2020 – Flash Flood: Diurnally driven thunderstorms brought wind damage, hail, and some flooding to mainly western and central Massachusetts.
- 9/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors.

In addition, minor flooding related to changes in groundwater was identified as affecting the Town, as basement flooding has been experienced by town residents who responded to the survey. The 2023 ResilientMass Plan describes how flooding resulting from changes in groundwater can impact communities in Massachusetts.[40]

[40] "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.1-34-

Probability of Future Events

Based upon previous data, there is a "moderate" probability of localized flooding occurring in Paxton in the next year. This represents a slight increase over the last plan due to increased precipitation from climate change.

Impact

The Town faces a minor impact from flooding, including flooding caused by changes in groundwater, with less than 10% of the total Town area likely to be affected by a 1% annual chance flooding event. Based on the HAZUS analysis described below, a flood in Paxton is unlikely to completely destroy any buildings, but a .2% annual chance flood event could displace residents and come with a significant economic cost.

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

	.2% annual chance flood event
Building Characteristics	
Estimated total number of buildings in Paxton	1,682
Estimated total building replacement value (2024 $)	$ 998,137,000
Building Damages	
# of buildings sustaining minor damage (1-10%)	0
# of buildings sustaining moderate damage (11-40%)	0
# of buildings sustaining severe damage (41-50%)	0
# of buildings destroyed	0
Population Needs	
# of households displaced	4
# of people seeking public shelter	0
Value of Damages	
Total property damage (buildings and content)	$540,000.00
Total losses due to business interruption	$ 270,000.00
Total Economic loss	**$ 810,000.00**

5.1-35.

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

EXPOSURE

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

- Low-lying areas, including but not limited to the FEMA 1% and .2% annual chance flood zones.
- Specific locations with undersized or outdated storm water infrastructure that cannot handle sudden surges in precipitation.
- Residents who may have trouble evacuating from their residence due to age, health concerns, or lack of a vehicle.
- Flood-prone municipal buildings and critical infrastructure.
- that are subject to flooding and potential contamination from flood waters.
- Septic systems, especially in flood prone areas or locations with high water tables.
- Aquatic ecosystems, which may suffer from erosion, eutrophication, or sedimentation due to stormwater.
- The municipal financial burden of infrastructure maintenance and upgrades meant to address flooding.
- Highway department staff, who sometimes must unclog storm drains during extreme weather events. Due to limited staffing, highway department employees often have to go out alone, making safety a concern.
- Sides of roadways, which may be erode due to excessive rainfall. Lack of funding to make road repairs may compound this issue.

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 State Hazard Mitigation and Climate Adaptation Plan, climate change effects coupled with changes in development and population density increase the risk of flooding from precipitation. As noted earlier in the plan, the Central region in particular is most likely to be

impacted by extremes in precipitation in the following ways:

- Climate change is projected to increase the variability of precipitation events within a year, including the potential for extreme precipitation events. Instances of inland flooding, river overflows, and pressure on dams may result.
- Projected changes in precipitation patterns in all seasons, as well as higher frequency of extreme weather (including hurricanes and nor'easters), will change patterns of river flow and increase the frequency and severity of inland riverine flooding.
- According to the 2023 ResilientMass Plan, climate change is predicted to affect groundwater levels. Sea level rise, extreme temperature events, and changes in precipitation patterns will all affect groundwater conditions and may increase the risk in town of minor basement flooding.[41]

In summary, climate change is likely to increase the extent and probability of future flood events in Paxton which will make it more likely for multiple storms in a short duration to cause cumulative damage. This can impact land use and development, such as no longer being able to develop on parts of town that flood frequently and the need to zone for increased stormwater resilience.

VULNERABILITY

Based on this analysis and the assessment of the Paxton Core Team, Paxton faces a hazard index rating of "3 - medium risk" from flooding, including flooding from changes in groundwater. The town's stormwater infrastructure is aging and undersized, which leads to increased incidence of localized flooding events around those particular pieces of faulty infrastructure. While the town isn't at significant threat from flash flooding events, the changes in groundwater levels due to increased precipitation in Paxton has caused flooding hazards due to groundwater saturation at several town facilities, notably the DPW offices and the Emergency Operations Center at the Paxton Public Safety Building.

MITIGATION STRATEGIES

The Town of Paxton is currently able to effectively respond to flooding through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to flooding could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of flooding in Paxton:

- Perform Route 31 Culvert Replacements upgrading drainage infrastructure on that road.
- Address drainage concerns at critical town facilities such as the Department of Public Works and the Paxton Public Safety building.
- Obtain Stormready Certification

[41] Ibid.

4.4 Severe Snowstorms / Ice Storms / Nor'easters

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

Location

The entire town of Paxton is equally susceptible to severe snowstorms, ice storms and nor'easters; which means the location of occurrence is "large." Because these storms occur regionally, they would impact the entire town is equally vulnerable.

Extent

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

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

Table 4: Northeast Snowfall Impact Scale Categories[42]

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

[42] National Centers for Environmental Information. (n.d.). Regional Snowfall Index (RSI). National Oceanic and Atmospheric Association. Retrieved January 27, 2022, from https://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis

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

Table 5: The Sperry-Piltz Ice Accumulation Index[43]

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

The Miller classification is a system used to classify nor'easters.[44] The types of storm classification under the Miller classification are listed below.

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

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

Table 6: The Miller Classification for Nor'easters

Miller Classification	Description
Miller A / Storm Type A	Miller A, or Storm Type A, nor'easters form in the southeastern USA or along the Gulf of Mexico and intensify as they move north until turning east to the Atlantic Ocean. They are most impactful the mid-Atlantic region but can also lead to major snow events in New England if they are strong enough.
Miller B / Storm Type B	Miller B, or Type B, nor'easters form in the midwestern USA and move slightly southeast to the southern mid-Atlantic region until they combine with / transfer energy to a storm originating along the coast in this region. This combined storm then travels north, impacting inland and coastal areas of the northeast USA with major snow events, before turning east to the Atlantic Ocean.
Miller C / Storm Type C	Miller C, or Type C, nor'easters are similar to Miller B nor'easters but are stronger and tend to be more impactful in the midwestern USA and southern New England.
Miller D / Storm Type D	Miller D, or Type D, nor'easters are similar to Miller B nor'easters but are weaker and tend to have more limited impacts in the southern mid-Atlantic region.
Miller E / Storm Type E	Miller E, or Type E, nor'easters are similar to Miller B nor'easters but form further to the south and tend to have a long band of area they are highly impactful in which stretches from the northern part of the inland southeastern states, through the mid-Atlantic region, and to inland New England.

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

Previous Occurrences

Based on data available from the National Oceanic and Atmospheric Administration, there are 88 high-impact snowstorms since 1958 that have affected the Northeast Corridor. Of these, approximately 38 storms resulted in snow falls in Paxton of at least 10 inches. These storms are listed in the table below:

Start Date	NESIS Value	NESIS Category	NESIS Classification
12/13/2022	8.52	4	Crippling
01/28/2022	1.73	1	Notable
01/04/2022	1.60	1	Notable
01/30/2021	4.93	3	Major
12/04/2020	3.21	2	Significant
03/03/2019	1.29	1	Notable
3/11/2018	3.16	2	Significant
1/3/2018	2.27	1	Notable
3/12/2017	5.03	3	Major
2/8/2015	1.32	1	Notable
1/29/2015	5.42	3	Major
1/25/2015	2.62	2	Significant
3/4/2013	3.05	2	Significant
2/7/2013	4.35	3	Major
1/26/2011	2.17	1	Notable
1/9/2011	5.31	3	Major
12/24/2010	4.92	3	Major
2/23/2010	5.46	3	Major
12/18/2009	3.99	2	Significant
3/15/2007	2.54	2	Significant
2/12/2006	4.10	3	Major
1/21/2005	6.80	4	Crippling
2/15/2003	7.50	4	Crippling
3/31/1997	2.29	1	Notable
2/8/1994	5.39	3	Major
3/12/1993	13.2	5	Extreme
2/10/1983	6.25	4	Crippling
4/6/1982	3.35	2	Significant
2/5/1978	5.78	3	Major
1/19/1978	6.53	4	Crippling
2/18/1972	4.77	3	Major
2/22/1969	4.29	3	Major
2/8/1969	3.51	2	Significant
2/5/1967	3.50	2	Significant

Start Date	NESIS Value	NESIS Category	NESIS Classification
2/2/1961	7.06	4	Crippling
1/18/1961	4.04	3	Major
12/11/1960	4.53	3	Major
3/2/1960	8.77	4	Crippling
2/14/1958	6.25	4	Crippling

Additionally, the NCEI database notes at several instances of heavy snowfall in the area of Worcester County:

- 01/07/2024 – Heavy Snow: A strong storm moved up the east coast passing near the 70/40 benchmark brought heavy snow to southern New England beginning late Monday night and continuing on Sunday. The first round of heavy snow fell overnight followed by a lull in the snow and mixing with rain Sunday morning. Comma head snow then filled back into eastern MA and RI bringing moderate to heavy snow Sunday afternoon and evening. Snow amounts ranged from 2 to 18 inches.
- 12/05/2020 – Heavy Snow: A rapidly intensifying storm system produced strong to damaging winds and heavy rain (2-4 inches) which changed to a period of heavy snow in the higher elevations. The low pressure system crossed between Nantucket and Cape Cod before lifting northeast. Heavy snow fell in northern Worcester County. Some totals included 12.5 inches in Paxton, 10.0 inches in Rutland, 9.3 inches in Petersham, 8.5 inches in Leicester and Hubbardston, 8.0 inches in Holden, 6.7 inches in Boylston, and 6.0 inches in Spencer.
- 03/23/2020 – Heavy Snow: Low pressure moved from south of Long Island to south of Nantucket late on March 23rd and then to Nova Scotia on the morning of March 24th. Snow changed to rain in eastern Massachusetts, but a band of heavy snow set up in the higher elevation areas in the east slopes of the Berkshires and in the northern Worcester Hills. Heavy snow totals ranged from 5.5 inches to 8.0 inches. The highest was a public report in Royalston of 8.0 inches. Other reports included an amateur radio observer in Winchendon with 7.5 inches; a Public report of 7.2 inches in Fitchburg; a Trained Spotter report of 6.4 inches in Lunenburg; a Trained Spotter report of 5.8 inches in Boylston; an amateur radio report of 5.5 inches in Ashburnham; and a Public report of 5.5 inches in Sterling.
- 11/15/2018 – Heavy Snow: An early-season nor'easter moved from the Mid-Atlantic coast to southeastern Massachusetts on the 15th and away from the region on the 16th. A quick thump of heavy snow occurred on the front end of the storm, with most accumulations over with by or shortly after midnight on the 16th. Snowfall amounts ranged from only a couple of inches in southeasternmost sections of MA to 8 to 10 inches in western and northern MA. Mainly rain occurred at Boston's Logan Airport. Strong east to northeast winds battered coastal areas ahead of the low pressure system. Based on numerous reports from CoCoRaHS, Co-Op, trained spotter, and amateur radio observers, snowfall ranged from 7 to 10 inches in northern Worcester County. Here are some sample amounts: Lunenburg had 8.5 inches, Westborough, Fitchburg, Clinton, and Boylston all had 9.0 inches; and the highest total was 10.0 inches in Princeton.

The Paxton Hazard Mitigation Team noted that snow and ice storms in 1992, 2003, and 2008

were particularly challenging. In 1992, a winter storm in December left the Town without power for two weeks. The storm started off as ice and then turned to heavy wet snow that caused a lot of damage. And the ice storm in 2008 had a similar damaging impact, bringing down many trees and power lines. The local planning team identified several ice storm during the winter of 2023 that downed trees in January and mid-March and required extensive cleanup.

Probability of Future Events

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

The 2023 ResilientMass Plan notes that on average, Massachusetts experiences one to two nor'easters per year. In the past 10 years (2013– 2022), there have been 63 heavy snow days, 12 blizzard days, and two ice storm days in Massachusetts.

Impact

Paxton faces a "limited" impact or less than 10% of total property damaged, from snowstorms. The weight from multiple snowfall events can test the load ratings of building roofs and potentially cause significant damage. Multiple freeze-thaw cycles can also create large amounts of ice and make for even heavier roof loads.

Other impacts from snowstorms and ice storms include:

- Tree damage and fallen branches that cause utility line damage and roadway blockages
- Disrupted power and phone service
- Unsafe roadways and increased traffic accidents
- Infrastructure and other property are also at risk from severe winter storms and the associated flooding that can occur following heavy snow melt.
- Damage to telecommunications structures
- Reduced ability of emergency officials to respond promptly to medical emergencies or fires

The Paxton Hazard Mitigation Planning Team noted that Paxton tends to get more snow and ice than surrounding towns due to its increased elevation.

EXPOSURE

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

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

The Local Hazard Mitigation Planning Team noted that several key buildings within town are susceptible to snow load on their roofs due to the flat roof construction of those sites:

- The DPW
- Paxton Town Hall
- Paxton's Senior Center

Potential Climate Change Effects

According to the 2023 ResilientMass Plan, Sea level rise, warming ocean temperatures, and changing atmospheric circulation patterns are likely to increase the frequency and severity of winter storms. Warmer temperatures indicate that more precipitation will fall as rain rather than snow throughout the 21st century. This essentially will create fewer overall snowstorms, but the snowstorms that do occur will likely be worse. This also creates a greater risk for Wintery Mix, Sleet and Ice Storms and hazardous roadway conditions as temperature drops overnight will cause transportation infrastructure to ice over without mitigations in place.

In summary, climate change is likely to increase the extent and probability of future snowstorm events in Paxton. This may have societal impacts as more frequent severe winter storms may change lang use and development protocols; more homes and community buildings may need to account for greater sheltering infrastructure to prepare for heavy snowfall. The local planning team noted that extreme snowfall events were high on their list of concerns.

Vulnerability

Based on the above assessment, Paxton has a hazard index rating of "2 — high risk" from snowstorms, ice storms, and nor'easters. Snowstorms, ice storms, nor'easters, and other forms of winter precipitation are a common occurrence in Massachusetts and expected to only become more common over time. Additionally, the expected increase in "wintery-mix" precipitation may lead to increased roadway hazards as standing water may freeze in overnight temperatures creating hazardous road conditions for travelers and responders. A number of facilities in town that are critical to the safety of town residents and continued operations are vulnerable to heavy snow loads due to their flat roof design and construction.

MITIGATION STRATEGIES

The Town of Paxton is currently able to effectively respond to severe snowstorms, ice storms, and Nor'easters through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. Being a town that experiences snowstorms frequently as do many Massachusetts towns, snow events are amply prepared for by local officials and emergency response personnel. However, the Town's existing capabilities to mitigate and respond to severe snowstorms, ice storms, and Nor'easters could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of Snowstorms in Paxton:

- Draft a Snowstorm Plan for road information coordination and planning for snow removal.
- Address snow load and ice storm concerns on town owned facilities with retrofits to those facilities.

4.5 Hurricanes

Hurricanes begin as tropical storms that form over warm ocean waters in the Atlantic Ocean, Pacific Ocean, or off the west coast of Africa. The heated, moist air is drawn up into the atmosphere and begins circulating clockwise or counterclockwise depending on which hemisphere they are in. Tropical storms become hurricanes when their sustained winds exceed 74 miles per hour, or greater. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricanes winds can reach speeds of up to 200 miles per hour and can grow to 500 miles in diameter. In New England, hurricanes generally occur between August, September, and the first half of October, and can result in flooding and wind damage to structures and above-ground utilities.[45]

Location

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

Extent

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

Table 7: Saffir-Simpson Scale[46]

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

[45] 2023 ResilientMass Plan.

[46] National Hurricane Center and Central Pacific Hurricane Center. (n.d.). Saffir-Simpson Hurricane Wind Scale. National Oceanic and Atmospheric Association. Retrieved January 31, 2022, from https://www.nhc.noaa.gov/aboutsshws.php

Previous Occurrences

Hurricanes that have affected the region in which Paxton is located are shown in the following table:

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Belle	1976	Tropical Storm
Gloria	1985	1
Henri	1985	Tropical Storm
Chris	1988	Minor Storm
Bob	1991	2
Beryl	1994	Tropical Storm
Bertha	1996	Tropical Storm
Floyd	1999	Tropical Storm
Gordon	2000	Minor Storm
Hermine	2004	Tropical Storm
Barry	2007	Minor Storm
Hanna	2008	Minor Storm
Irene	2011	Tropical Storm
Sandy	2012	"Super Storm"
Andrea	2013	Minor Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Probability of Future Events

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a "low" probability (1 percent to 10 percent in any given year) of hurricanes in Paxton. Climate change is projected to result in more severe weather, including increased occurrence of hurricanes and tropical storms. Because of this, the occurrence of hurricanes will increase in the future.

Impact

A description of the damages that could occur due to a hurricane is described by the Saffir-Simpson scale, as shown below:

Storm Category	Damage Level	Description of Damages	Wind Speed (MPH)
1	MINIMAL Very dangerous winds will produce some damage	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage. An example of a Category 1 hurricane is Hurricane Dolly (2008).	74-95
2	MODERATE		96-110

	Extremely dangerous winds will cause extensive damage	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings. An example of a Category 2 hurricane is Hurricane Francis in 2004.	
3	EXTENSIVE Devastating damage will occur	Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland. An example of a Category 3 hurricane is Hurricane Ivan (2004).	111-129
4	EXTREME Catastrophic damage will occur	More extensive curtain wall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland. An example of a Category 4 hurricane is Hurricane Charley (2004).	130-156
5	CATASTROPHIC Catastrophic damage will occur	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required. An example of a Category 5 hurricane is Hurricane Andrew (1992).	157+

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

	1% storm (89 mph winds)	0.2% storm (102-105 mph winds)
Building Characteristics		
Estimated total number of buildings	1,682	
Estimated total building replacement value (2014 $)	$ 998,214,000.00	
Building Damages		
# of buildings sustaining minor damage	72	289
# of buildings sustaining moderate damage	4	38
# of buildings sustaining severe damage	0	2
# of buildings destroyed	0	2
Population Needs		
# of households displaced	0	6
# of people seeking public shelter	0	3
Debris		
Building debris generated (tons)	1,477	3,123
Tree debris generated (tons)	6,158	10,674
# of truckloads to clear building debris	9	37
Value of Damages		
Total property damage (buildings and content)	$ 7,590,690.00	$ 22,498,020.00
Total losses due to business interruption	$ 254,220.00	$ 1,510,600.00

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

The Town faces a "limited" impact from hurricanes, with 10 percent or less of Paxton affected.

EXPOSURE

Certain features within Paxton's community infrastructure, society, and environment may face more exposure to hurricanes, or be disproportionately impacted by them, relative to the rest of the

community. Some of these features may be documented in the list of critical facilities and vulnerable populations in Section 3. Vulnerable community features include:

- The electrical grid is vulnerable to outages from trees falling across power lines. National Grid proactively trims trees in their right of way, but outages are still common.
- Municipal buildings have been impacted by high winds in the past. Damage to these buildings could impact critical town functions and be a distraction from other essential emergency response and recovery activities.
- Public safety, utility, and highway department workers, who are tasked with responding to emergency calls and keeping the streets clear during hurricanes.

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

Potential Climate Change Effects

According to the 2023 ResilientMass Plan, there are two major ways that hurricanes and tropical storms can be influenced by climate change:

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

In summary, climate change is likely to increase the frequency and extent of hurricanes in Paxton.

Vulnerability

Based on the above analysis, Paxton has a hazard index rating of "4 – limited risk" from hurricanes. Its location and elevation decrease the risk of hurricane force winds and rains, though does not remove them entirely. Historically, by the time a hurricane has arrived in Paxton, it has typically been downgraded to a tropical storm or tropical depression, though climate change may increase the severity of storms in the future.

Mitigation Strategies

The Town of Paxton is currently able to effectively respond to hurricanes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to hurricanes could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of hurricanes in Paxton:

- Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.

- Obtain Stormready Certification.
- Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.

4.6 Severe Thunderstorms / Wind / Tornado

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

Every thunderstorm has an updraft (rising air) and a downdraft (sinking air). Sometimes strong downdrafts known as downbursts can cause tremendous wind damage that is similar to that of a tornado. A small (less than 2.5 mile path) downburst is known as a "microburst" and a larger downburst is called a "macro-burst." An organized, fast-moving line of microbursts traveling across large areas is known as a "derecho." These occasionally occur in Massachusetts. The strongest downburst recorded was a downburst in North Carolina of 175 mph. Winds exceeding 100 mph have been measured from downbursts in Massachusetts.[47]

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

Tornadoes are swirling columns of air that typically form in the spring and summer during severe thunderstorm events. In a relatively short period of time and with little or no advance warning, a tornado can attain rotational wind speeds in excess of 250 miles per hour and can cause severe devastation along a path that ranges from a few dozen yards to over a mile in width. The path of a tornado may be hard to predict because they can stall or change direction abruptly. Within Massachusetts, tornadoes have occurred most frequently in the Connecticut River Valley and in western Worcester County, with Paxton some 35 miles east of the zone of most frequent past occurrence. High wind speeds, hail, and debris generated by tornadoes can result in loss of life, downed trees and power lines, and damage to structures and other personal property. These events have been grouped together in this analysis due to the similarities between them in that the primary cause of damage occurs from high winds, with lightning damage existing as a potential to occur, and have similar mitigation strategies to address them. Hail damage is not expected to be a significant factor for damage based on previous occurrences.

[47] 2023 Resilient Mass Plan.

LOCATION

As per the Massachusetts Hazard Mitigation Plan, the entire Town is at risk of high winds, severe thunderstorms, hail and tornadoes. The plan identifies Paxton and its surrounding communities as having a moderate frequency of tornado occurrence within the Massachusetts context. However, the actual area affected by thunderstorms, wind, or tornadoes is "small," with less than 10 percent of the Town generally affected.

EXTENT

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. Thunderstorms can cause hail, wind, lightning damage, and flooding.

High wind can be linked to several different hazards, including hurricanes and winter storms, in addition to thunderstorms and tornadoes. High winds can cause damage to structures, trees, as well as increase the risk of wildfire.

Tornadoes are measured using the enhanced F-Scale, shown with the following categories and corresponding descriptions of damage:

Table 8: Enhanced Fujita Scale Levels and Descriptions of Damage[48]

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

The extent of the damages caused by hail can be measured by the size of the hailstones and the intensity at which they fall, which if variable based on the extent of the high wind or thunderstorm

[48] National Oceanic and Atmospheric Administration. (n.d.). The Enhanced Fujita Scale (EF Scale). National Weather Service; NOAA's National Weather Service. Retrieved January 31, 2022, from https://www.weather.gov/oun/efscale

they are attached to and are included in in the risk analysis for high winds and thunderstorms.

Table 9: Extent Scale for Hail[49]

HAIL SIZE (in.)	OBJECT ANALOG REPORTED
0.50	Marble, moth ball
0.75	Penny
0.88	Nickel
1.00	Quarter
1.25	Half Dollar
1.50	Walnut, ping pong
1.75	Golf ball
2.0	Hen egg
2.5	Tennis ball
2.75	Baseball
3.00	Tea cup
4.00	Grapefruit
4.50	Softball

Previous Occurrences

Because thunderstorms and wind affect the town regularly on an annual basis, there are not significant records available for these events. As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year.

In Worcester County, there have been several F1 tornadoes over the years. However, a data search for tornadoes rating 3 or above, or resulting in death/injury, or significant property damage, identifies the following events:

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

[49] National Oceanic and Atmospheric Administration. (n.d.). Hail Size as Related to Objects. Storm Prediction Center. Retrieved January 31, 2022, from https://www.spc.noaa.gov/misc/tables/hailsize.htm

The local planning team noted that the worst tornado the town experienced was on August 10, 1979, when a tornado that touched down west of town moved through the Treasure Valley Boy Scout Camp, downing several trees and killing two scouts.

Within the last 5 years, there has only been one small tornado that has affected communities near Paxton:

- 2018 Tornado (East Douglas, Uxbridge, Upton)

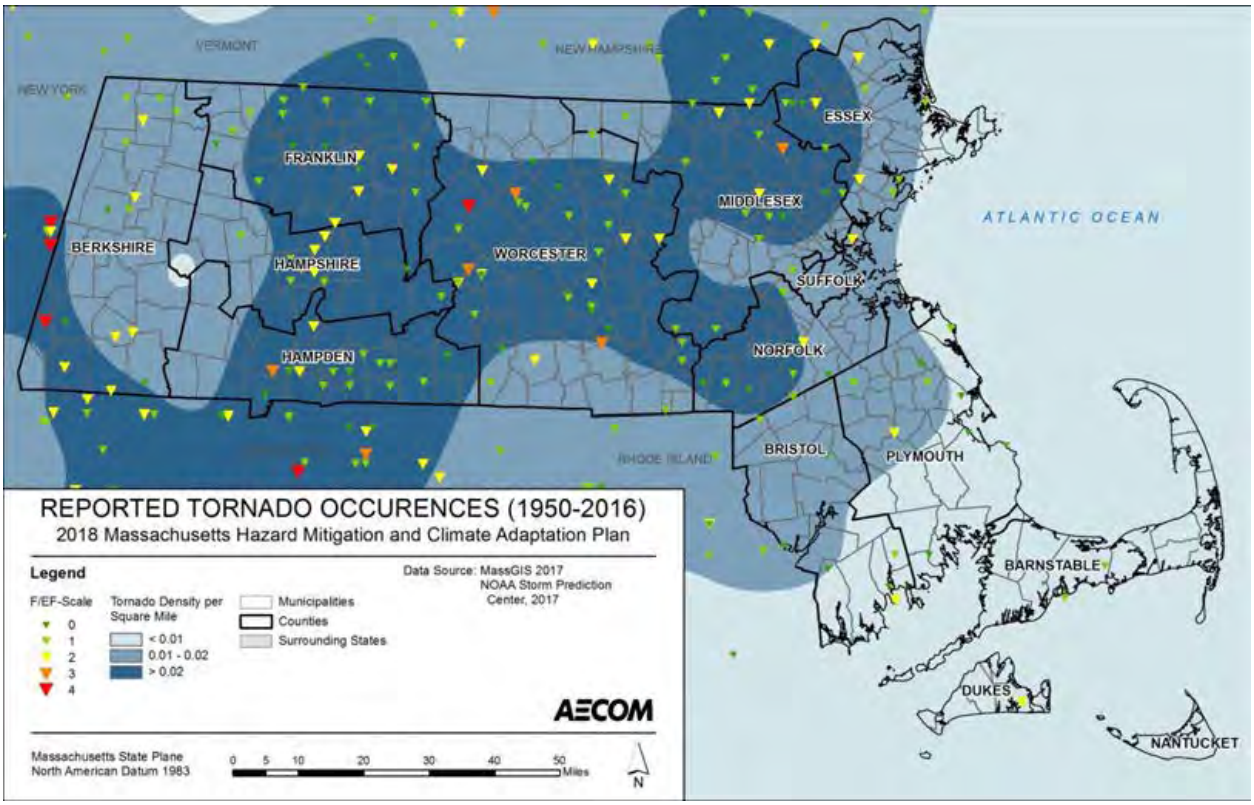


Image 1: Density of Reported Tornados per Square Mile (1950-2016). Source: Massachusetts State Hazard Mitigation and Climate Adaptation Plan, 2018.



Image 2: Above: NASA released this image of part of the 39-mile-long tornado track through south-central Mass. The image was captured on June 5, 2011 by Landsat 5 satellite.

Probability of Future Events

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

- 01/31/2013 – High Wind: A warm front moved northward across southern New England. This brought a period of mainly rain and warm temperatures. In addition, a strong low-level jet (up to 80 kts) resulted in high winds across much of southern New England. There was some tree damage and downed power lines with winds gusting to 60 to 70 mph. An amateur radio operator in Milford recorded a wind gust to 64 mph on their home weather station. The Automated Surface Observation System at Worcester Regional Airport (KORH) recorded a wind gust to 55 mph.
- 10/24/2017 – Strong Wind: Low pressure moved north through the Great Lakes. This swung a cold front slowly east into Southern New England on October 25. The front stalled over the region during the 25th before moving off to the east on the 26th. Strong low-level winds brought a flow of tropical moisture ahead of the front. The strong winds aloft were brought to the surface in damaging wind gusts, with speeds reaching 45 to 55 mph. The tropical moisture was converted to heavy downpours, with storm rainfall totals ranging from 2 inches to 6 1/2 inches. This brought widespread urban and poor drainage flooding. Tree down on power lines on Pleasant Street near State Route 56 in Paxton.
- 02/25/2015 – High Wind: A storm moving north through the Great Lakes redeveloped

along the Mid Atlantic coast on the 24th, then moved up the coast past Southern New England. This coastal storm brought damaging west-northwest winds to Massachusetts as it moved off through the Maritimes on the 25th.

- 12/25/2020 – Thunderstorm Wind: An anomalously deep, full-latitude mid-level trough over the Mississippi Valley caused a strong frontal system to move up the Appalachians. It brought strong to damaging winds, heavy rain with minor flooding, and well above normal temperatures to southern New England early on Christmas Day. Winds generally gusted to 40 to 60 mph, except 65 to 70 mph along the southeast Massachusetts coast. South winds were blowing more than 100 mph only 2000 feet above the ground in eastern Massachusetts and Rhode Island, but despite temperatures in the lower 60s there, a surface inversion was strong enough to prevent these very damaging winds from reaching the surface. Two to four inches of rain fell across the region, with the highest totals from central Rhode Island northwestward across northern Connecticut and portions of western and central Massachusetts. Winds generally were gusting to around 50 mph.
- 07/27/2021 – Thunderstorm Wind: A cold front entered a marginally unstable, but highly sheared environment during the late afternoon and evening hours. A broken line of severe thunderstorms moved across most of Massachusetts and a portion of northern Connecticut and northern Rhode Island.
- 02/28/2024 – High Wind: A strong cold front crossed southern New England on Wednesday night the 28th bringing soaking rains and strong wind gusts to southern New England followed by sharply falling temperatures. This cold frontal passage included a fine line stronger storms. Winds generally gusted 45 to 55 mph. The strongest gusts were 59 mph at the Worcester Airport ASOS (KORH) at 2:18 AM EST on the 29th and a gust to 55 mph at the Fitchburg Airport ASOS (KFIT) at 1:57 AM EST on the 29th.

The database also notes several hail occurrences, a few of which occurred in or near Paxton:

- 09/13/2010 – Hail: A strong upper level disturbance moved through Southern New England, producing showers and thunderstorms across the area. Very cold air at the mid levels aided in producing large hail up to ping pong ball size. Quarter size hail fell on South Road.
- 08/19/2011- Hail: Southwest flow kept a cold front over Southern New England for a prolonged period of time. Coupled with an approaching shortwave, this created enough lift, instability, and moisture to produce strong to severe thunderstorms. These storms produced both large hail and damaging winds with hail up to quarter size and numerous downed trees.
- 05/30/2014 – Hail: A cold front moved across Southern New England, resulting in isolated showers and thunderstorms. One of these storms became severe producing quarter size hail.
- 03/29/2020 – Hail: Elevated instability combined with an upper level short wave trough to produce scattered severe thunderstorms during the mid evening hours across portions of mainly central and eastern Massachusetts. Large hail, ranging from quarter to golf ball size, was reported with a few of these storms. Golf ball size hail was reported via amateur radio at 756 PM EST in Worcester. It began with dime size hail at 753 PM EST.

According to the NOAH Storm Events Database, none of these hail events caused any damage of note to people, property or crop damages.

Probability of Future Events

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

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

Impact

Overall, Paxton faces a "minor" impact from severe thunderstorms, and a "limited" impact from severe winds, or tornados, with 10% or less of the Town likely to be affected.

The Enhanced Fujita Scale Levels for tornados describes the likely impacts of tornados on the physical environment:

As indicated as part of the Enhanced Fujita Scale Levels for tornados, the following impacts can result from a tornado:

- EF0 - Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
- EF1 - The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
- EF2 - Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
- EF3 - Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
- EF4 - Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.

The potential for locally catastrophic damage is a factor in any tornado, severe thunderstorm, or wind event. In Paxton, a tornado that hit residential areas would leave much more damage than a

tornado with a travel path that ran along the town's uplands or along the reservoir, where less settlement has occurred. Most buildings in the town have not been built to Zone 1, Design Wind Speed Codes. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, and 68.7% percent of the town's 1,688 occupied housing units was constructed in 1979 or earlier (American Communities Survey, 2020 5-year estimate).

Utilizing the Town's median home value of $ 434,700.00 (American Communities Survey, 2020 5-year estimate), combined with the total value of all property, $ 782,518,766.00 (Massachusetts Department of Revenue, 2024), and an estimated 10 percent of damage to 5 percent of all structures, the estimated amount of damage from a tornado is $ 3,912,593.83. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

The impact on the population of Paxton is highly dependent on the track of the high winds, thunderstorms or tornadoes, and will vary based on the severity of the storm event with the greatest impact caused by tornadoes. Hail is not expected to have a significant impact on its own based on previous occurrences, and the damage factor would come from the high winds and thunderstorms, and therefore its impact is included within the analysis for high wind and thunderstorm events.

EXPOSURE

Certain features within Paxton's community infrastructure, society, and environment may face more exposure to severe thunderstorms/wind/tornadoes, or be disproportionately impacted by them, relative to the rest of the community. Some of these features may be documented in the list of critical facilities and vulnerable populations in *Section 3*. Vulnerable features to severe thunderstorms/wind/tornadoes overlap with features vulnerable to hurricanes and flooding.

POTENTIAL CLIMATE CHANGE EFFECTS

The 2023 ResilientMass Plan identifies that current climate models predict an increase in severe thunderstorms, which have the potential to produce tornadoes. However, it is unclear if tornado frequency will increase with climate change. Some studies suggest there will be a decrease in the number of tornado days, but an increase in the number of tornadoes per day.[50]

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

VULNERABILITY

Based on the above assessment, Paxton has a hazard index rating of "2- high risk" from severe thunderstorms and winds, and a "4 – low risk" from tornadoes. Strong winds in Paxton pose a

[50] 2023 ResilientMass Plan, (pg. 5.1-56).

greater threat to infrastructure and transportation due to the characteristics of the town's forests and the frequency of high wind events, however the rarity of tornado events and the overall development patterns of Paxton reduces the overall risk to life and property from a tornado event.

Mitigation Strategies

The Town of Paxton is currently able to effectively respond to severe thunderstorms, wind, and tornadoes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to severe thunderstorms, wind, and tornadoes could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of severe thunderstorms and tornados in Paxton.

- Install Tornado Warning Sirens on town facilities for advanced notice and warnings to town residents.
- Establish Tree Management and Stabilization Fund to address hazardous tree concerns in town.
- Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.

4.7 Wildfires / Brush Fires

Wildfires are typically larger fires, involving full-sized trees as well as meadows and scrublands. Brushfires are uncontrolled fires that occur in meadows and scrublands, but do not involve full-sized trees. Typical causes of brushfires and wildfires are lightning strikes, human carelessness, and arson. Relative humidity and wind and two weather-related factors that influence fire danger. Relative humidity refers to "the ratio of the amount of moisture in the air to the amount of moisture necessary to saturate the air at the same temperature and pressure."[51] When relative moisture drops, light fuels like grasses become drier and burn more easily.[52]

FEMA has classifications for 3 different classes of wildfires:

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

Potential vulnerabilities to wildfires include damage to structures and other improvements and impacts on natural resources. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases.

Location

Approximately 64% of total land area in Northern Worcester County is forested land.[53] Similarly, in Paxton, an estimated 64% of the land is forested.[54] While Paxton is developed in a mostly low-density suburban pattern, many uninterrupted tracts of forest are present. Combined with Paxton's tree coverage, wildfires and brush fires pose a moderate risk. The Town's Water Distribution System shows hydrants throughout Town used for fire control. In areas untouched by the Municipal water supply, cisterns are used for firefighting. The total amount of town that could be affected by a wildfire is categorized as "medium," or 10 percent to 50 percent of the total area.

[51] "Understanding Fire Danger," Nps.gov, United States National Park Service, August 17, 2023, https://www.nps.gov/articles/understanding-fire-danger.htm.

[52] Ibid.

[53] Massachusetts Bureau of Geographic Information, "MassGIS Data: 2016 Land Cover/Land Use," Mass.gov, Massachusetts Executive Office of Technology Services and Security, May 2019,

[54] Ibid.

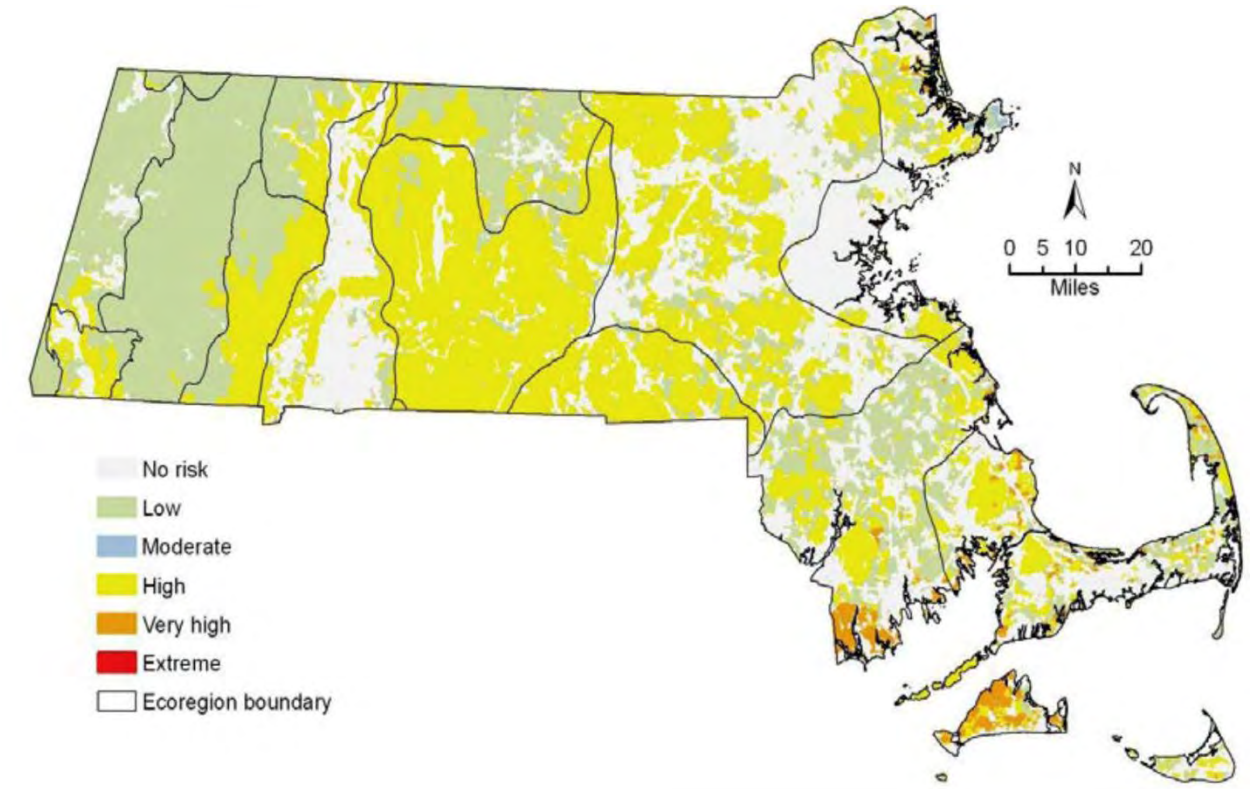


Figure 1: Wildfire Risk Areas for the Commonwealth of Massachusetts. Source: 2018 SHMCAP.

EXTENT

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

Paxton, having approximately 64% of the total land area being forested, the risk of a fire is real, however, there are also open spaces, developed areas, rivers and major transportation corridors (Route 122, Route 31, Route 56) breaking up the forest. In drought conditions, a brushfire or wildfire would be a matter of greater concern. As noted in the next section describing previous occurrences of wildfires, there have not been any major wildfires recorded in Paxton in recent decades.

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

Rating	Basic Description	Detailed Description
CLASS 1: Low Danger (L) Color Code: Green	Fires not easily started	Fire starts are unlikely. Weather and fuel conditions will lead to slow fire spread, low intensity, and relatively easy control with light mop up. Controlled burns can usually be executed with reasonable safety.
CLASS 2: Moderate Danger (M) Color Code: Blue	Fires start easily and spread at a moderate rate	Some wildfires may be expected. Expect moderate flame length and rate of spread. Control is usually not difficult and light to moderate mop up can be expected. Although controlled burning can be done without creating a hazard, routine caution should be taken.
CLASS 3: High Danger (H) Color Code: Yellow	Fires start easily and spread at a rapid rate	Wildfires are likely. Fires in heavy, continuous fuel, such as mature grassland, weed fields, and forest litter, will be difficult to control under windy conditions. Control through direct attack may be difficult but possible, and mop up will be required. Outdoor burning should be restricted to early morning and late evening hours.
CLASS 4: Very High Danger (VH) Color Code: Orange	Fires start very easily and spread at a very fast rate	Fires start easily from all causes and may spread faster than suppression resources can travel. Flame lengths will be long with high intensity, making control very difficult. Both suppression and mop up will require an extended and very thorough effort. Outdoor burning is not recommended.
CLASS 5: Extreme (E) Color Code: Red	Fire situation is explosive and can result in extensive property damage	Fires will start and spread rapidly. Every fire start has the potential to become large. Expect extreme, erratic fire behavior. NO OUTDOOR BURNING SHOULD TAKE PLACE IN AREAS WITH EXTREME FIRE DANGER.

Beyond the direct hazards that wildfires pose, wildfires pose an additional indirect hazard of reducing air quality through smoke particulates. This is measured, along with other particulates that effect air quality, by the EPA's Air Quality Index[55]. For each pollutant an AQI value of 100 generally corresponds to an ambient air concentration that equals the level of the short-term national ambient air quality standard for protection of public health. AQI values at or below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is unhealthy: at first for certain sensitive groups of people, then for everyone as AQI values get higher. The EPA establishes an AQI for five major air pollutants regulated by the Clean Air Act. Each of these pollutants has a national air quality standard set by EPA to protect public health: ground-level ozone; particle pollution (also known as particulate matter, including PM2.5 and PM10); carbon

[55] "Air Quality Index (AQI) Basics," Airnow.gov, United States Environmental Protection Agency, accessed June 10, 2024, https://www.airnow.gov/aqi/aqi-basics/.

monoxide; sulfur dioxide; and nitrogen dioxide.

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

AQI Basics for Ozone and Particle Pollution

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

Previous Occurrences

Paxton has a mixed on-call/part-time/full-time fire department which also operates the Town ambulatory service, running two ambulances. Paxton is part of the Northern Worcester County Fire District (Mutual Aid District 8), as well as the Mid-State Fire Mutual Aid Association. There have not been any major forest fires in Paxton in recent decades. During the period of 2012-2013, there were 7 brush fires in Town, totaling 2 burned acres. One of these acres was burned in a small wildfire on April 19, 2012, which started in meadowlands and spread to Route 56 on the Leicester-

Paxton line, supported by dry conditions and gusty winds. During this fire, one firefighter was injured. Paxton issues permits for controlled burning of yard waste between January 15th and April 30th each year. In the 1930s, a wildfire at Boynton Park burned a couple hundred acres of brush.

Probability of Future Events

The 2023 ResilientMass Plan notes that changes in precipitation, prolonged drought conditions, rising temperatures, and increased frequency of thunderstorms are expected to increase the frequency and severity of wildfires. Particularly in drought conditions, forest types that are not typically prone to fire hazard will become more likely to burn. Globally, wildfires are projected to increase worldwide by 14% by 2030, 30% by 2050, and 50% 2100.

Climate scenarios project that by mid-century, the mean summer temperatures in the Chicopee River basin will increase by 3.6° F to 8.1° F.[56] Combined with increasingly variable precipitation, rising temperatures could exacerbate summer drought and further promote high-elevation wildfires, releasing stores of carbon and further contributing to the buildup of greenhouse gases.

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

Impact

While a large wildfire could in theory damage much of the landmass of Paxton, most forested areas are sparsely developed, meaning that wildfire affected areas are not likely to cause damage to property. For this reason, the town faces a "minor" impact from wildfires, with little damage likely to occur.

Both wildfires and brush fires can consume homes, other buildings and/or agricultural resources. The impact of wildfires and brush fires are as follows:

- Impact to benefits that people receive from the environment, such as food/water and the regulation of floods and drought
- Impact on local heritage, through the destruction of natural features
- Impact to the economy, due to damage to property and income from land following a wildfire
- Impact through the destruction of people and property

Utilizing the total value of all property, $ 782,518,766 and an estimated 5% of damage to 1 percent of all structures, the estimated amount of damage from a wildfire is $391,259.38. The cost

[56] ResilientMass Maps and Data Center, "Climate Change Projections Dashboard," Resilientma-mapcenter-mass-eoeea.hub.arcgis.com, ResilientMass, accessed August 15, 2024, https://resilientma-mapcenter-mass-eoeea.hub.arcgis.com/#ClimateDashboard.

of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

EXPOSURE

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

- People who are sensitive to smoke, including children, the elderly, and individuals with other health conditions. Wildfires outside of Paxton may also impact the town residents. Air pollution from wildfires can be a severe public health concern. Smoke can exacerbate respiratory conditions like asthma and carry toxic chemicals and particulate matter. In 2021, wildfire smoke from western states and Canada extended across the continental US forced the Massachusetts Department of Environmental Protection to issue an air quality alert.[57]
- First responders, especially the town's firefighters.

Additionally, Wildfires do not have to take place within town to affect the town: in March through July of 2023, historic wildfires in Canada sent smoke across a broad swath of New England, peaking in June of that year. In Worcester County, Air quality was reduced throughout the months of May and June, with the AQI for Worcester County peaking at 148: Unhealthy for Sensitive Groups for fine particulate matter (PM2.5) on June 6th 2023[58].

The local planning team noted that they have a few locations in town that are vulnerable to wildfires:

- The town has a significant wildland-urban interface near Knollwood road in the southeast of Paxton.
- The town is host to several state and local parks, such as Moore State Park, and an unhoused population that resides within Boynton Park who would be vulnerable to wildfires.

The Town is interested in opening lines of communication with conservation organizations and land trust groups (such as the Greater Worcester Land Trust) to improve fire management on their properties.

POTENTIAL CLIMATE CHANGE EFFECTS

[57] McAlpine, K. J. (2021, July 27). Wildfire Smoke in New England Is "Pretty Severe from Public Health Perspective." The Brink. https://www.bu.edu/articles/2021/wildfire-smoke-in-new-england/

[58] "Pre-Generated Data Files," Aqs.epa.gov, United States Environmental Protection Agency, October 26, 2023, https://aqs.epa.gov/aqsweb/airdata/download_files.html.

According to the 2023 ResilientMass Plan, Precipitation changes, prolonged drought, rising temperatures, and increased frequency of lightning are expected to contribute to increased frequency and severity of wildfire. As droughts become more frequent and severe, forest types that do not usually burn and are not fire adapted will be more likely to burn. Wildfires are projected to increase worldwide by 14% by 2030, 30% by 2050, and 50% 2100.

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

In summary, climate change is likely to increase the frequency and extent of wildfires in Paxton. The increase in wildfires may result in changes in land use, such as the Town no longer being able to develop nearby dense forest. Additionally, if brush fires worsen significantly, residents may desire to move away from dense forest, shifting populations from more rural areas to cities or downtown communities. The future air quality risks to Paxton from wildfires are hard to predict with any certainty, and represent a threat to the broader region more than a single town, but air purifying equipment may need to be included within shelter planning within the foreseeable future.

Vulnerability

Based on the above assessment, Paxton has a hazard risk index of "3 – Moderate risk" from wildfires. However, this risk assessment is highly dependent on short term weather patterns like wind, lightning, and rainfall, which are impossible for the town to predict with certainty.

Mitigation Strategies

The Town of Paxton is currently able to effectively respond to wildfires and brushfires through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to wildfires and brushfires could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of wildfires/brush fires in Paxton:

- Water Infrastructure Replacement on West Street, Water infrastructure there is Aging and supplies water to west side of the town. Begin a Broader study of the Town's Water system to create a replacement plan for aging infrastructure
- Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR.
- Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.

4.8 EARTHQUAKES

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

LOCATION

Because of the regional nature of the hazard, the entire Town of Paxton is susceptible to earthquakes. This makes the location of occurrence "large," or over 50 percent of the total area.

EXTENT

The magnitude of an earthquake is sometimes measured using the Richter Scale, which measures the energy of an earthquake by determining the size of the greatest vibrations recorded on the seismogram. On this scale, one step up in magnitude (from 5.0 to 6.0, for example) increases the energy more than 30 times. Earthquakes are also commonly measured using the moment magnitude scale, which provides similar measurements to the Richter scale but more accurately measures earthquakes with magnitudes greater than 8.[59]

Table 10: Richter Scale Magnitudes and Effects

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

[59] Michigan Tech. (n.d.). How Do We Measure Earthquake Magnitude? Michigan Technological University. Retrieved February 3, 2022, from https://www.mtu.edu/geo/community/seismology/learn/earthquake-measure/

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

Table 11: Modified Mercalli Intensity Scale for and Effects[60]

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

[60] U.S. Geological Survey. (n.d.). The Modified Mercalli Intensity Scale. UGGS. Retrieved February 3, 2022, from https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale?qt-science_center_objects=0#qt-science_center_objects

Previous Occurrences

The last earthquake to cause major damage in New England occurred in 1755,[61] though seismologists state that another serious earthquake occurrence is possible. There are five seismological faults in Massachusetts, but there is no discernible pattern of previous earthquakes along these fault lines. Additionally, earthquakes that are based in more seismologically active regions like parts of Canada may also impact Massachusetts.[62] Earthquakes occur without warning and may be followed by aftershocks. Image 4 below shows the locations of earthquakes that have occurred across the New England region and beyond over the last 45 years.

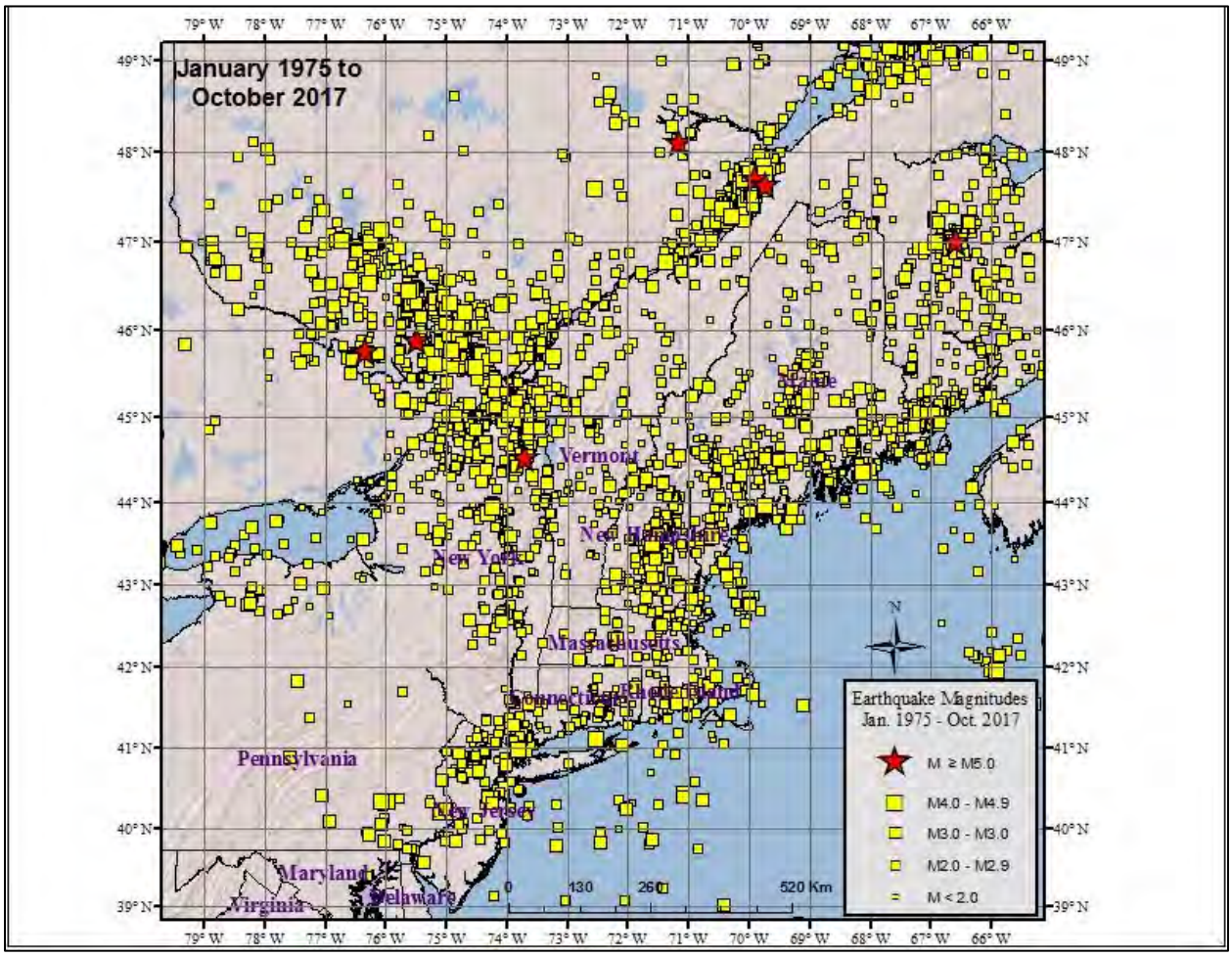


Image 4: Map of Earthquakes of the Northeastern US and Southeastern Canada 1975 to 2017. Source: The Northeast States Emergency Consortium website.

The local Hazard Mitigation Team reports that no earthquakes have been felt in Paxton. To determine whether earthquakes have occurred recently near Paxton, events listed by Weston

[61] Northeast States Emergency Consortium. (n.d.). Massachusetts Earthquakes. Retrieved February 3, 2022, from http://nesec.org/massachusetts-earthquakes/

[62] 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan.

Observatory in Boston College were reviewed for all towns in Massachusetts for a five-year lookback. Listed earthquakes above magnitude 2.0 include:

- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1 [Mn*/Mc**]
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
  *Mn is the Nuttli Magnitude (see below)
  **Mc is the Coda Duration Magnitude (see below)

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

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

On August 23, 2011, an earthquake measuring 5.8 on the Richter scale centered in Virginia was felt in much of the Northeast but was not felt in Paxton according to the local planning team.[63]

Probability of Future Events

The 2023 ResilientMass Plan notes that "The probability of a magnitude 5.0 or greater earthquake centered in New England in a 10-year period is about 10–15%[64]" Additionally, the plan notes that while Massachusetts is not near any tectonic plate boundaries, it is still susceptible to earthquakes on the North American Plate. Earthquakes elsewhere could also have secondary effects to the state and the region, potentially disrupting supply chains or causing other secondary effects.

Based upon existing records, there is a "very low" frequency (less than 1 percent probability in any given year) of a damaging earthquake in Paxton.

Impact

Massachusetts introduced earthquake design requirements into their building code in 1975 and improved building code for seismic reasons in the 1980s. However, these specifications apply only to new buildings or to extensively modified existing buildings. Buildings, bridges, water supply

[63] Weston Observatory Boston College

[64] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," page 5.1-42.

lines, electrical power lines and facilities built before the 1980s may not have been designed to withstand the forces of an earthquake The first edition of the Massachusetts State Building Code went into effect on January 1, 1975, and 68.7% percent of the town's 1,688 occupied housing units was constructed in 1979 or earlier (American Communities Survey, 2020 5-year estimate).[65] The seismic standards were upgraded with the 1997 revision of the State Building Code. The local planning team noted that its water infrastructure and distribution system would be severely damaged by an earthquake due to the age of the system. Subsequently, Paxton faces a "moderate" impact from earthquakes, despite the extreme rarity of damaging events.

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

	Magnitude 5.0
Building Characteristics	
Estimated total number of buildings	1,682
Estimated total building replacement value (2024 $)	$ 998,214,000.00
Building Damages	
# of buildings sustaining slight damage	513
# of buildings sustaining moderate damage	244
# of buildings sustaining extensive damage	50
# of buildings completely damaged	10
Population Needs	
# of households displaced	15
# of people seeking public shelter	7
Debris	
Building debris generated (tons)	18,000
# of truckloads to clear debris (@ 25 tons/truck)	720
Value of Damages (dollars)	
Total property damage	$119,682,300.00
Total losses due to business interruption	$19,536,700.00

[65] US Census Bureau, 2020 American Community Survey 5-year estimates, DP04.

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

EXPOSURE

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

- Older buildings constructed prior to the first edition of the Massachusetts State Building Code.
- The Town's Water Distribution System is aging and breaks annually near Shenandoah Drive.
- The town has older buildings that they own that are of concern for primary and secondary hazards relating to earthquakes: chiefly the Senior Center and the Paxton Center School complex. The school itself does not have a sprinkler system installed and is attached to a historic wooden building called the White Building, which puts the facility at risk of fire as a secondary hazard following an earthquake event.

POTENTIAL CLIMATE CHANGE EFFECTS

According to the 2023 ResilientMass Plan, no climate change effects have been identified that pertain to earthquake hazards.

VULNERABILITY

Based on the above analysis, Paxton has a hazard index rating of "5- lowest risk" from earthquakes. Despite the hazards that earthquakes would pose to the town, the rarity of them for the region reduces the overall risk within this planning cycle.

MITIGATION STRATEGIES

The Town of Paxton is currently able to effectively respond to earthquakes through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to earthquakes could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of Earthquakes in Paxton:

- Paxton Center School Infrastructural Mitigations: Install Fire protection System in Paxton Center School to prevent catastrophic Fire Damage within the school building caused by a hazard event such as an earthquake.
- Participate in Evacuation Plan updates.
- Inventory unreinforced masonry and brick buildings in town that may be vulnerable to earthquakes. Conduct a study which identifies ways that these buildings can meet the Massachusetts State Building Code's seismic standards.

4.9 Dam Failure

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

When a dam fails, the potential energy of the stored water behind the dam is released rapidly. Some dam failures occur when floodwaters above overtop and erode the material components of the dam. Other failures are caused by foundation defects, inadequate maintenance, internal erosion caused by seepage, and many other specific causes.[66] Dam failure may be influenced by storm floodwaters but most are caused by structural, mechanical, or hydraulic failures.[67] Dam breeches can lead to catastrophic consequences as the water rushes in a torrent downstream flooding an area engineers refer to as an "inundation area." The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area.

Many dams in Massachusetts were built 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 the agency 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 Commonwealth of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

Location

According to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton. It serves the Pine Hill Reservoir, which is Worcester's largest reservoir supply for drinking water. On the City of Worcester's website, the Pine Hill Pond Dam is noted as spanning Paxton, Holden, and Rutland, it is 100 years old, capable of holding up to 2,971,000,000 gallons

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

[67] FEMA. (2013). Living with Dams: Know Your Risks (FEMA P-956; p. 9). Federal Emergency Management Agency. https://www.fema.gov/sites/default/files/2020-08/fema_living-with-dams_p-956.pdf

of water, and requiring rehabilitation. (http://www.worcesterma.gov/dpw/water-sewer-operations/pine-hill-dam-rehab). The local planning team noted the following:

- Asnebumskit Dam would takeout roadways, driveways, and any property that borders Streeter Pond should it fail. However, the planning team do not foresee any eminent failures, as the dam is in relatively good shape, but high hazard due to proximity to homes. The dam itself holds back an existing drinking water reservoir, but the town does not utilize it as such presently due to the lack of a water treatment facility.
- Illig's Pond Dam holds back a small amount of water, and would flood some basements Shanandoah Drive and maybe impact Route 31 should it fail.
- Eames Mill Pond Dams concerns there have been mostly addressed with recent repair work made by DCR.
- Streeter Pond Dam would flood roads nearby, but the planning team is unsure about impacts on Pine Hill Pond Dam. Spillway is deteriorating but holds back a relatively small amount of water.

Generally, if any of the dams go would expect minor property damage within Paxton, but greater impact would be influx of water on the Pine Hill Reservoir and potentially would cause cascading damages into Holden and Worcester. The names and hazard levels of dam structures within Paxton are:

National ID	Dam Name	Owner	Regulatory Authority	Hazard Code	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.	MA0067
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High		MA0067
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.	MA0067
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.	MA0067
MA0196	Small Pond Dam	Private	N/A		MA0196
MA0196	Kauppila Pond Dam	Private	N/A		MA0196

MA0196	Arrowhead Pond Dam	Private	N/A		MA0196
MA0196	Cournoyer's Dam	Private	N/A		MA0196
MA0196	Rasvall Pond Dam	Private	N/A		MA0196
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.	MA0253
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.	MA0254
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.	MA0237
MA0286	Turkey Hill Pond Dam	Private	N/A		MA0286

EXTENT

Often dam or levee breaches lead to catastrophic consequences as the water ultimately rushes in a torrent downstream flooding an area engineers refer to as an "inundation area." The number of casualties and the amount of property damage will depend upon the timing of the warning provided to downstream residents, the number of people living or working in the inundation area, and the number of structures in the inundation area. The inundation area for these dams affecting the town of Paxton cover less than 10% of the town, or a "small" portion of its area.

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

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

Some dams do not have a hazard rating.

Previous Occurrences

To date, there have been no catastrophic dam failures in Paxton. It was documented that the Streeter Pond Dam does overflow regularly due to beaver activity, however, this has not resulted in catastrophic damage.

Probability of Future Events

While Paxton has a High Hazard dam, and a couple Significant Hazard dams, there are no reported previous dam failure events in many decades that the dams have been present. Probability for future failure events is "very low" with less than 1 percent chance of a dam bursting in any given year.

Impact

The Town faces a "limited impact" from failure of dams with, with 10 to 25 percent of the Town likely to see damage.

It is not possible to estimate the property loss impacts of dam failure quantitatively given the large number of variables involved in failure events. Qualitatively, losses from failure of an individual dam could be significant but would be geographically limited to portions of the dam's inundation zone. This may change with future improvements to dam breach modeling software being developed and that are currently in early trial stages, such as the DSS-WISE™ (Decision Support System for Water Infrastructural Security) program[68].

Potential Climate Change Effects

Dam failure through overtopping can be caused by floodwaters flowing into a dammed body of water, exceeding the spillway capacity of the dam, and causing water to flow over dam the top of the dam (overtopping). If the water flowing over the dam erodes the dam itself, then a dam failure can occur. Therefore, the risk of dam failure may be indirectly impacted by climate change through its impacts on flooding.

Vulnerability

Based on a mostly qualitative assessment, Paxton has a hazard index rating of "4 – low risk" from dam failure. Locally, there was no concern explicitly stated about any of the dams. Asnebumskit Pond Dam (Significant Hazard) is 0.5 miles north of a day care (6 Bel Arbor Drive) and directly north of evacuation Route 31, however, the evacuation Route may be the only infrastructure in jeopardy from a dam failure, as Kauppila Pond Dam is located directly northeast of the daycare and is not considered a hazard. Cournoyer's Pond Dam is 0.26 miles north of another day care in Paxton (311 Richards Ave), and Richards Ave is also known as Evacuation Route 56, but again, no

[68] "About DSS-WISE™ Web," Dsswiseweb.ncche.olemiss.edu, University of Mississippi, accessed June 10, 2024, https://dsswiseweb.ncche.olemiss.edu/userpages/about.php.

concern was explicitly stated by the Town about this dam. Vulnerabilities from the High Hazard dam, Kettle Brook Reservoir #4 Dam, are nil, as it rests within the Kettle Brook reservoir which contains no buildings. A dam failure from Kettle Brook Reservoir #4 may impact Evacuation Route 56, as the southern water body of Kettle Brook Reservoir is extremely close, 0.02 miles west, of Route 56.

Mitigation Strategies

The Town of Paxton is currently able to effectively respond to Dam Failures through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to dam failures could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of Dam Failures in Paxton:

- Draft a Town wide beaver mitigation strategy to address beaver dam flooding concern, and install beaver deceivers and other beaver management techniques in and around the Asnebumskit Dam and Spruce pond Area.
- Perform H+H study of Asnebumskit Pond Dam as recommended by the evaluation report. Continue maintenance of the dam and perform Dam Inspection every 5 years
- Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.
- Monitor implementation of Hazard Mitigation Plan, to include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve. Incorporate High Hazard Potential Dam information in future updates.

The town currently lacks the planning capacity for a High Hazard Potential Dam Appendix to be included in this current update of the Hazard Mitigation Plan.

4.10 Drought, Including Changes in Groundwater

Drought, including changes in groundwater, is a normal, recurrent feature of climate. It occurs almost everywhere, although its features vary from region to region. In the most general sense, drought originates from a deficiency of precipitation over an extended period of time, resulting in a water shortage for some activity, group, or environmental sector. Reduced crop, rangeland, and forest productivity; increased fire hazard; reduced water levels; increased livestock and wildlife mortality rates; and damage to wildlife and fish habitat are a few examples of the direct impacts of drought. Of course, these impacts can have far-reaching effects throughout the region and even the country.

Location

Because of this hazard's regional nature, a drought (including reduced groundwater levels) would likely impact the entire community, meaning the location of occurrence is "large" or over 50 percent of the town.

EXTENT

The severity of a drought would determine the scale of the event. The National Drought Mitigation Center also records information on historical drought occurrence. Unfortunately, data are only available at the state level. The National Drought Mitigation Center categorizes drought on a D0-D4 scale as shown below.

Table 12: U.S. Drought Monitor[69]

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

Roughly 75% of Paxton residents and businesses are served by municipal water; the remainder uses private wells. Paxton purchases 100% of their municipal water from the City of Worcester whose reservoirs are located in the Town of Paxton. The local planning team identified water supply as a large concern for the town, as they are reliant on external water sources.

[69] National Drought Mitigation Center. (n.d.). Drought Classification. U.S. Drought Monitor. Retrieved February 3, 2022, from https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx

Previous Occurrences

In Massachusetts, nine extreme droughts have occurred statewide since 1930, though the Paxton area has been spared the most severe impacts in each case according to USGS Water Supply Paper for Massachusetts #2375. These historic major droughts range in severity and in length, lasting from three to eight years. In many of these droughts, water-supply systems around the state were found to be inadequate. Water was piped into urban areas, and water-supply systems were modified to permit withdrawals at lower water levels. The following table displays peak drought severity since 2000, from the National Drought Mitigation Center:

Table 13: Annual Drought Status[70]

Year	Maximum Severity
2000	No drought
2001	D2 conditions in 21% of the state
2002	D2 conditions in 100% of the state
2003	No drought
2004	D0 conditions in 48% of the state
2005	D1 conditions in 7% of the state
2006	D0 conditions in 98% of the state
2007	D1 conditions in 71% of the state
2008	D0 conditions in 69% of the state
2009	D0 conditions in 45% of the state
2010	D1 conditions in 27% of the state
2011	D0 conditions in 0.01% of the state
2012	D2 conditions in 51% of the state
2013	D1 conditions in 60% of the state
2014	D1 conditions in 54% of the state
2015	D1 conditions in 58% of the state
2016	D3 conditions in 52% of the state
2017	D3 conditions in 9% of the state
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022 (to September)	D3 conditions in 39% of the state

[70] National Drought Mitigation Center. (2016, 2022). Statistics by Threshold. U.S. Drought Monitor. https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

In Paxton, the past most notable drought events occurred in the years 2016, 2017, and 2018. During these years, the City of Worcester issued a Stage 1 Water Supply Alert. All out-of-City customers, which include Paxton, were notified of their obligation to implement water conservation measures equal to those imposed on City residents. During the 2016 drought conditions the city had to purchase water from MWRA. Although the City and most of the State of Massachusetts experienced some level of drought during these years, no significant impacts, such as wells running dry, were experienced in Paxton.

Probability of Future Events

In Paxton, as in the rest of the state, extreme and exceptional droughts and reductions in groundwater availability occur at a "very low" probability (1 to 10 percent in the next year). Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that Central Massachusetts may be slightly more vulnerable than parts of eastern Massachusetts to severe drought conditions. However, many factors, such as water supply sources, population, economic factors (i.e., agriculture-based economy), and infrastructure, may affect the severity and length of a drought event.

In the long-term, the risk of drought and reduced groundwater levels, may increase in Paxton due to climate change influences, which will result in annual increases of consecutive dry days.

Impact

The specific impacts of drought in Massachusetts are categorized by the National Drought Mitigation Center in Table 23 below:

Table 14: Historic Impacts of Drought in Massachusetts[71]

Category	Historically observed impacts
D0	Crop growth is stunted; planting is delayed
	Fire danger is elevated; spring fire season starts early
	Lawns brown early; gardens begin to wilt
	Surface water levels decline
D1	Irrigation use increases; hay and grain yields are lower than normal
	Honey production declines
	Wildfires and ground fires increase
	Trees and landscaping are stressed; fish are stressed
	Voluntary water conservation is requested; reservoir and lake levels are below normal capacity

[71] National Drought Mitigation Center. (n.d.). State Impacts. U.S. Drought Monitor. Retrieved February 3, 2022, from https://droughtmonitor.unl.edu/DmData/StateImpacts.aspx

Category	Historically observed impacts
D2	Specialty crops are impacted in both yield and fruit size
	Producers begin feeding cattle; hay prices are high
	Warnings are issued on outdoor burns; air quality is poor
	Golf courses conserve water
	Trees are brittle and susceptible to insects
	Fish kills occur; wildlife move to farms for food
	Water quality is poor; groundwater is declining; irrigation ponds are dry; outdoor water restrictions are implemented
D3	Crop loss is widespread; Christmas tree farms are stressed; dairy farmers are struggling financially
	Well drillers and bulk water haulers see increased business
	Water recreation and hunting are modified; wildlife disease outbreak is observed
	Extremely reduced flow to ceased flow of water is observed; river temperatures are warm; wells are running dry; people are digging more and deeper wells

The 2023 ResilientMass plan notes that while drought is a naturally occurring climate phenomenon, its impacts can be exacerbated by human behavior. The volume and rate of groundwater withdrawn from underground aquifers can impact the amount of water that flows through surface water bodies, negatively impacting aquatic ecosystems. Additionally, more impervious surface coverage, and some forms of stormwater infrastructure, can prevent natural infiltration of precipitation into groundwater.[72]

Reduced groundwater levels caused by drought can cause public water suppliers to have difficulty in meeting users' demands while also maintaining enough water pressure in their systems to facilitate fire suppression and water quality needs. Decreased firefighting capabilities due to low water availability during drought can increase the community's vulnerability to wildfires and fires caused by lightning strikes. Reduced groundwater levels can also lead to remaining well water having sediment (due to intense pumping into bedrock or the overburden aquifer being needed) and/or pollutants such as nitrates and heavy metals in it, and communities may need to consider drilling deeper wells or re-siting wells to areas less affected by drought if sedimentation and/or contamination occurs.

Impacts in Paxton may vary among customers of the municipal water systems and private well users. Wildfire and brush fires would also be a concern in long periods of drought. While the impact of a drought can be assessed as "minor" overall, with very little damage to property (damage to less than 10% of property in the area affected by the hazard), injuries, or loss of life likely to occur in town, drought impacts may be higher in the parts of town that are not located within the town's water service area.

[72] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

Regardless, the Town made no mention of significant droughts, or wells running dry from changes in ground water, in Paxton in recent decades.

EXPOSURE

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

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

The local planning team noted that while they do not typically have issues with water supply, their reliance on City of Worcester water can be both a boon and a burden, in that they can usually procure water through the City, but are also subject to restrictions as with other city water clients.

Higher water bills or the cost of re-drilling private wells due to drought impacts, could also negatively affect local residents. Approximately 25% of town residents are on private well, and are at greater risk to reduced availability of groundwater due to drought. Other factors like PFAS contamination of water sources could compound drought-related water supply challenges, as reductions in groundwater can cause concentration of PFAS and other chemicals in the remaining available groundwater.

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

- The frequency and extent of droughts are projected to increase in summer and fall as higher temperatures result in more evaporation, snow melts earlier in the year, and precipitation becomes less constant and more extreme.
- Rising temperatures and changes in precipitation will reduce the snowpack and hasten snowmelt. This could result in less snowmelt recharge of groundwater, less snowmelt feeding stream flows, and less snowmelt as a water source for agriculture.

In summary, climate change is likely to increase the frequency and extent of drought in Massachusetts. Drought that is worsened by climate change can have numerous social implications in Paxton. The town may also have to plan for changes in its drinking water system to account for drought conditions (including a reduction in available groundwater), in order to prevent increases in cost to residents and protect residents not currently on town water.

VULNERABILITY

Based on the above assessment, the Town of Paxton has a hazard index rating of "3 – Moderate

risk" from drought. Minimal or no loss of property, or damage to people or property is expected due to this hazard. Vulnerability is higher in areas outside the municipal water service area or in areas more prone to wildfires. The Paxton Hazard Mitigation Team noted that the Town is at the mercy of the City of Worcester in times of drought caused reductions in groundwater.

MITIGATION STRATEGIES

The Town of Paxton is currently able to effectively respond to drought through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to drought could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of drought in Paxton:

- Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought, in conjunction with obtaining well access or installing new wells
- Water Infrastructure Replacement on West Street, water infrastructure there is aging and supplies water to west side of the town. Begin a broader study of the Town's water system to create a replacement plan for aging infrastructure.
- Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).
- Develop a town water plan that examines all options the town can take to secure water resources for the town (including water conservation planning for residents, water acquisition planning for the town, and possible municipalization of town water resources)

4.11 Extreme Temperatures

As per the 2023 ResilientMass Plan, there is no universal definition of "extreme heat," "extreme cold," or "extreme temperatures": these terms are relative terms whose meaning depends on the normal average temperatures and climatic highs and lows in a region. Extreme heat in Massachusetts is typically defined as a period of 3 or more consecutive days with temperatures above 90 °F.[73] Extreme heat may also refer to any prolonged period of especially hot weather (a heat wave), which may also be accompanied by high humidity. 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.

For Massachusetts, extreme temperatures can be defined as those that are far outside the normal ranges. Normal temperatures within the period ranging from 1991-2020 for the Paxton area are.[74]

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

Specific criteria used by the National Weather Service for issuing extreme heat and extreme cold watches, warnings, and advisories, are described in Extent, below.

Location

Extreme temperatures can be expected to be uniform across Paxton during a given weather event, due to the town's lack of extreme elevations, urban areas, and coastal areas. Therefore, this hazard has a "large" geographic coverage.

Extent

2023 ResilientMass Plan notes that the extent (severity or magnitude) of extreme cold temperatures are generally measured through the Wind Chill Temperature Index. Wind Chill Temperature is the temperature that people and animals feel when outside and it is based on the rate of heat loss from exposed skin by the effects of wind and cold[75]. In Massachusetts, a wind chill warning is issued by the National Weather Service (NWS) Norton Forecast Office when the Wind Chill Temperature Index, based on sustained wind, is –25°F or lower for at least three hours. NWS Windchill Chart (shows three shaded areas of frostbite danger. Each shaded area shows how long a person can be exposed before frostbite develops.

[73] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-1-5.2-2.

[74] "Climate," Weather.gov.

[75] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-1-5.2-3.

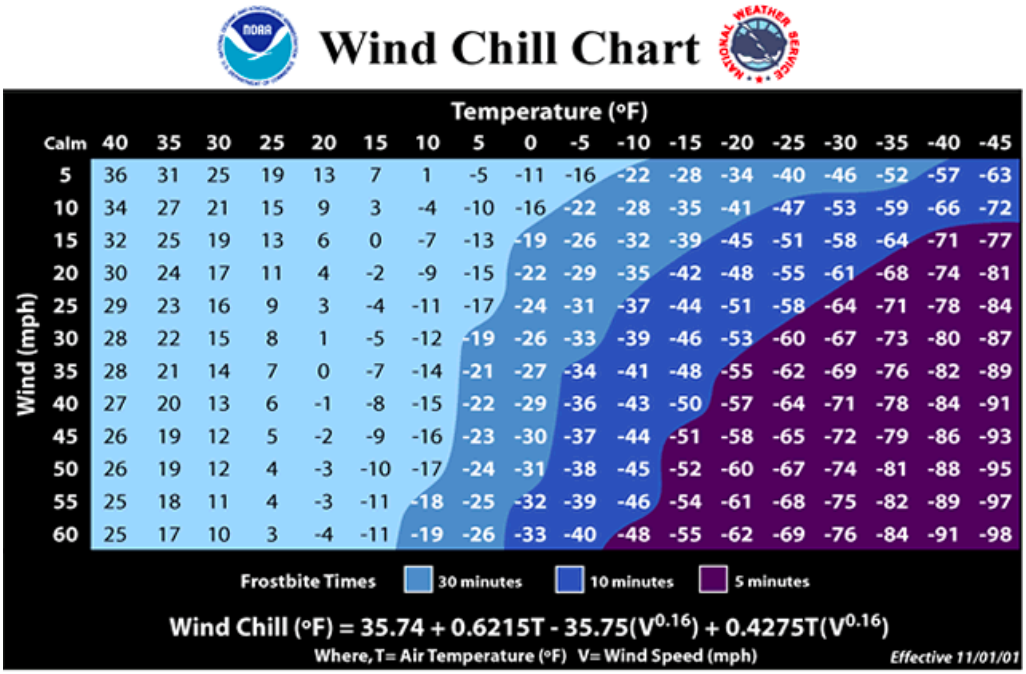


Figure 2: NWS Wind Chill Temperature (WCT) index. Source: https://www.weather.gov/safety/cold-wind-chill-chart

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

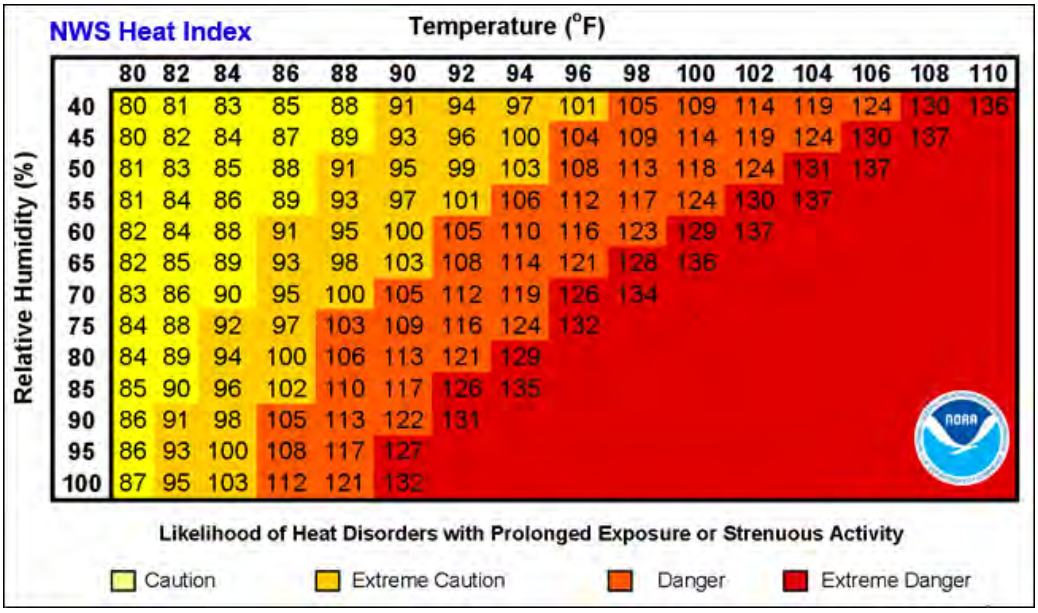


Figure 3: Heat Index. Source: https://www.weather.gov/safety/cold-wind-chill-chart

Extreme heat causes more fatalities in the United States that all other weather-related natural Extreme heat causes more fatalities in the United States that all other weather-related natural hazards combined.[76] Extreme heat can be the underlying cause of death or can worsen other medical conditions like heart disease, hypertension, alcohol poisoning and drug overdoses.[77] The heat-related mortality rate is higher among males and people aged 65 years and older.[78]

Table 13: Heat Effects on Body lists the effects of the body at different levels of the heat index. It is important to note that while temperatures exceeding 100°F are unusual for Central Massachusetts, high humidity is very common during the summer and can drive the heat index to dangerous levels.

Table 15: Heat Effects on Body[79]

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

Other impacts of high temperatures include drought, wildfire, and the formation of ground-level ozone.[80] Prolonged heat can cause power use to spike and overload the electrical grid, causing outages.[81] Cold temperatures are often combined with winter storms. Individuals may have to deal with the loss of heat and power due to storm damage, which could further subject them to the cold.[82] Carbon monoxide poisoning is another risk during cold weather, especially when households lack adequate power or heat.[83] Extreme heat and cold can both negatively impact transportation

[76] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,"

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

[78] Ibid.

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

[80] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan,"

[81] Ibid.

[82] Ibid.

[83] Ibid.

infrastructure. Railroad tracks are a particular concern because the metal rails can kink in high temperatures.[84]

Previous Occurrences

There is not a comprehensive data source listing instances when the National Weather Service has issued extreme heat or cold warnings or advisories in Worcester County. Across Massachusetts as a whole, there were 33 cold weather events between 1994 and 2018. The NOAA storm Events database lists the following Extreme Cold/ Wind Chill Events as having occurred in Southern Worcester County since the last Paxton HMP was developed in 2017:

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

According to the 2023 Resilient Mass Plan, there have been 118 warm weather events (heat and excessive heat events) between 1995 and 2022[85]. In Massachusetts, 2010–2022 had seven of the 10 warmest summers on record. The hottest two summers on record for the Commonwealth were 2020 and 2022[86]. August 2022 was the hottest August recorded in the Commonwealth, with temperatures more than 6°F greater than the 20th century average. In 2022, Boston experienced at least 17 days above 90 degrees and two six-day heat waves.

In 2012, Massachusetts temperatures broke 27 heat record[87]s. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast[88]. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the heat index reached 100°F[89]

[84] Ibid.

[85] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.2-7-5.2-8.

[86] Ibid.

[87] Ibid.

[88] Ibid.

[89] Ibid.

Inland portions of Massachusetts are more subject to extreme temperatures because they lack the moderating effect of the Atlantic Ocean, and densely developed cities are more likely to be impacted by heat waves than smaller towns like Paxton.

Probability of Future Events

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

Impact

The impact of extreme heat or cold in Paxton is considered to be "moderate," as the local planning team noted that the town is more concerned with extreme cold rather than extreme heat due top frequent breaks in their water infrastructure caused by cold weather events. and a limited effect on humans. These have occurred in several areas in town, notably on West Street and Route 122, which experience a break during a particularly cold weather event.

EXPOSURE

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

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

The Town's water infrastructure is particularly susceptible to cold weather events, and the local planning team noted that heating systems in public and private buildings are of concern, as they do not have natural gas and limited access to fuel within town. Paxton Center school is additionally vulnerable to temperature extremes, as it is without air conditioning and its heating systems are in need of replacement.

Potential Climate Change Effects

According to the 2023 ResilientMass Plan, climate change is already having an effect on temperatures within Massachusetts and beyond, with more high heat days and fewer extreme cold events. This will also shift the average temperature in Massachusetts higher, leading to longer warm seasons. The changes in temperature will also cause shifts to growing seasons, habitat and vegetation ecosystems, and migratory patterns. Rising temperatures will also cause warming seas, a degradation in air quality, impacts on health and an increased demand for energy and government services. Secondary climate risks include increased severity of wildfires, droughts, flooding and encroachment by invasive species as temperatures rise. According to the 2023 ResilientMass Plan,

- By 2050 average annual temperatures are expected to increase by 5.9 to 7.9°F. This is a drastically shortened timeline from the previous plan where increases of this magnitude were not expected until the end of the century.[90]
- By 2100, annual average temperatures are expected to increase by 10.0 to 12.9°F compared to the 1971-2000 baseline.

According to the 2022 Massachusetts Climate Change assessment by 2030 The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), worsening stress on electric transmission and utility distribution infrastructure[91].

In summary, climate change is likely to increase the frequency and duration of extreme heat events in Massachusetts. Changes to average annual temperatures will also impact Paxton. Seasonal temperatures will shift, with spring and summer temperatures extending through more of the year.[92] Winters may also be more mild than historical norms.[93] Changes to average temperatures could impact the agricultural industry and the natural environment. Farmers may need to shift their practices to account for new climate conditions, and certain specific plants and animals may need to migrate to new ranges to find suitable habitat.[94] In response, Paxton residents and businesses may have to alter work patterns during extreme heat days and events to reduce workplace injuries in vulnerable jobs such as construction trades and agricultural labor. The town may have to plan for more cooling stations to offer residents, particularly vulnerable populations, such as the elderly and low-income residents. Similarly to drought conditions, Paxton may have to account for an increase in population of people seeking refuge from extreme heat in other parts of the country.

90 "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

91 "2022 Massachusetts Climate Change Assessment," page RS30.

92 "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

93 Ibid.

94 Ibid.

Vulnerability

Paxton's vulnerability from extreme heat and cold is considered to be, "2 – High Risk." The town does have a heating/cooling center in the form of a senior center, but town infrastructure and facilities are vulnerable to cold weather events, more so than other towns in the region. In addition to this the town's elevation causes temperatures to trend lower than surrounding towns.

Mitigation Strategies

The Town of Paxton is currently able to adequately respond to extreme temperatures through the emergency response facilities and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town's existing capabilities to mitigate and respond to extreme temperatures could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of extreme temperatures in Paxton:

- Paxton Center School Infrastructural Mitigations: Install upgraded high efficiency heating and cooling system to prevent damage from extreme temperatures as well as open up the possibility of utilizing the school as a approved shelter location. Identify and improve shortcomings in energy efficiency for the school as a whole.
- GIS Water Infrastructure mapping to provide accurate water infrastructure data to fix mains and reduce loss of service to community.
- Create and distribute Education around personal preparedness, utilizing Ready.Gov and MEMA/FEMA public outreach materials.

4.12 Invasive Species

Invasive species, as defined by the Invasive Species Advisory Committee (ISAC) on the U.S. Department of the Interior as "a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health."[96] This definition distinguishes invasives from other native pest species, such as beavers and deer, which will be discussed in greater detail in subsequent sections. The State of Massachusetts, being heavily forested with relatively new growth forest, as well as having a great deal of its water sourced from open reservoirs, is vulnerable to the threat of both land and aquatic invasives. Invasive species can damage and disrupt existing ecosystems by outcompeting the native flora and fauna and can have negative impacts to water quality for aquatic species and can increase wildfire risks for land born invasives. These effects are all species dependent, making invasives a challenge

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

to address for municipalities affected by some invasives but not others.

LOCATION

Because of this hazard's regional nature, broad swaths of the state are affected by one invasive species or another. In the central region, Emerald Ash Borer (*Agrilus planipennis*) has been detected in every city and town within the region.[97] However, since invasives and their effects are very species dependent, and their affects are localized in many instances, this hazard bears a resemblance to other more localized hazards. Subsequently, in Paxton the location of occurrence is "large" or over 50 percent of the town.

EXTENT

The mercurial nature of and lack of verified data clearinghouses about invasive species, in addition to a lack of resources and capacity for local conservation officials to track invasives creates a dearth of knowledge about the extent of invasives. Very often, it is not until the damage caused by invasives is apparent that the true extent of the hazard is known. Still, there is some resources available to the local hazard mitigation planning team; the chief sources being utilized for this plan being the Massachusetts Department of Agriculture's Invasive Pest Dashboard[98]; the Center for Invasive Species and Ecosystem Health's Early Detection and Distribution Mapping System (EDDMapS) hosted by the University of Georgia[99]; and the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas[100]. In Worcester County, according to EDDMapS analysis of verified invasive species reporting from 2017 to 2024 there have been 378 records of locations with invasive species with 353 distinct sightings of invasive species ranging from plants to insects that have been left unchecked, with 2 invasive species being treated, and a total of 47 acres considered to be infested[101]. In May of 2024, the US Department of Agriculture placed the state of Massachusetts under a Box Tree Moth quarantine[102].

---

[97] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," page 5.1-48.

[98] "MDAR Invasive Pest Dashboard," Experience.arcgis.com, Massachusetts Department of Agricultural Resources, accessed June 10, 2024, https://experience.arcgis.com/experience/a25afa4466a54313b21dd45abc34b62d/page/Page-2/?views=Town-by-Town.

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

[100] "Northeastern Forest Health Atlas," UVM.edu, Forest Ecosystem Monitoring Cooperative, accessed June 10, 2024, https://www.uvm.edu/femc/forest-health-atlas.

[101] "My EDDMapS," EDDMapS.org.

[102] https://www.aphis.usda.gov/news/program-update/aphis-establishes-quarantines-box-tree-moth-cydalima-perspectalis-massachusetts

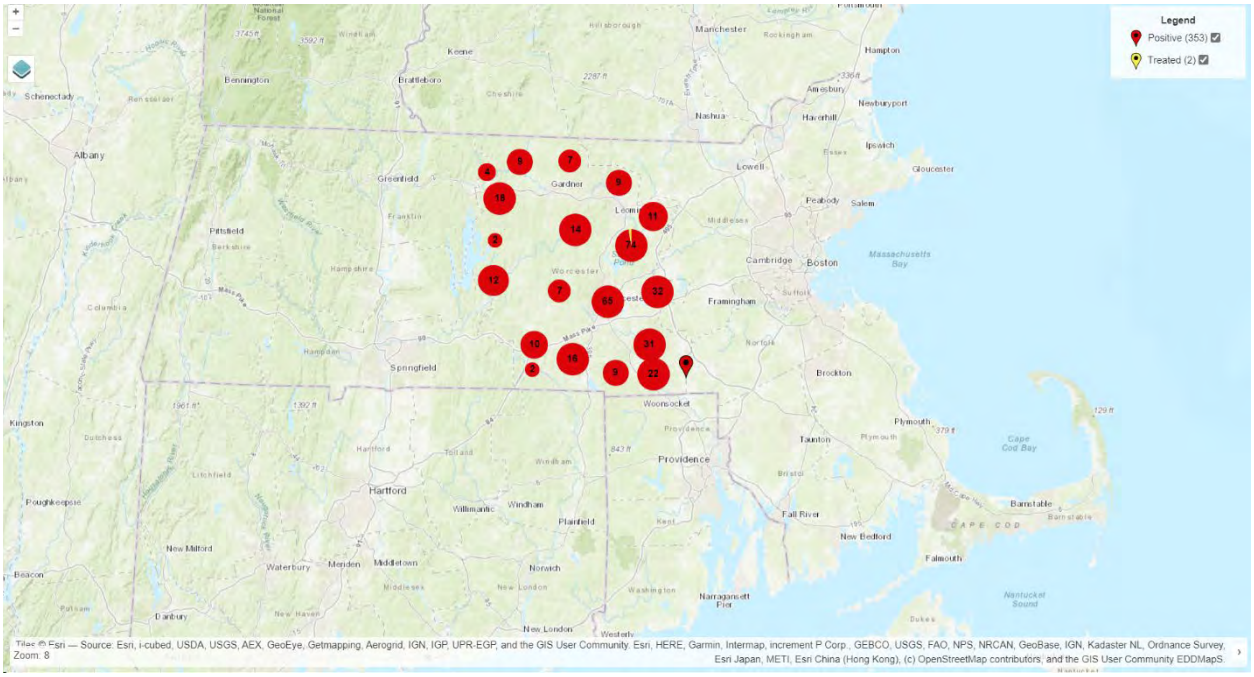


Figure 4: EDDMapS Analysis of Worcester County Invasives 2017-2024

In Paxton the Massachusetts Department of Agriculture's Invasive Pests dashboard notes that Emerald Ash Borer has been detected in town in 2022, and Beech Leaf Disease in 2021 [103]. Paxton is bordered by communities with Asian Longhorn Beetle spotted lanternfly and Mile-A-Minute vine infestation [104]. However, a lack of reporting on invasives may yet prove that the extent is far greater than previously surmised from these databases.

Previous Occurrences

In Massachusetts, according to the Northeast Forest Health Atlas, in the past 20 years of reporting Massachusetts has experienced tree damage (including defoliation and mortality events) to 43,127,411 Acres from a variety of invasive pests, alarmingly with the greatest proportion of that damage occurring in the past 3 years [105].

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in

[103] "MDAR Invasive Pest Dashboard: Emerald Ash Borer (*Agrilus planipennis*)," Experience.arcgis.com, Massachusetts Department of Agricultural Resources, June 10, 2024, https://experience.arcgis.com/experience/a25afa4466a54313b21dd45abc34b62d/page/Page-2/?views=Emerald-Ash-Borer#data_s=id%3AdataSource_3-17f4202b73c-layer-3%3A87.

[104] Ibid

[105] "Northeastern Forest Health Atlas - Defoliation: Years of Damage," UVM.edu, Forest Ecosystem Monitoring Cooperative, accessed June 10, 2024, https://www.uvm.edu/femc/forest-health-atlas?premade=All_Defo.

2020[106]. Whether stocked intentionally or not, Black Crappie are a non-native predator species and the extent of its impact is unknown.

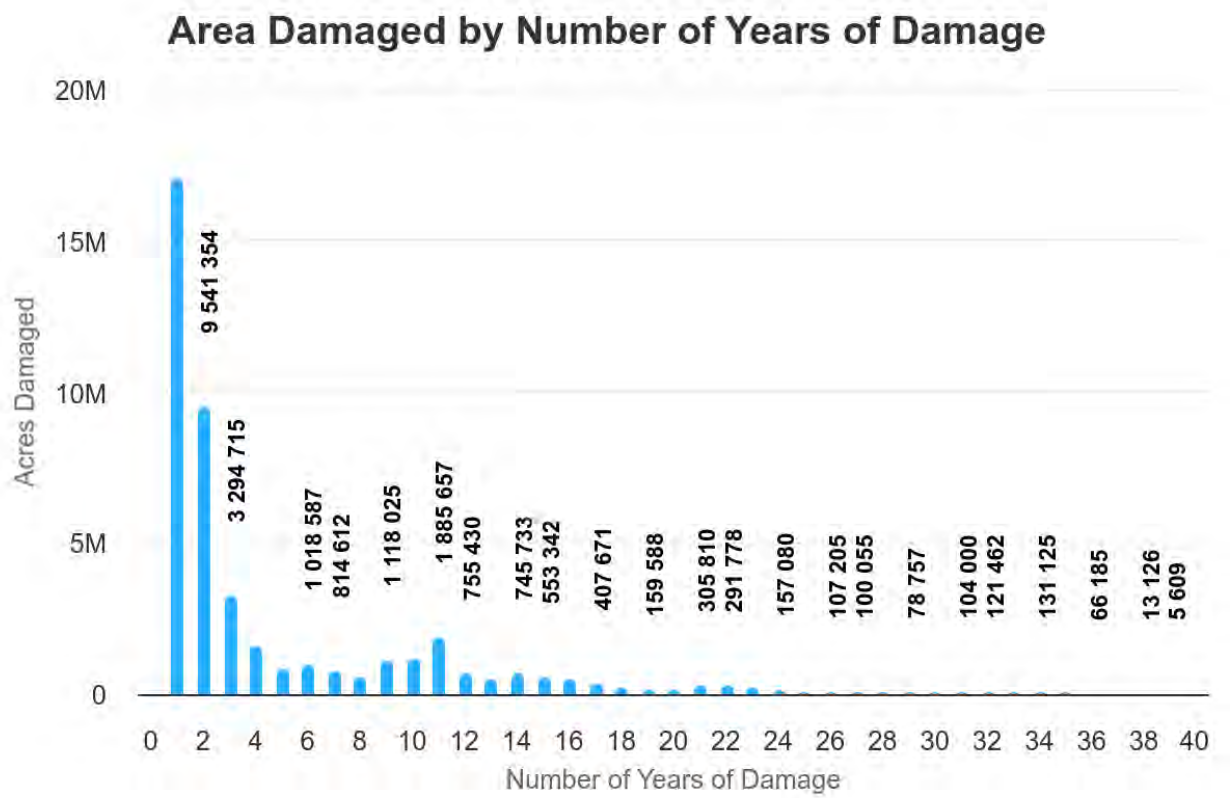


Table 16: Area Damaged by Spongy Moth, Forest Tent Caterpillar, and Winter Moth from 1979 to 2019

In Worcester County the vast majority of these damage events occurred in Southern Worcester County, as well as significant damages to the west and southwest of the county near the border with Hampshire and Hamden Counties, as well as localized defoliation events around the towns of Barre, the Tatnuck neighborhood of Worcester, and other towns. Tree mortality was concentrated in the southern half of Worcester County[107]. In 2008, an outbreak of Asian long-horned beetles in Worcester destroyed nearly 30,000 trees[108].

According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir. While the Atlas's reporting years only run to 2019, based on trends identified in the atlas there is no

[106] "NAS-Non Indegenous Aquatic Species Specimen Viewer », USGS.Gov, USGS Nonidigenous Aquatic Species Viewer, Accessed August 29th 2024, https://nas.er.usgs.gov/queries/SpecimenViewer.aspx?SpecimenID=1675156

[107] "Northeastern Forest Health Atlas - Defoliation: Years of Damage," UVM.edu, Forest Ecosystem Monitoring Cooperative, accessed June 10, 2024, https://www.uvm.edu/femc/forest-health-atlas?premade=All_Defo.

[108] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

reason to assume that the hazard has lessened in the subsequent years. The local planning team also noted the presence of Japanese Knotweed in town.

Probability of Future Events

The 2023 ResilientMass Plan notes that increased globalization of trade has created new paths for invasives to spread. Climate change is also an aggravating factor, as natural ecosystems become strained by increased temperatures and shifting precipitation patterns, there will only be more opportunities for invasives to disrupt and already fragile ecology. Based on the previously identified occurrences and trends, the probability of an invasive species event in Paxton is Very High, with a 70-100% probability in the next year.

Impact

Specific impacts in Paxton may vary, depending on the type of invasive, its habitat that it is supplanting within the native ecosystem, and other factors. Invasive species direct impact on the natural ecology has many notable secondary impacts. The 2023 ResilientMass plan identifies that Invasive species can bring with them new diseases to a region (such as the 2005 Chikungunya Epidemic, spread in part by a viral mutation that allowed for the virus to be more readily in the *Aedes albopictus* mosquito, an invasive subspecies)[109]. Invasives are also one of the costliest natural hazards in terms of control efforts, costing the United States and estimated $21 billion per year[110]. With what information we know about the extent of invasive species within Paxton, we can estimate a "High" Impact on the town.

EXPOSURE

Certain features within Paxton's community infrastructure, society, and environment may face more exposure to Invasives;

- People with compromised immune systems or preexisting health conditions, children under five, and people over 65 might be particularly vulnerable to new diseases or aggravated health problems caused by invasives.
- Japanese Knotweed, an invasive known to cause streambank destabilization, can contribute to flood damages as well as affect sightlines along roadways, potentially causing roadway hazards.
- Invasive species may pose a management cost burden that exceeds the local capacity to fund, especially in departments tasked with their management, and to the departments tasked with the maintenance of facilities that are impacted by invasives.

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

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

- Invasive Species can also change the local ecology to make it more fire prone, either by damaging the native plants or by being prone to fire themselves, increasing the vulnerability to wildfires.

Potential Climate Change Effects

According to the 2023 ResilientMass Plan, climate change is predicted to increase the spread of invasive species and expand their range. Already fragile ecosystems if left unmanaged will suffer the worst effects, being supplanted invasive species that outperform or outright damage our native flora and fauna. The vast majority of invasive species introductions are caused by human activity and introduction, either accidentally or intentionally.

Both changes in temperature and precipitation may increase chances of successful invasion of ecosystems by non-native species. As warmer temperatures place stress on native cold-weather species in the region, the shift allows invasive species accustomed to higher temperatures to expand their habitat ranges northward.

1. Precipitation
    a. Additionally, elevated atmospheric CO2 concentrations could reduce the ability of ecosystems to recover from climate shocks creating an opportunity for invasive species, which can often establish more rapidly following a disturbance, to successfully propagate.
2. Temperature
    a. Climate-driven temperature changes exacerbate the impacts of invasive species by altering ecosystem conditions in ways that enhance their ability to reproduce, spread, and in some cases outcompete native species.

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

Vulnerability

Based on the above assessment, Paxton has a hazard index rating of 2, “High” from Invasive Species.

Mitigation Strategies

The Town of Paxton is as able to respond to invasive species as any other community within Massachusetts through public outreach and services identified in the critical infrastructure and facilities and existing protection sections of this plan. However, the Town’s existing capabilities to mitigate and respond to invasive species could be expanded upon through numerous avenues. The local planning team identified the following strategies that could be used to reduce the threat of Invasives in Paxton:

- Install bat boxes and dragonfly gardens on public property in town to reduce the threat from mosquito borne illnesses.

- Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarantine invasives.
- Create and distribute information around Invasive Species Education and firewood sourcing

4.13 Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, and tsunamis. It was determined that these hazards are irrelevant to Paxton due to the town's location.

Landslides

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

- storms
- earthquakes
- volcanic eruptions
- fires
- alternate freezing or thawing
- steepening of slopes by natural erosion or by human modification

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

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be cause by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas. Should a landslide occur in the future in Paxton, the type and degree of impacts would be highly localized. Vulnerabilities could include damage to structures, damage to transportation and other infrastructure, and localized road closures, though

our data review and the local planning team noted no specific concerns. Injuries and casualties, while possible, would be unlikely given the low extent and impact of landslides in Paxton. Landslides are therefore considered low frequency events that may occur once in 50 to 100 years (a 1% to 2% chance of occurring per year). Paxton, like most communities in the CMRPC region, has few areas with susceptibility to landslides according to the 2023 ResilientMass Plan.[111] Landslides are therefore considered low frequency events that may occur once per 50 to 100 years (a 1% to 2% chance of occurring per year). Therefore, the Hazard Mitigation Planning Team did not consider landslides to be a notable enough natural hazard risk to analyze.

Changes in Groundwater

Another Hazard of concern that affects Paxton is changes in groundwater. This hazard was identified primarily through the community survey with residents noting basement flooding from water intrusion as being a common concern among respondents, as well as concerns of wells drying up in the future. While the 2023 ResilientMass Plan notes Changes in Groundwater as a specific hazard, our plan identifies it as being secondary effects to drought/ flooding[112]. Paxton is no more or less vulnerable than any other community in the CMRPC region, with the town being primarily serviced through Worcester Water, with some houses on private wells. The details of the specific vulnerabilities are included in both the drought and flooding sections of the plan, as well as mitigation strategies to address these concerns.

According to the 2023 ResilientMass Plan, Climate change is predicted to have an effect on groundwater availability: Sea level rise, extreme temperature events, changes in precipitation patterns and the increased frequency and duration of drought conditions will all negatively impact the amount of available groundwater to the town[113].

5.0 Existing Protection Measures

Sections 5.0 and 5.1 help meet:

- C1. "Does the plan document each participant's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?" (Requirement 44 CFR § 201.6(c)(3)) and
- C2. *"Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate?" (Requirement 44 CFR § 201.6(c)(3)(ii))*

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

[112] "ResilentMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan," pages 5.1-34-5.1-35.

[113] Ibid.

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. The town is currently in the process of Seeking Firewise and Stormready Certifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process. \

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands, stormwater management through the Central Mass Stormwater Coalition, tree maintenance coordinated by the Municipal Light Department and the recently hired Lewis Tree Company, and others. Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, a Water Superintendent, a Conservation Agent, and a Municipal Light Department Manager who acts as a Tree Warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan (2006), an Open Space and Recreation Plan (2015), Municipal Vulnerability Preparedness Plan (2019) and a Master Plan (2008). Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted in to fire protection mutual aid agreements through MEMA. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no-cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

5.1 Existing Protection Matrix

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP)	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code. Paxton is in the process of updating their floodplain zoning (Chapter 7.2.2) in its Zoning Bylaw to the latest FIRMs. The current floodplain bylaw establishes floodplain districts in Zones A and AE in the map panels of the Worcester County FIRM that are wholly or partially within the Town of Paxton are panel numbers 25027C0580E, 25027C0585E, 25027C0590E and 25027C0595E dated July 4, 2011.	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 1% flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP. The Town's Select Board are the appointed designees who implements the addressed commitments and requirements of the NFIP in town and implement substantial improvement/substantial damage provisions of the Mass State Building Code and the town bylaws, in conjunction with the Planning Board and Building Inspector. The Town has adopted the Flood Insurance Rate Map (FIRM)

Existing Measure	Description	Action	Effectiveness & Recommendations
			dated from July 4, 2011[114] this information is noted in the Floodplain Overlay District section 7.0 of Paxton's Zoning Bylaws.[115]
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge.	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition. There have been some updates in recent years to	Very effective There will be additional updates to this policy in the near future.

[114] "Section 7 – Flood Plain District" https://www.townofpaxton.net/sites/g/files/vyhlif4846/f/uploads/zoning_bylaw_amend_5.6.19.pdf

[115] Ibid

Existing Measure	Description	Action	Effectiveness & Recommendations
		the stormwater management policy. The town is currently Working on updating its subdivision rules and regulations to improve MS4 compliance.	
Local Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee updated this plan in 2015. As of writing of this Hazard Mitigation Plan, the town is in the process of updating their Open Space and Recreation Plan.	Somewhat effective Paxton should prepare its plan update per MA Division of Conservation Services requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.
Local Planning Efforts: Municipal Vulnerability Preparedness Plan	This plan is a guide for climate resiliency implementation projects	The Paxton Municipal Vulnerability Preparedness Plan was adopted in 2019	Somewhat effective The Town should incorporate its

Existing Measure	Description	Action	Effectiveness & Recommendations
	in town. It includes a vulnerability assessment and an action-oriented resiliency plan. This plan makes the town eligible for MVP Action Grant funding.		MVP Plan recommendations into its broader planning goals and objectives.
Local Planning Efforts: Paxton Master Plan	The Master Plan serves as a policy guide as well as the Town's future vision of itself. It compiles a comprehensive analysis of all aspects of community development and is designed to be a resource for the Town over the next 10-20 year time period.	Paxton's Master Plan was adopted in 2008. Paxton has been implementing the goals and objectives from this plan.	Somewhat Effective The Town should consider reviewing and updating their master plan.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve capacity and quality.	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

Existing Measure	Description	Action	Effectiveness & Recommendations
Drainage system maintenance and repair program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order	Paxton performs street sweeping in spring and fall, and catch basin cleaning year round.	Somewhat Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices . They should send out quarterly education flyers on this topic.
Tree Trimming and tree wire installation to protect power lines	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris and damage to power lines in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. Lewis Tree Company was hired by the Paxton Light Department in August 2016 to trim trees. Tree wire is being installed to further reduce the effects of damaging storms.	Effective Current efforts are focused on power lines. It is recommended to establish a tree trimming program for all trees throughout town.
Culvert Maintenance and Replacement	Maintain existing culverts through regular maintenance and (in some cases) beaver	The Town has historically maintained and replaced problem culverts when needed	Somewhat effective It is part of the Stormwater

Existing Measure	Description	Action	Effectiveness & Recommendations
	controls; replace/expand culverts where needed to allow for adequate stormwater flow.	and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Management Plan to develop a prioritized inventory of problem culverts.
Dam Inspection and Evaluation Reporting	Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life.	In 2012, Paxton hired Lenart Consulting Service to inspect and evaluation Asnebumskit Dam, a Significant Hazard Dam. The Dam was found to be in "fair" condition, and the report listed 11 actions to be taken. Studies of this kind should be undertaken for the remaining Significant Hazard Dam in Town, as well as the High Hazard Dam in Town.	Somewhat effective. Additional studies should be sought to address other noted hazardous dams in Town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association and the Northeast Public Power Mutual Aid	These two fire and emergency response groups serve as organized systems for fire departments to work together across municipal boundaries.	Paxton joined these groups in recent years and have benefitted from doing so.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.

Existing Measure	Description	Action	Effectiveness & Recommendations
Continue to upgrade, improve, or secure secondary sources of power to eliminate outages from hurricanes and severe snowstorms.	The Town secured power substations in recent years and relies on this as its primary source of electricity. The Town relies on power coming from the City of Worcester and the National Grid transmission line as a secondary source of power.	The Town no longer relies on National Grid or the City of Worcester as its main source of power.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.
Relocated Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town's Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town..	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

6.0 Status of Mitigation Measures From 2017 Plan

Section 6.0 helps meet:

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

Town staff provided updates on the status of mitigation measures from Paxton's 2017 Hazard Mitigation Plan. Certain measures were incomplete as of 2024 and deemed "still relevant". These actions were reviewed by the Core Team. Some actions were re-incorporated in the 2024 Hazard Mitigation Plan action strategy based on whether they could be completed in the next 5 years, and their perceived effectiveness.

2017 Task	2024 Status	2024 Notes	Include in 2024 Plan?
Structure & Infrastructure Strategies			
Raise Hill Street (3 feet high, 1,000-1,500 feet long) to eliminate flooding and allow emergency vehicles to pass.	Not Completed	Paxton was unable to complete this mitigation strategy due to other financial priorities. The local planning team have elected not to include this strategy in the update.	NO
Implement actions of Asnebumskit Pond Dam Phase 1 Inspection and Evaluation Report to prevent dam failure.	Ongoing	The Town is updating this mitigation strategy to be more specific and actionable.	YES
Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	In Progress	The Town is seeking funding to achieve this mitigation strategy's desired outcomes.	YES
Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses.	Ongoing	The town is continuously doing this activity, and is also going to attempt to expand it to include tree trimming around critical communications infrastructure.	YES

Replace emergency generator at Asnebumskit hill and relocate to most utilized emergency shelter (to provide power to building and food storage and preparation areas) in the case of power going out.	Completed	The Town completed this mitigation strategy item.	NO
Preparedness, Coordination & Response Action Strategies			
Create a plan to ensure that shelters open immediately and completely within four hours of Town-wide power outages for the sake of Paxton's vulnerable populations (elderly and minors).	In Progress	The town currently has a "best practices" policy that remains unwritten. The town is interested in codifying this plan when funds become available to do so.	YES
Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management	Ongoing	The Town continues to participate in NFIP, and will be updating their Floodplain Zoning bylaw to reflect the Current FIRMs.	YES
Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate	In Progress	The town is still considering seeking CRS credit. If the town does decide to pursue CRS Credit they can utilize this plan to do so for Section 510/512 credit points.	YES
Road information coordination and planning for snow removal	Ongoing	The Town maintains communication between Highway Department, MassDOT, and other organizations for snow removal.	YES
Evacuation Plan updates	In Progress	The town has indicated that they are interested in participating in a regionwide Evacuation planning update. Central Massachusetts Regional Planning Commission has been seeking avenues for funding for this regional update.	YES
Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas.	In Progress	The Town is seeking funding to perform this mitigation strategy, and include state and regional partners such as DCR and the Greater	YES

		Worcester Land Trust.	
Education & Awareness Strategies			
Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	No movement on this action yet	The Town is looking into generating these educational outreach materials when they have the capacity and capability to produce and distribute them.	YES
Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	No movement on this action yet	The Town is looking into generating these educational outreach materials when they have the capacity and capability to produce and distribute them.	YES
Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	No movement on this action yet	The Town is looking into generating these educational outreach materials when they have the capacity and capability to produce and distribute them.	YES
Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.	No movement on this action yet	The Town is looking into generating these educational outreach materials when they have the capacity and capability to produce and distribute them.	YES
Local Plan & Regulation Strategies			
Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's	No movement on this action yet	The Town is seeking funding to achieve this mitigation strategy's desired outcomes.	YES

needs.			
Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	Ongoing	The Town works to ensure that all new construction meets the current state standards of resiliency to natural hazards.	YES
Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply.	In Progress	The town is currently working on its local Wetlands Protection Bylaw.	YES
Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	In Progress	The Town is seeking funding to achieve this mitigation strategy's desired outcomes.	YES
Monitor implementation of Hazard Mitigation Plan.	Ongoing	The town is looking to incorporate review and monitoring of the hazard mitigation plan on an annual basis into their planning agendas.	YES
Adopt and Implement the National Weather Service's Storm Ready Program in order to have the Town of Paxton designated as a "Storm Ready" Community	In Progress	The town is presently working on achieving a Storm Ready designation.	YES

7.0 Mitigation Strategy

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

7.1 Priority and Impact

Section 7.1 helps meet:

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

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

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

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

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

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

Administrative burden – Strategies that are realistically within the administrative capacity of the town and its available support network (CMRPC, local non-profit organizations, regional collaborative associations etc.) are prioritized. Grant application requirements, grant administrative

requirements (including audit requirements), procurement, and staff time to oversee projects are all considered when figuring out the administrative burden of a strategy.

Impact – The HMP Core Team's consideration of each strategy included an analysis of the mitigation impact each can provide, regardless of cost, political support, funding availability, and other constraints. The intent of this step is to separately evaluate the theoretical potential benefit of each strategy to answer the question: if cost were no object, what strategies have the most benefit? Factors considered in this analysis include the number of hazards each strategy helps mitigate (more hazards equals higher impact), the estimated benefit of the strategy in reducing loss of life and property (more benefit equals higher impact), and the geographic extent of each strategy's benefits (other factors being equal, a larger area equals higher impact).

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

7.2 Estimated Cost

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

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

7.3 Timeline

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

7.4 Strategy Types

Mitigation strategies are subdivided into the following four broad categories so that they can facilitate local implementation discussions, especially regarding budget considerations and roles/responsibilities:

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

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

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

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

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

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

7.5 Town of Paxton 2024 Hazard Mitigation Strategies

Section 7.5 helps meet:

- *C3. "Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards?" (Requirement 44 CFR § 201.6(c)(3)(i));*
- *C4. "Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure?" (Requirement 44 CFR § 201.6(c)(3)(ii)); and*
- *C5. "Does the plan contain an action plan that describes how the actions identified will be prioritized (including a cost-benefit review), implemented, and administered by each jurisdiction?" (Requirement 44 CFR § 201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))*

OVERALL GOAL: Facilitate activity within the Town of Paxton that reduces the loss, and risk of loss, to persons, property, and the environment. Please view section 8.4, Potential Federal and State Funding sources, for more information on the funding sources listed below.

Number	Actions	Hazards Addressed	Agencies Involved	Potential Funding Sources	Priority	Impact	Estimated Cost	Timeline
Structure & Infrastructure Strategies								
A-1	Draft a Town wide beaver mitigation strategy to address beaver dam flooding concern, and install beaver deceivers and other beaver management techniques in and around the Asnebumskit Dam and Spruce Pond	FL, SS, ST, HU	DPW, Conservation, Board of Health, Mass Conservation or Mass Wildlife land	Local (Town Meeting, Capital Fund, General Fund), Federal Grants (HMGP/PDM), State Grants (Various)	Medium	Medium/High	High/Low $2.5-$5 million	3-5 years

	Area							
A-2	Perform H+H study of Asnebumskit Pond Dam as recommended by the evaluation report. Continue maintenance of the dam and perform Dam Inspection every 5 years	DF, FL, ST, HU	DPW, Water, Conservation	Local (Town Meeting, Capital Fund, General Fund), Federal Grants, State Grants	Low	Low	Low	Ongoing
A-3	Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	FL, SS, ST, HU	DPW, Light	Local (General Operating Budget), State, Federal Grants	Medium	Medium	Medium	Implement-ation underway Fall 2016, ongoing

A-4	Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.	FL, SS, ST, HU	National Grid, Town (Light), Private	Utility (National Grid), Local (Light Company), Private (property owners)	High	High	Medium	Ongoing
A-5	Install Generators For SCADA System Asnebumskit Hill water tank and Repeater Antennae at 105 Asnebumskit	All	DPW, Water	Local (Water Enterprise), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	Med/Low	<1 Year
A-6	Paxton Center School Infrastructural Mitigations: Relocate the White Building attached to the school by a minimum of 40 ft to mitigate secondary fire damages from hazard events.	All	Wachusett Regional School District, Fire Department, Town Administration,	Local (Enterprise Fund), Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable

A-7	Paxton Center School Infrastructural Mitigations: Install Fire protection System in Paxton Center School to prevent catastrophic Fire Damage within the school building caused by a hazard event.	All	Wachusett Regional School District, Fire Department, Town Administration,	Local (Enterprise Fund), Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
A-8	Paxton Center School Infrastructural Mitigations: Install upgraded high efficiency Heating and cooling system to prevent damage from extreme temperatures as well as open up the possibility of utilizing the school as a approved shelter location. Identify and improve shortcomings in energy efficiency for the school as a whole.	Extreme Temps	Wachusett Regional School District, Fire Department, Town Administration,	Local (Enterprise Fund), Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable

A-9	Paxton Center School Infrastructural Mitigations: Identify Owner of drainage pipe that is believed to pass beneath the school and evaluate drainage pipe for structural integrity and feasibility to reroute the drainage pipe around the school facility.	All	Wachusett Regional School District, Fire Department, Town Administration, Mass DOT	Local (General Operating Budget), Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
A-10	Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought, In conjunction with obtaining well access or installing new wells	Drought	Town Administration, DPW, Water Department	Local (Enterprise Fund), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	Low	High	High	5+ years

A-11	Upgrade and maintain the pump equipment at Asnebumskit Reservoir for utilization in an emergency	Drought	DPW, Water, Conservation, MASS DEP, EPA,	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	High	1-3 Years
A-12	Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarantine invasives.	IS, WF, ST, SS	DPW, Conservation, Emergency Management, Planning Department	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	High	Ongoing
A-13	Perform Route 31 Culvert Replacements upgrading drainage infrastructure on that road.	FL	DPW, MASS DOT, Conservation, DEP, EPA	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various, DLTA)	High	High	High	1-2 years
A-14	Water Infrastructure Replacement on West Street, water infrastructure there is aging and supplies water to west side of the town. Begin a broader study of the Town's Water system to create a	DR, WF	DPW, MassDOT	Local (Enterprise Funds), Federal Grants (USDA, BRIC), State Grants (Various, DLTA)	High	High	High	2 Years

	replacement plan for aging infrastructure							
A-15	Dam Inspection and Evaluation Reporting: Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life. Utilize recommendations from previous inspections and perform additional studies of hazardous dams.	DF, FL, ST, HU	DPW, Water, Conservation	Local (Town Meeting, Capital Fund, General Fund), Federal Grants, State Grants	Low	Medium	Medium	Ongoing
A-16	Consider burying power and electrical infrastructure as it gets replaced and phased out to prevent damage from	HU, ST, ET	DPW, Light Department	Local (Town Meeting, Capital Fund, General Fund), Federal Grants, State Grants	Medium	Medium	High	Ongoing

	High winds and high temperatures							
A-17	Install Tornado Warning Sirens on town facilities for advanced notice and warnings to town residents.	ST	DPW, Town Emergency Management	Local (Enterprise Funds), Federal Grants (USDA, BRIC), State Grants (Various, DLTA)	Medium	High	Low	1-2 Years
A-18	Install bat boxes and Dragonfly gardens on public property in town to reduce the threat from mosquito borne illnesses.	IS	DPW, Conservation Commission	Local (General Operating Budget, Volunteer Hours)	High	Medium	Low	1-2 years
A-19	Address drainage concerns at critical town facilities such as the Department of Public Works and the Paxton Public Safety building.	FL	Town Administration, DPW, Fire Department, Police Department	Local (Enterprise Funds), Federal Grants (USDA, BRIC), State Grants (Various, DLTA)	High	High	Medium	1-2 years
A-20	Address snow load and ice storm concerns on town owned facilities with retrofits to those facilities.	SS	Town Administration, DPW, Fire Department, Police Department	Local (Enterprise Funds), Federal Grants (USDA, BRIC), State Grants (Various, DLTA	High	High	Medium	1-2 Years

Preparedness, Coordination & Response Action Strategies								
B-1	Create a plan to ensure that shelters open immediately and completely within four hours of Town-wide power outages and for heat and cold events for the sake of Paxton's vulnerable populations (elderly and minors).	FL, SS, ST, HU, EQ, ET	DPW, Light, Local Emergency Management, Board of Health	Local (General Operating Budget)	Medium	Medium	Low	1-2 years
B-2	Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local (General Operating Budget)	High	High	Low	Ongoing
B-3	Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local (General Operating Budget)	Low	Low	Low	1-2 Years

B-4	Draft a Snowstorm Plan for road information coordination and planning for snow removal.	SS	DPW; MassDOT; Mass State Police; CMRPC	Local (General Operating Budget), Federal Grants (HMGP/PDM), State Grants (Various), Private Contracts	High	High	Low	Ongoing
B-5	Participate in Evacuation Plan updates.	All	Local Emergency Management, DPW, CMRPC, MassDOT	Local (General Operating Budget), Federal Grants (Homeland Security via MEMA and CRHSAC)	High	High	Low	1-2 Years (update every 5 Years)
B-6	Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR	WF	Fire Department, DPW, GWLT, DCR	Local (General Operating Budget)	Medium	Medium	Low	1 year

B-7	Establish a Contract with Leicester for Backup Water Interconnection	WF, DR, ET	Town of Leicester, Water Department, Town Administration, City of Worcester	Local (General Operating Budget), State Regionalization Investment (Community Compact)	High	High	Low	Ongoing
B-8	GIS Water Infrastructure mapping to provide accurate water infrastructure data to fix mains and reduce loss of service to community	WF, DR, ET	DPW, Outside Engineering Firm	Local (Enterprise Fund), State (Various), Federal (Various)	High	High	Med/Low	1 Year
B-9	Obtain Stormready Certification	FL, SS, HU, ST	Fire Department	Local (General Operating Budget)	High	High	Low	Ongoing
Education & Awareness Strategies								
C-1	Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	FL, SS, ST, HU	DPW, Light Dept., Planning, Local Emergency Management	Local (General Operating Budget)	Medium	Low	Low	1-2 years

C-2	Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	DR, WF	DPW, Conservation, Water	Local (General Operating Budget), Private (water companies)	High	Medium	Low	Ongoing
C-3	Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	All	Local Emergency Management	Local (General Operating Budget)	Medium	Medium	Low	1 year
C-4	Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or	WF	Fire Department	Local (General Operating Budget)	Medium	Medium	Low	1 year

	National Fire Protection Agency (NFPA) materials.							
C-5	Create and distribute Education around personal preparedness, utilizing Ready.Gov and MEMA/FEMA public outreach materials.	All	Local Emergency Management	Local (General Operating Budget)	Low	Low	Low	Ongoing
C-6	Create and distribute information around Invasive Species Education and firewood sourcing	IS	Conservation, DPW, Tree Warden	Local (General Operating Budget), State (MVP Action, EEA)	Low	Low	Low	Ongoing

C-7	Educational outreach Program on What Homeowners Can do about basement flooding and why their basement may be flooding	FL, SS, ST, HU	Planning Board	Local (General Operating Budget)	Low	Low	Low	Ongoing
Local Plan & Regulation Strategies								
D-1	Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's needs. Update Local Drought management plans as needed.	DR	DPW, Water Department, Conservation	Local (General Operating Budget)	Medium	Low	Low	1-2 years

D-2	Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	All	All Town Departments	Local (General Operating Budget)	Medium	High	Low	Ongoing
D-3	Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply. [Existing Protection Measure]	FL, DR	Conservation, Water, DPW	Local (General Operating Budget)	Medium	Medium	Low	1-2 years

D-4	Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	DF, FL, ST, EQ	DPW, Water, Conservation, Local Emergency Management	Local (General Operating Budget), State Grants (Various)	Medium	Medium	More information required, but cost is likely "Medium" to "High" as three dams remain with a significant, high, and low hazard rating, and nine other dams rated Not Applicable (N/A)	2-4 years
D-5	Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve. Incorporate High Hazard Potential Dam information in future updates.	All	All Town Departments	Local (General Operating Budget), State Grants (DLTA)	High	High	Low	Ongoing

D-6	Develop a Water Master Plan to address current and future water needs based on Paxton's development patterns.	DR, WF	Water Department	Local (Enterprise Fund), State (DLTA)	Medium	High	Medium	1-2 Years
D-7	Develop a Road Grading Plan to improve Paxton's infrastructure and maintenance of evacuation corridors as well as other highways and byways of the town.	All	DPW	Local (Enterprise Fund), State (DLTA)	High	High	Low	Ongoing

D-8	Consider creating a fund to partially subsidize well water testing for town residents.	All	Water Department, Town Administration	Local (Enterprise Fund), State	Medium	High	Medium	Ongoing
D-9	Establish Tree Management and Stabilization Fund to address hazardous tree concerns in town.	HU, ST, WF	Town Administration	Local (Enterprise Fund), State	High	Medium	High	Ongoing

D-10	Inventory unreinforced masonry and brick buildings in town that may be vulnerable to earthquakes. Conduct a study which identifies ways that these buildings can meet the Massachusetts State Building Code's seismic standards.	EQ	**Building Commission-er,** PB	Local (current operating budget), State (MEMA Grants), Federal (FEMA Grants (National Earthquake Hazards Reduction Program's State Assistance Program))	Low	Medium	Low	0-3 years, then ongoing

'Hazards Addressed' abbreviations:

DF	Dam Failure
DR	Drought
EQ	Earthquake
FL	Flooding
HU	Hurricane
IS	Invasive Species
SS	Severe Snowstorm / Ice Storm / Nor'easter
ST	Severe Thunderstorm / Wind / Tornado
WF	Wildfire / Brushfire
XT	Extreme Temperatures
OT	Other

Who? Agencies Involved' abbreviations:

CMRPC	Central Mass. Regional Planning Commission	CC	Conservation Commission
DPW	Department of Public Works	EMD	Emergency Management Director
PB	Planning Board	LEPC	Local Emergency Planning Committee

ZBA Zoning Board of Appeals

8.0 Plan Adoption, Implementation, And Maintenance

8.1 Plan Adoption

A public meeting was held on September 24th, 2024 as part of the Select Board's meeting in order detail the planning process to date and to solicit comments and feedback from the public on the draft Paxton Hazard Mitigation Plan then being developed. The draft plan was provided to the Town for distribution as well as public review and input. The Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their review. Upon receiving conditional approval of the plan by FEMA, the final plan was adopted by vote of the Paxton Select Board and certified on June 29th, 2026.

8.2 Plan Implementation

Section 8.2 helps meet:

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

The Town of Paxton has taken steps to implement findings from the 2018 Hazard Mitigation Plan into the following policy, programmatic areas and plans: the 2019 Municipal Vulnerability Preparedness Plan, the 2008 Master Plan, and the 2015 Open Space and Recreation Plan.

The implementation of the 2026 plan update began upon its formal adoption by the Board of Selectmen and approval by MEMA and FEMA. Town departments and boards responsible for ensuring the development of policies, ordinance revisions, and programs as described in Sections 6 and 7 of this plan will be notified of their responsibilities immediately following this plan's approval. The local Hazard Mitigation Planning Team in town will oversee the implementation of this plan, led by the town's emergency management director, who will annually assemble this team to review the plan and work towards implementing the strategies in this plan. This meeting will also be called by the emergency management director following a disaster event to review applicable strategies to address that disaster as well.

Incorporation with Other Planning Documents

Existing plans, studies, reports, and municipal documents were incorporated throughout the planning process. This included a review and incorporation of significant information from the following key documents:

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

emergency response shortcomings.

- ***Regional Evacuation Plan*** – Funded by Homeland Security via the Commonwealth of Massachusetts and the Central Regional Homeland Security Advisory Council, the regional evacuation plan prepared by CMRPC was used to identify evacuation routes and shelters.
- ***Paxton Open Space and Recreation Plan*** – This Plan was used to identify the natural context within which mitigation planning would take place. This proved useful insofar as it identified water bodies, rivers, streams, infrastructure components (i.e., water and sewer, or the lack thereof), as well as population trends. This was incorporated to ensure that the Town's mitigation efforts would be sensitive to the surrounding environment. It should be noted that this plan has expired and is in the process of being updated.[116]
- ***Paxton Zoning Bylaw*** –Zoning was used to gather identify those actions that the town is already taking that are reducing the potential impacts of a natural hazard (i.e., floodplain regulations) to avoid duplicating existing successful efforts.[117]
- ***Paxton Master Plan*** – This plan was used to identify the main priorities for the Town so that the Hazard Mitigation Plan's strategies can align with these priorities.[118]
- ***Paxton Municipal Vulnerability Preparedness Plan –*** Recommendations from this plan deemed important to hazard mitigation by the planning team in town were incorporated into the Hazard Mitigation Plan's mitigation strategies.[119]
- ***ResilientMass State Hazard Mitigation and Climate Adaptation Plan*** - This plan was used to ensure that the town's HMP data and priorities are consistent with the State's data and priorities.[120]
- ***2022 Massachusetts Climate Change Assessment*** - This plan was used to ensure that the town's HMP data and priorities, especially in the hazards section of the plan, are consistent with the State's data and priorities.[121]

After this plan has been approved by both FEMA and the local government, links to the 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 action plan, into other planning processes and documents. In addition, during annual monitoring meetings for the Hazard Mitigation

[116] Town of Paxton Open Space & Recreation Committee et al., "Town of Paxton Open Space and Recreation Plan – 2015," townofpaxton.net, The Town of Paxton, accessed July 15, 2024, https://www.townofpaxton.net/sites/g/files/vyhlif4846/f/uploads/osrp_final_copy_march_2015.pdf

[117] "Town of Paxton, Section 7: Flood Plain District," townofpaxton.net, The Town of Paxton, accessed July 15, 2024, https://www.townofpaxton.net/sites/g/files/vyhlif4846/f/uploads/section_7_-_bylaws_flood_plain_district.pdf.

[118] CMRPC, "Town of Paxton Master Plan 2008," townofpaxton.net, The Town of Paxton, December 2008, https://www.townofpaxton.net/planning-board/pages/master-plan.

[119] Fuss & O'Neill, "Community Resilience Building Workshop Summary of Findings," townofpaxton.net, The Town of Paxton, October 2019, "R:\Climate Resiliency Planning\Municipal Vulnerability Preparedness Program\All Towns Planning - Action\Paxton (Fuss & O'Neill)\FY19 MVP Planning Grant Report Paxton.pdf"

[120] "ResilientMass Plan: 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan"

[121] "2022 Massachusetts Climate Change Assessment"

Plan implementation process, the Hazard Mitigation Team will review whether any of these plans are in the process of being updated. If so, the Hazard Mitigation Team will remind people working on these plans, policies, etc., of the Hazard Mitigation Plan, and urge them to incorporate the Hazard Mitigation plan into their efforts. The Hazard Mitigation Team will also review current town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan. The Hazard Mitigation Plan will also be incorporated into updates of the Town's Comprehensive Emergency Management Plan.

8.3 Plan Monitoring and Evaluation

Section 8.3 helps meet:

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

The town will review and update the Hazard Mitigation Plan every five years through forming a HMP planning team and working with a contractor to complete the update. The Town's Planner or Town Emergency Manager will call meetings of all responsible parties to review plan progress, on a yearly basis and/or as is needed based on the occurrence of hazard events. The public will be notified of these meetings in advance through a posting of the agenda at Town Hall. Responsible parties identified for specific mitigation actions will be asked to submit their reports in advance of meetings.

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

Plan Mission and Goal

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

Hazard Identification and Risk Assessment

- Have there been any new occurrences of hazard events since the plan was last reviewed? If so, these hazards should be incorporated into the Hazard Identification and Risk Assessment.

- Have any new occurrences of hazards varied from previous occurrences in terms of their extent or impact? If so, the stated impact, extent, probability of future occurrence, or overall assessment of risk and vulnerability should be edited to reflect these changes.
- Is there any new data available from local, state, or Federal sources about the impact of previous hazard events, or any new data for the probability of future occurrences? If so, this information should be incorporated into the plan.

Existing Mitigation Strategies

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

Proposed Mitigation Strategies

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

Review of the Plan and Integration with Other Planning Documents

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

Following these discussions, it is anticipated that the planning team may decide to reassign the roles and responsibilities for implementing mitigation strategies to different town departments and/or revise the goals and objectives contained in the plan. The team will review and update the Hazard Mitigation Plan every five years.

Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Team will hold all meetings in accordance with Massachusetts open meeting

laws, and the public will be invited to attend these meetings. The public will be notified of any changes to the Plan via the meeting notices board at Town Hall, and copies of the revised Plan will be made available to the public at Town Hall.

8.4 Potential Federal and State Funding Sources

8.4.1 Federal Funding Sources

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

Table 17: Federal Hazard Mitigation Funding

Program	Type of Assistance	Availability	Managing Agency	Funding Source
National Flood Insurance Program (NFIP)	Pre-disaster insurance	Any time (pre & post disaster)	DCR Flood Hazard Management Program	Property Owner, FEMA
Community Rating System (CRS) (Part of the NFIP)	Flood insurance discounts	Any time (pre & post disaster)	DCR Flood Hazard Management Program	Property Owner
Hazard Mitigation Grant Program (HMGP)	Post-disaster cost-share grants	Post disaster program	MEMA	75% FEMA/ 25% non- federal
Building Resilient Infrastructure and Communities (BRIC)	National, competitive cost-share grant program for projects & planning	Annual, pre-disaster mitigation program	MEMA	75% FEMA/ 25% non- federal
Flood Mitigation Assistance (FMA) Program	Cost share grants for pre- disaster planning & projects	Annual pre-disaster grant program	MEMA	75% FEMA/ 25% non- federal
Public Assistance	Post-disaster aid to state & local governments	Post Disaster	MEMA	FEMA/ plus a non-federal share
Small Business Administration (SBA) Mitigation Loans	Pre- & Post- disaster loans to qualified applicants	Ongoing	MEMA	Small Business Administration
Hazard Mitigation Grant Program Post-Fire (HMGP-PF)	Cost-share post-wildfire disaster mitigation measures	Annual, within six months after FMAG declaration	FEMA	75% FEMA/25% non-federal

Assistance to Firefighters Grants (AFG)	Training & equipment for wildfire-related hazards	Annual	FEMA	FEMA
Fire Prevention & Safety Grant Program (AFG) (FP&S)	Cost-share funding to support projects that protect people from fire-related hazards	Annual	FEMA	95% FEMA, 5% non-federal
Fire Management Assistance Grants (F-MAG)	Cost-share funding to mitigate & manage major disasters caused by fire	Any time (pre- & post disaster)	FEMA	75% FEMA/25% non-federal
Emergency Management Performance Grant (EMPG)	Pre- & post-disaster management and implementation grants	Annual	FEMA	50% FEMA/50% non-federal match
Homeland Security Grant Program (HSGP)	Funding to prevent, respond to, and recover from acts of terrorism	Annual	FEMA	FEMA
National Dam Safety Program (State Assistance Grant Program) (NDSP)	Funding to improve dam safety & State dam safety programs	Annual	FEMA	FEMA, BIL
Rehabilitation of High Hazard Potential Dam Program (State Dam Safety Divisions) (HHPD)	Cost-share funding to plan and rehabilitate HHPD	Annual	FEMA	65% FEMA/35% non-federal
National Earthquake Hazards Reduction Program's State Assistance Program (NEHRP)	Cost-share funding for pre-earthquake risk management	Annual	FEMA	75% FEMA/25% non-federal
Emergency Food and Shelter Program (EFSP)	Grant funding for supplemental food & shelter for those experiencing/at risk of experiencing	Annual	FEMA	FEMA

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

The FEMA web pages identify several funding opportunities. Please refer to https://www.fema.gov/grants. Some programs are described in more detail below:

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

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

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

Communities can CRS earn points based on their implementation of various flood mitigation initiatives,
including but not limited to: (1) restricting development on flood prone areas, (2) extending public risk communication with flood warning systems, and (3) enhancing infrastructural resilience to flood damage. Please refer to https://www.floodsmart.gov/ and https://www.fema.gov/floodplain-management/community-rating-system for more information.

HAZARD MITIGATION ASSISTANCE

The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to Natural Hazards. Brief descriptions of the HMA grant programs can be found below. For more information on the individual programs, or to see information related to a specific Fiscal Year, please click on one of the program links.

Hazard Mitigation Grant Program (HMGP)

HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities. Please refer to http://www.fema.gov/hazard-mitigation-grant-program for additional information.

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

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

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

The Hazard Mitigation Grant Program Post-Fire (HMGP-PF) is a program aimed at providing financial funding to localities in order to reduce risk of fire damage after a fire has occurred. Funds are determined through a Benefit-Cost Analysis software. For more information, please refer to: Hazard Mitigation Grant Program Post Fire | FEMA.gov

Building Resilient Infrastructure and Communities (BRIC)

The Building Resilient Infrastructure and Communities program aims to categorically shift the federal focus away from reactive disaster spending and toward research-supported, proactive investment in community resilience. Examples of BRIC projects are ones that demonstrate innovative approaches to partnerships, such as shared funding mechanisms, and/or project design. For example, an innovative project may bring multiple funding sources or in-kind resources from a range of private and public sector partners. Or an innovative project may offer multiple benefits to a community in addition to the benefit of risk reduction. The BRIC program is replacing the Pre-Disaster Mitigation grant program. More information on the BRIC program can be found here: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities.

The Massachusetts Emergency Management Agency (MEMA) coordinates BRIC applications for municipalities within the Commonwealth. Links to MEMA resources and BRIC application materials can be found here: https://www.mass.gov/service-details/building-resilient-infrastructure-and-communities-bric-flood-mitigation-assistance-fma-grant-programs.

FLOOD MITIGATION ASSISTANCE (FMA)

Flood Mitigation Assistance (FMA) provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program. Please refer to the FMA website: http://www.fema.gov/flood-mitigation-assistance-

grant-program.

Three types of FMA grants are available to States and communities:

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

MEMA coordinates FMA applications for municipalities within the Commonwealth. Links to MEMA resources and FMA application materials can be found here: https://www.mass.gov/service-details/building-resilient-infrastructure-and-communities-bric-flood-mitigation-assistance-fma-grant-programs.

DISASTER ASSISTANCE

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

Disaster Assistance Available from FEMA

In the event of a Declaration of Disaster, assistance from FEMA is grouped in 3 categories:

A. Housing Needs

- **Temporary Housing** (a place to live for a limited period of time): Money is available to rent a different place to live, or a government provided housing unit when rental properties are not available.
- **Repair**: Money is available to homeowners to repair damage from the disaster to their primary residence that is not covered by insurance. The goal is to make the damaged home safe, sanitary, and functional.
- **Replacement**: Money is available to homeowners to replace their home destroyed in the disaster that is not covered by insurance. The goal is to help the homeowner with the cost of

replacing their destroyed home.

- **Permanent Housing Construction**: Direct assistance or money for the construction of a home. This type of help occurs only in insular areas or remote locations specified by FEMA, where no other type of housing assistance is possible.

B. Other than Housing Needs

- Money is available for necessary expenses and serious needs caused by the disaster, including:
- Disaster-related medical and dental costs.
- Disaster-related funeral and burial cost.
- Clothing; household items (room furnishings, appliances); tools (specialized or protective clothing and equipment) required for your job; necessary educational materials (computers, school books, supplies)
- Fuels for primary heat source (heating oil, gas).
- Clean-up items (wet/dry vacuum, dehumidifier).
- Disaster damaged vehicle.
- Moving and storage expenses related to the disaster (moving and storing property to avoid additional disaster damage while disaster-related repairs are being made to the home).
- Other necessary expenses or serious needs as determined by FEMA.
- Other expenses that are authorized by law.

C. Additional Services

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

DISASTER LOANS AVAILABLE FROM THE SMALL BUSINESS ADMINISTRATION

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

- Physical damage loans: Loans to cover repairs and replacement of physical assets damaged in a declared disaster.
- Mitigation assistance: Funding to cover small business operating expenses after a declared disaster.
- Economic injury disaster loans: This loan provides economic relief to small businesses and

nonprofit organizations that have suffered damage to their home or personal property.

- Military reservist loans: SBA provides loans to help eligible small businesses with operating expenses to make up for employees on active-duty leave.

For many individuals the SBA disaster loan program is the primary form of disaster assistance. Please find more information about this loan program here: https://www.sba.gov/funding-programs/disaster-assistance.

DISASTER ASSISTANCE FROM OTHER ORGANIZATIONS AND ENTITIES

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

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

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

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

FIRE MANAGEMENT ASSISTANCE GRANTS (F-MAG)

The Fire Management Assistance Grants (F-MAG) Program supports in firefighting efforts in fire related disasters on public and private forests and grasslands at the state, local and tribal level. For more information, please refer to: Fire Management Assistance Grants | FEMA.gov.

EMERGENCY MANAGEMENT PERFORMANCE GRANT (EMPG)

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

Emergency Management Performance Grant | FEMA.gov..

HOMELAND SECURITY GRANT PROGRAM (HSGP)

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

- State Homeland Security Program (SHSP)
- Urban Area Security Initiative (UASI)
- Operation Stonegarden (OPSG)

Please find more about this grant program at the link here: Homeland Security Grant Program | FEMA.gov..

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

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

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

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

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

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

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

More about this program can be found at this link: National Earthquake Hazards Reduction Program's State Assistance Program | FEMA.gov.

EMERGENCY FOOD AND SHELTER PROGRAM (EFSP)

The Emergency Food and Shelter Program (EFSP) assists and expands upon the work of local nonprofit and governmental social service organizations to provide shelter, food and other services

to people experiencing, or at risk of hunger and/or homelessness. For more information, please refer to: Emergency Food and Shelter Program | FEMA.gov.

PUBLIC HEALTH CRISIS RESPONSE COOPERATIVE AGREEMENT (PHCRCA)

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

ARMY CORP OF ENGINEER PLANNING ASSISTANCE

Under the authority provided by Section 22 of the Water Resources Development Act of 1974 (PL 93-251), as amended, the U.S. Army Corps of Engineers can provide states, local governments, other non-Federal entities, and eligible Native American Indian tribes assistance in the preparation of comprehensive plans for the development, utilization, and conservation of water and related land resources. Typical studies are only planning level of detail; they do not include detailed design for project construction. The program can encompass many types of studies dealing with water resources issues. Types of studies conducted in recent years under the program include the following: water supply/demand, water conservation, water quality, environmental/conservation, wetlands evaluation/restoration, dam safety/failure, flood damage reduction, coastal zone protection, and harbor planning. Please refer to: https://www.nae.usace.army.mil/missions/public-services/planning-assistance-to-states/.

FOREST SERVICE COMMUNITY WILDFIRE DEFENSE GRANT (USDA-FSCWDG)

The Forest Service Community Wildfire Defense Grant Program (USDA-FSCWG) provides funding and assistance to at-risk local communities and tribes to reduce wildfire risk. This is primarily done through the revision and development of community wildfire protection plans and the assistance in implementing new projects in said plans. For more information, please refer to: Community Wildfire Defense Grant Program | US Forest Service (usda.gov).

EMERGENCY WATERSHED PROTECTION PROGRAM (EWP)

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

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

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

Natural Resources Conservation Service (usda.gov).

USDA COMMUNITY FACILITIES DIRECT LOAN & GRANT PROGRAM

The UDSA Community Facilities Direct Loan & Grant program provides affordable funding to develop essential community facilities in rural areas. An essential community facility is defined as a facility that provides an essential service to the local community for the orderly development of the community in a primarily rural area, and does not include private, commercial or business undertakings. Rural areas including cities, villages, townships and towns including Federally Recognized Tribal Lands with no more than 20,000 residents according to the latest U.S. Census Data are eligible for this program. Funds can be used to purchase, construct, and / or improve essential community facilities, purchase equipment and pay related project expenses. For more information, please refer to: https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-direct-loan-grant-program.

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

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

BRIDGE INVESTMENT PROGRAM (BIP)

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

8.4.2 STATE FUNDING SOURCES

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

Table 18: State Hazard Mitigation Funding

Program	Type of Assistance	Availability	Managing Agency	Funding Source
604b	Grants focused on nonpoint source pollution assessment and watershed planning	Annual	Mass DEP	State funding (match not required but recommended)

Section 319 Nonpoint Source Competitive Grants Program	Competitive grant program funding projects that address the prevention, control, and abatement of nonpoint source (NPS) pollution	Annual	Mass DEP	State funding
Water Quality Monitoring Grant Program	Reimbursement funding for monitoring and/or data collection efforts that support water quality assessments	Annual	Mass DEP	State funding
Statewide Water Management Act Grant	Reimbursement grant funding for projects to help public water suppliers plan and manage water use	Annual	Mass DEP	Reimbursement grant
Massachusetts Gap Energy Grant Program (Gap III)	New program providing grant assistance up to ($200,000 per community) for implementing energy efficiency and clean energy generation projects at water and wastewater plants	Annual (likely)	Mass DEP	State funding
State Revolving Fund	Low-interest loans	Annual	Mass DEP	Municipal funding with state loan
Municipal Vulnerability Preparedness (MVP) Action Grants	Competitive climate adaptation grants	Annual	EEA	75% EEA/ 25% non-state match
Planning Assistance Grants (EEA PAG)	Competitive grants that support efforts to plan, regulate (zone), and act to conserve and develop land consistent with	Annual	EEA	75% EEA / 25% non-state match

Dam and Seawall Repair or Removal Program	Competitive grants for dam and seawall repair and removal, as well as construction loans	Annual	EEA	State funding
Massachusetts Land & Water Conservation Fund Grant Program (LWCF)	Federal grant program to help improve access to and protection for public lands and waters	Annual	EEA	Federal program that funds up to 50% of total costs for acquisition, development, and renovation
Land Acquisition for Natural Diversity (LAND)	Financial assistance to municipalities for the acquisition of conservation land	Annual	EEA	Reimbursement grant, the reimbursement rate varies per Town
Drinking Water Supply Grant	Competitive grants for protection of drinking water supplies	Annual	DCS	State funding
Land and Recreation Grants and Loans	Varies, though primarily grant funding for conservation and recreation projects	Varies, generally annually	DCS	Varies
Water Quality Management Planning Grant	Competitive grant for water quality assessment and management planning	Annual	DCS	State funding
Forest Legacy Grant Program (USDA-FS) (FLGP)	Grant funding to protect environmentally important forestland from conversion	Annual	DCR	75% USDA FS, 25% non-federal
Volunteer Fire Assistance Program (VFA)	Reimbursement grant program that funds technical, financial and other assistance to fire departments for forest fire related purposes	Annual	DCR	State funding

Culvert Replacement Municipal Assistance Grant Program	Competitive grants for replacing an undersized, perched, and/or degraded culvert located in an area of high ecological value	Annual	DER	State funding
Division of Ecological Restoration Priority Project Program	State competitive grant program that funds projects that restore and protect the State's rivers, wetlands, and watersheds (priority projects may differ each year)	Annual	DER	State funding
Mass Wildlife Habitat Management Grant Program (MWHMGP)	Reimbursement grant funding to assist municipalities enhance wildlife habitat and increase recreational opportunities on protected lands	Annual	DFW	USDA NRCS
Agricultural Climate Resiliency and Efficiencies Program (ACRE)	Competitive, reimbursement grant funding that supports practices that mitigate the agricultural sector's vulnerability to climate change	Annually through Climate Smart Agriculture Program (CSAP)	MDAR	MDAR
Agricultural Preservation Restriction Program (APR)	Financial assistance in exchange for permanent deed restriction to protect the land's agricultural viability	Any time for owners of at least 5 acres of farmland	MDAR	MDAR
Hazard Mitigation Planning Grant Program (HMPG)	Grant program for communities, after a disaster, to reduce or eliminate future risk to lives and property from natural hazards	Annual	FEMA	75% federal/25% state/local match

Hazard Mitigation Grant Program (State) (HMGP)	Sub-grant programs for Hazard Mitigation Grant program	Annual	MEMA	State funding
Community Development Block Grants (CDBG)	Competitive community development grants	Annual	EOHED	US Department of Housing and Urban Development
Emergency Solutions Grant (ESG)	Competitive grant funding designed to support services that assist those experiencing/at risk of experiencing homelessness	Annual	EOHED	MA EOHLC
Mass Works	Competitive infrastructure grants	Annual	EOHED	State funding
Community Preservation Act (CPA)	Establishes a local community preservation fund through tax surcharge to support a variety of project related to conservation and housing	Ongoing	Department of Revenue (DOR)	Statewide Community Preservation Trust Fund / local Community Preservation Fund
Special appropriations and legislative earmarks	Varies	Infrequent, after natural disasters or legislature vote	Massachusetts General Legislature	State funding
District Local Technical Assistance (DLTA)	Funding to support planning and technical assistance for housing, economic growth, and regional projects	Varies, generally annually	Massachusetts General Legislature, CMRPC	State funding
Local Planning Assistance (LPA)	Planning and technical assistance	Annual	CMRPC	Planning assistance hours
Support and Incentive Grant	Reimbursement grant funding designed to assist in providing enhanced 911 service	Annual	MA EOPSS	MA EOPSS

Municipal Small Bridge Program	Competitive grants for small bridge replacement, preservation, and rehabilitation projects	Annual	Mass DOT	State funding
Chapter 90 Program (Transportation Capital Improvement Projects) (Chpt. 90)	Reimbursable grants to support capital improvements on local public ways	Ongoing	Mass DOT	State funding
State Transportation Improvement Program (STIP)	Competitive funding opportunity for transportation projects along federal-aid roadways	Annually updated five-year programming document	MassDOT	MassDOT
Complete Streets (CS)	Reimbursement grant funding to provide safe and accessible options for al travel modes	Annually available to municipalities that adopt a Complete Street Policy	MassDOT	State funding

The Community Grant Funder web page includes the municipal grant programs listed above, as well as other funding opportunities: https://www.mass.gov/lists/community-grant-finder. Some programs in Table 15 are described in more detail on the following pages.

604B

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

SECTION 319 NONPOINT SOURCE COMPETITIVE GRANTS PROGRAM

Section 319 of the Clean Water Act provides funding opportunities for prevention, control, and abatement of nonpoint source (NPS) pollution. These grants are available to eligible Massachusetts public or private organization: State and Federally Recognized Tribes, Regional Planning Agencies, Councils of Governments, Counties, Conservation Districts, Cities and Towns, other substate public planning agencies, and interstate agencies. To be eligible, these entities' projects must include: have measures that address the prevention, control, and abatement of NPS pollution, target major sources of NPS pollution within the watershed, contain an appropriate method for evaluating the project results, and address activities in the current Massachusetts NPS Management Program Plan. For more information on this program, please refer to: Grants & Financial Assistance: Watersheds

& Water Quality | Mass.gov

WATER QUALITY MONITORING GRANT PROGRAM

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

STATEWIDE WATER MANAGEMENT ACT GRANT

The Statewide Water Management Act Grant provides grant funding for projects which improve the ecological conditions of specific watershed, projects aimed at reducing water demand and projects that address the following: improve or increase instream flow, keeping wastewater local, stormwater management, reduce impervious cover and/or improve water quality, water supply operational improvements, habitat improvement, reduction of wastewater inflow and infiltration, and other projects that can be demonstrated to mitigate the impacts of water withdrawals. This program awards approximately 10 grants a year and has a reimbursement rate of 80%. Grants are awarded to eligible public water suppliers and municipalities with Water Management Act permits. For more information, please refer to: Water Management Act Grant Programs for Public Water Suppliers | Mass.gov.

MASSACHUSETTS GAP ENERGY GRANT PROGRAM (GAP III)

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

PLANNING ASSISTANCE GRANTS (EEA PAG)

These grants are available to municipalities, and Regional - Planning Agencies acting on their behalf to financially support efforts to conserve and develop land consistent with the Massachusetts's Sustainable Development Principles. Top priorities of the program include: zoning for sustainable housing production, mitigation of climate change through zoning and other regulatory actions, and zoning that results in permanent land conservation. For more information about these grants, please refer to: Planning Assistance Grants | Mass.gov.

STATE REVOLVING FUND

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

MUNICIPAL VULNERABILITY PREPAREDNESS ACTION GRANT PROGRAM

The MVP Action Grant offers financial resources to municipalities that are seeking to advance

priority climate adaptation actions to address climate change impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate impacts. Towns are eligible for this competitive grant program after successfully completing an MVP planning grant. A variety of project types are eligible for funding, but projects must address local vulnerabilities to climate change and incorporate MVP Core Principles. Grant application information can be found here: https://www.mass.gov/service-details/mvp-action-grant. MVP Core Principles can be found here: https://www.mass.gov/doc/mvp-core-principles/download.

DAM AND SEAWALL REPAIR OR REMOVAL PROGRAM

The EEA funds projects for the repair and removal of dams, levees, seawalls, and other forms of inland and coastal flood control. For additional information, please refer to https://www.mass.gov/service-details/dam-and-seawall-repair-or-removal-program-grants-and-funds.

MASSACHUSETTS LAND & WATER CONSERVATION FUND GRANT PROGRAM (LWCF)

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

LAND ACQUISITION FOR NATURAL DIVERSITY (LAND)

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

DRINKING WATER SUPPLY GRANT

The DWSP grant program provides financial assistance to public water systems and municipal water departments for the purchase of land or interests in land for the following purposes: 1) protection of existing DEP-approved public drinking water supplies; 2) protection of planned future public drinking water supplies; or 3) groundwater recharge. It is a reimbursement program.

LAND AND RECREATION GRANTS AND LOANS

The Division of Conservation Services (DCS) manages several grant or loan programs that enable land preservation, natural resources conservation, and public recreation. Municipalities with an active Open Space and Recreation Plan are generally eligible to apply for these programs. Preserving natural open space can buffer natural systems from development impacts, protect open spaces from future development, and maintain ecosystem services like natural flood mitigation. The full list of DCS grant programs can be found here: https://www.mass.gov/land-and-recreation-grants-loans/need-to-know.

WATER QUALITY MANAGEMENT PLANNING GRANT

This grant program is authorized under the federal Clean Water Act Section 604(b) for water quality assessment and management planning. Eligible entities include: regional planning agencies,

councils of governments, conservation districts, counties, cities and towns, and other substate public planning agencies and interstate agencies. No local match is required.

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

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

VOLUNTEER FIRE ASSISTANCE PROGRAM (VFA)

The Volunteer Fire Assistance Program (VFA) was born from a collaborative effort between the US Forest service and the Massachusetts DCR Bureau of Forest Fires and Forestry. This program aims to provide funding for volunteer fire departments in towns of under 10,000 people. For more information, please refer to: Volunteer Fire Assistance (VFA) Program | Mass.gov.

CULVERT REPLACEMENT MUNICIPAL ASSISTANCE GRANT PROGRAM

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

DER PRIORITY PROJECTS

The Priority Project Program is an opportunity under the Division of Ecological Restoration for organizations to receive technical assistance, consulting and/or direct grant funding for wetland and river restoration projects through a state-wide, competitive process. DER chooses high-priority projects that bring significant ecological and community benefits to the Commonwealth. DER's most recent call for applications solicited projects located in Massachusetts that focus on cranberry bog wetland restoration, dam removal and river restoration, coastal wetland restoration projects, or a combination of these topics. More information on the Priority Projects program can be found here: https://www.mass.gov/how-to/become-a-der-priority-project. This program can be used to remove significant or high hazards dams that communities no longer want to maintain, which may improve the health and resilience of aquatic systems.

MASS WILDLIFE HABITAT MANAGEMENT GRANT PROGRAM (MWHMGP)

This is a program dedicated to the protection and restoration of wildlife habitat. MWHMGP awards grants of $10,000 to $75,000 to private landowners with habitat restoration projects. Teh program also places emphasis on the protection of endangered species and the expansion of outdoor recreation opportunities, the enhancement of ecological communities disproportionally susceptible to climate change. For more information about this program, please refer to: MassWildlife Habitat Management Grant Program | Mass.gov.

AGRICULTURAL CLIMATE RESILIENCY AND EFFICIENCIES PROGRAM (ACRE)

ACRE is a competitive grant program available to eligible farmers that funds materials and labor

to improve climate change resilience, economic resiliency and to forward the goals of the Massachusetts Local Food Action Plan. For more about this program, please refer to: Agricultural Climate Resiliency & Efficiencies (ACRE) Program | Mass.gov.

AGRICULTURAL PRESERVATION RESTRICTION PROGRAM (APR)

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

HAZARD MITIGATION PLANNING GRANT PROGRAM (HMPG)

This program provides funding for cities, towns, state agencies and certain non-profit organizations for natural disaster mitigation after a Presidential Disaster Declaration has been issued. Grants on average are awarded from $100,000 to $500,000. For more information, please refer to: Hazard Mitigation Grant Program | Mass.gov.

HAZARD MITIGATION GRANT PROGRAM (STATE) (HMGP)

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

COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG)

CDBG remains the principal source of revenue for communities to use in identifying solutions to address physical, economic, and social deterioration in lower-income neighborhoods and communities. CDBG is primarily a housing and community development program administered through the Executive Office of Housing and Community Development (HCD). The program can fund certain critical infrastructure projects, and necessary housing improvements that benefit populations that may be more vulnerable to certain natural hazards. The program can also fund the rehabilitation of municipal buildings such as town halls, which in many cases, also serve as Emergency Operations Centers for their communities.

EMERGENCY SOLUTIONS GRANT (EFG)

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

MASSWORKS INFRASTRUCTURE PROGRAM

The MassWorks Infrastructure Program provides a one-stop shop for municipalities and other eligible public entities seeking public infrastructure funding to support economic development and job creation. Although not specific to natural hazards per se, these infrastructure enhancements under MassWorks could also address identified needs for hazard mitigation. The MassWorks Infrastructure Program is administered by the Executive Office of Housing and Economic Development, in cooperation with the Department of Transportation and Executive Office for Administration & Finance. Please refer to http://www.mass.gov/hed/economic/eohed/pro/infrastructure/massworks/ for additional information.

COMMUNITY PRESERVATION ACT (CPA)

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

SPECIAL APPROPRIATIONS AND LEGISLATIVE EARMARKS

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

DISTRICT LOCAL TECHNICAL ASSISTANCE

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

According to the most recent guidelines of the Commonwealth's DLTA program, a proposed project

must fall into one of the following four (4) general priority categories to be considered eligible for technical assistance:

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

The goal of the DLTA Fund is to direct these funds to projects and activities that result in change in the municipality(ies) receiving these DLTA Fund services, whether in law, regulation, program management, or practice, that serve to further these objectives. Community Compact Cabinet (CCC) best practices should include both those that the Commonwealth of Massachusetts is seeking to fund as part of the CCC program as a first priority and also best practices that explicitly align with CCC best practices but are not best practices identified in a signed CCC agreement. COVID-19 relief/recovery activities that fall under the above priority categories are eligible.

LOCAL PLANNING ASSISTANCE

The Local Planning Assistance (LPA) program was initiated to improve the direct services of this agency to its member communities. Under the LPA program each community annually receives a minimum of 12 hours of technical assistance to be used in any reasonable planning project authorized by the town's Planning Board Chair.

SUPPORT AND INCENTIVE GRANT

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

MUNICIPAL SMALL BRIDGE PROGRAM

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

CHAPTER 90 FUNDS

This statewide program reimburses communities for roadway projects, such as resurfacing and related work and other work incidental to the above such as preliminary engineering including State Aid/Consultant Design Agreements, right-of-way acquisition, shoulders, side road approaches, landscaping and tree planting, roadside drainage, structures (including bridges), sidewalks, traffic control and service facilities, street lighting (excluding operating costs), and for such other purposes as the Department may specifically authorize. Maintaining and upgrading critical infrastructure and evacuation routes is an important component of hazard mitigation. Chapter 90 funds could be used for roadway improvements.

STATE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

STIP is an annual list of transportation infrastructure projects, funded and planned through the combined effort of MassDOT and other state agencies. For more on this program, please refer to: State Transportation Improvement Program (STIP) | Mass.gov.

COMPLETE STREETS (CS)

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

Appendix A: Maps and Map Key

Hazard Mitigation Plan
Review Map
Hazards and Critical Infrastructure and Facilities
Town of Paxton, Massachusetts

October 2021

Legend

- Assisted Living
- Emergency Shelters
- Misc Data
- Daycare
- Electric Substation
- EOC
- Other Government Buildings
- Airports
- Town Halls
- Local Police
- Fire Station
- Schools (Pre-K through High School)
- WRTA Bus Stop
- WRTA Bus Routes (IN/OUT)
- Active Rail Line

Transmission Lines by Type
- Powerline/Arbitrary Extension

Environmental Justice Populations (Census 2020)
- Minority
- Income
- Engllish isolation
- Minority and Income
- Minority and English isolation
- Income and English isolation
- Minority, Income and English isolation

- Town Boundaries
- Structures
- Water Bodies
- Streams
- Roads
- Regionwide Evacuation Routes

Hazards

Dams (2/2012)
- High Hazard
- Significant Hazard
- Low Hazard
- N/A
- IBTrACS Historical Hurricane Tracks (1842-2020)

FEMA DFIRM Flood Zones
- 100-year Flood Area*
- 500-year Flood Area

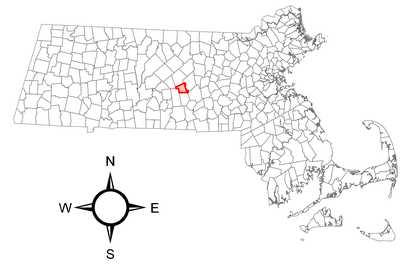
- High Slope (15% and above)
- Repetitive Loss Property Areas
- NOAA Tornado Tracks (as of 9/2021)

Locally Defined

- Critical Infrastructure
- Hazard

- Critical Infrastructure
- Hazard

- Critical Infrastructure
- Hazard
- Possible Flood Area



0.5 0.25 0 0.5 1 Miles

Data provided by participating municipalities, CMRPC, massDOT, MassGIS, FEMA and NOAA.
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
One Mercantile St. Suite 520, Worcester, MA 01608

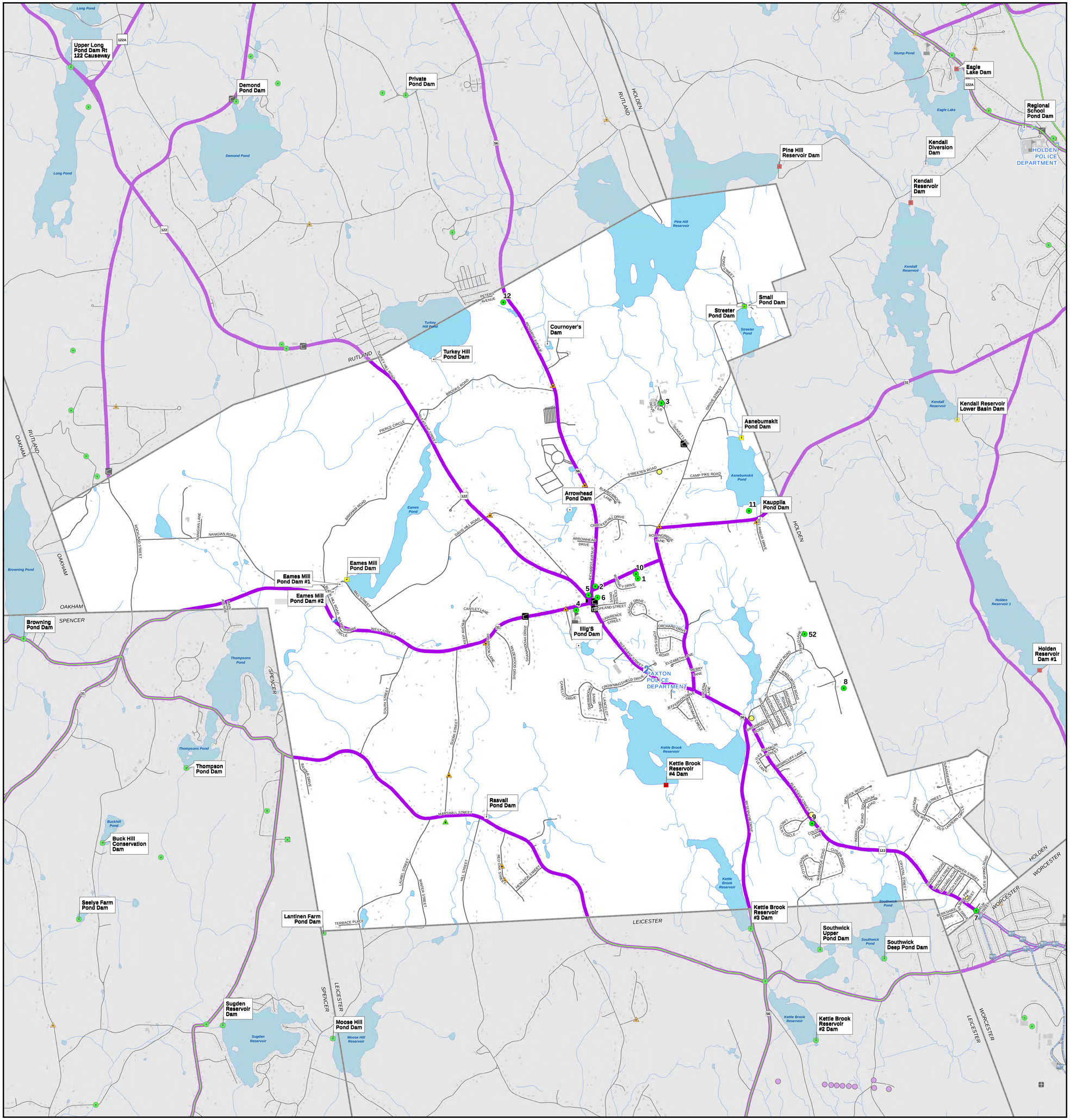
CMRPC
Central Massachusetts Regional Planning Commission

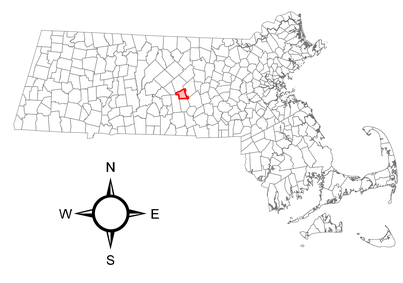
Date: 10/15/2021 Document Path: H:\Projects\HLS_GIS\subprojects\hmp\HMP_00_Local_Cls_Hazards_36x44.mxd

Hazard Mitigation Plan

Map 1
Critical Infrastructure and Facilities
Town of Paxton, Massachusetts

March 2024





0.5 0.25 0 0.5 1 Miles

Legend

- Assisted Living
- Emergency Shelters
- Misc Data
- Daycare
- Electric Substation
- EOC
- Airports
- Town Halls
- Local Police
- Fire Station
- Schools (Pre-K through High School)
- WRTA Bus Stop
- WRTA Bus Routes (IN/OUT)
- Active Rail Line

- Town Boundaries
- Structures
- Water Bodies
- Streams
- Roads
- Regionwide Evacuation Routes

Dams (2/2012)

- High Hazard
- Significant Hazard
- Low Hazard
- N/A

Locally Defined

- Critical Infrastructure
- Critical Infrastructure
- Critical Infrastructure

Data provided by participating municipalities, CMRPC, massDOT, MassGIS, FEMA and NOAA.
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
One Mercantile St. Suite 520, Worcester, MA 01608

Date: 3/19/2024 Document Path: H:\Projects\HLS_GIS\subprojects\hmp\HMP_01_Local_Cls_Map_36x44.mxd

Hazard Mitigation Plan

Map 2
Hazards
Town of Paxton, Massachusetts

March 2024

Upper Long Pond Dam Rt 122 Causeway
Demond Pond Dam
Private Pond Dam
Eagle Lake Dam
Regional School Pond Dam
HOLDEN POLICE DEPARTMENT
Pine Hill Reservoir Dam
Kendall Diversion Dam
Kendall Reservoir Dam
Streeter Pond Dam
Small Pond Dam
Cournoyer's Dam
Turkey Hill Pond Dam
Kendall Reservoir Lower Basin Dam
Asnebumskit Pond Dam
Arrowhead Pond Dam
Kauppila Pond Dam
Eames Mill Pond Dam
Eames Mill Pond Dam #1
Eames Mill Pond Dam #2
Illig'S Pond Dam
PAXTON POLICE DEPARTMENT
Holden Reservoir Dam #1
Browning Pond Dam
Thompson Pond Dam
Kettle Brook Reservoir #4 Dam
Rasvall Pond Dam
Buck Hill Conservation Dam
Seelye Farm Pond Dam
Lantinen Farm Pond Dam
Kettle Brook Reservoir #3 Dam
Southwick Upper Pond Dam
Southwick Deep Pond Dam
Sugden Reservoir Dam
Moose Hill Pond Dam
Kettle Brook Reservoir #2 Dam

Legend

- Assisted Living
- Emergency Shelters
- Misc Data
- Daycare
- Electric Substation
- EOC
- Airports
- Town Halls
- Local Police
- Fire Station
- Schools (Pre-K through High School)
- WRTA Bus Stop
- WRTA Bus Routes (IN/OUT)
- Active Rail Line
- Town Boundaries
- Structures
- Water Bodies
- Streams
- Roads
- Regionwide Evacuation Routes

Hazards

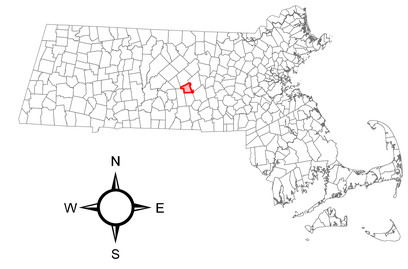
Dams (2/2012)
- High Hazard
- N/A

FEMA DFIRM Flood Zones
- 100-year Flood Area*
- 500-year Flood Area
- Repetitive Loss Property Areas
- NOAA Historic Hurricane Tracks (1842-2022)

USDA Wildfire Hazard Potential, Version 2020 Classified
- Very Low
- Low
- Moderate
- High
- Very High
- Non-burnable
- Water

Locally Defined Hazards

- Hazard
- Hazard
- Possible Flood Area
- Hazard



0.5 0.25 0 0.5 1 Miles

Data provided by participating municipalities, CMRPC, massDOT, MassGIS, FEMA and NOAA.
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
One Mercantile St. Suite 520, Worcester, MA 01608

Date: 3/19/2024 Document Path: H:\Projects\HLS_GIS\subprojects\hmp\HMP_02_Local_Hazards_36x44.mxd

Hazard Mitigation Plan
Map 3
Vulnerable Critical Infrastructure and Facilities
Town of Paxton, Massachusetts
March 2024

Upper Long Pond Dam Rt 122 Causeway
Demond Pond Dam
Private Pond Dam
Eagle Lake Dam
Regional School Pond Dam
Pine Hill Reservoir Dam
Kendall Diversion Dam
Kendall Reservoir Dam
HOLDEN POLICE DEPARTMENT
Small Pond Dam
Streeter Pond Dam
Cournoyer's Dam
Turkey Hill Pond Dam
Kendall Reservoir Lower Basin Dam
Asnebumskit Pond Dam
Arrowhead Pond Dam
Kauppila Pond Dam
Eames Mill Pond Dam
Eames Mill Pond Dam #2
Eames Mill Pond Dam #1
Illig'S Pond Dam
PAXTON POLICE DEPARTMENT
Holden Reservoir Dam #1
Browning Pond Dam
Thompson Pond Dam
Buck Hill Conservation Dam
Rasvall Pond Dam
Kettle Brook Reservoir #4 Dam
Seelye Farm Pond Dam
Lantinen Farm Pond Dam
Kettle Brook Reservoir #3 Dam
Southwick Upper Pond Dam
Southwick Deep Pond Dam
Sugden Reservoir Dam
Moose Hill Pond Dam
Kettle Brook Reservoir #2 Dam

Legend

- Assisted Living
- Emergency Shelters
- Misc Data
- Daycare
- Electric Substation
- EOC
- Airports
- Town Halls
- Local Police
- Fire Station
- Schools (Pre-K through High School)
- WRTA Bus Stop
- WRTA Bus Routes (IN/OUT)
- Active Rail Line
- Town Boundaries
- Structures
- Water Bodies
- Streams
- Roads
- Regionwide Evacuation Routes

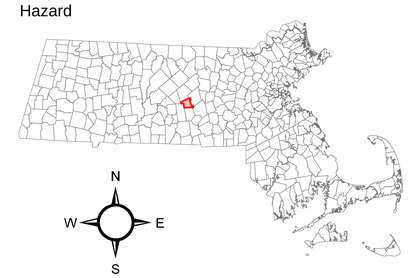
Hazards

Dams (2/2012)
- High Hazard
- Significant Hazard
- Low Hazard
- N/A

FEMA DFIRM Flood Zones
- 100-year Flood Area*
- 500-year Flood Area
- Repetitive Loss Property Areas
- NOAA Tornado Tracks (as of 9/2021)
- IBTrACS Historical Hurricane Tracks (1842-2020)

Locally Defined

- Hazard
- Vulnerable Critical Infrastructure
- Vulnerable Critical Infrastructure/ Hazard
- Non-vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure/ Hazard
- Hazard
- Vulnerable Critical Infrastructure
- Vulnerable Critical Infrastructure/ Hazard
- Non-vulnerable Critical Infrastructure
- Possible Flood Area
- Hazard
- Vulnerable Critical Infrastructure
- Non-vulnerable Critical Infrastructure



0.5 0.25 0 0.5 1 Miles

Data provided by participating municipalities, CMRPC, massDOT, MassGIS, FEMA and NOAA.
Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution intrepreting positional accuracy.

Produced by the Central Massachusetts Regional Planning Commission.
One Mercantile St. Suite 520, Worcester, MA 01608

CMRPC Central Massachusetts Regional Planning Commission

Date: 3/19/2024 Document Path: H:\Projects\HLS_GIS\subprojects\hmp\HMP_03_Local_CIs_Hazards_36x44.mxd

Name	Critical Infrastructure /Hazard	ID	Hazard Type	In Hazard	Edit Date	Notes
Maple Street Water Tank	CI	1		N	20181217	
Richards Memorial Library	CI	2		N	20181217	
Anna Maria College	CI	3		N	20240715	Anna Maria College is primary sheltering site and Paxton Center School is a secondary shelter. Overflow would go to congregational Church and St. Coumba Church.
Council on Aging	CI/H	4	EQ	Y	20240717	Earthquake
First Congregational Church	CI	5		N	20181217	
St. Columba Church	CI	6		N	20181217	
Pleasant St Pump Station/Emergency Comms Tower/SCADA System	CI	7		N	20240612	
Asnebumskit Communications Tower	CI	8		N	20181217	
Pleasant St Communications Tower	CI	9		N	20181217	
Maple St Communications Tower	CI	10		N	20181217	
Paxton Public Works Dept.	CI	11		N	20181217	
Richards Ave Electric Transformer	CI	12		N	20181217	
Repeater Tower	CI	13		Y	20240612	
Worcester WTAG	CI	52		N	20211015	Originally coded as 348_52
Paxton Center School	CI/H	53		N	20240715	Dispensing site for PH emergency. Potential earthquake hazard (school does not have sprinkler system).
Ten West Market building	CI	54		N	20240715	Town owned.
Draft Site	CI	55		N	20240719	
Draft Site	CI	56		N	20240719	
Asnebumskit Pump Station	CI	57		N	20240719	
Potential Battery Bank Site	CI	58		N	20240724	Potential Battery Bank Site
Potential Battery Storage	CI	59		N	20240724	
Potential battery Storage	CI	60		N	20240724	

Culvert North of Thompson Pond	CI/H	61		N	20240726	North of Thompsons Pond cross culvert collapsed on outlet side (concern about applying for grant because of ongoing planning of construction of bridge to the East.
Cross Culvert	CI/H	62		N	20240726	
R + 3 culvert	CI/H	63		Y	20240726	No hooding here. Culverts need more work in general.
Drainage Pipe	CI	64	NA	N	20240719	
Eames Mill Pond Dam	H	DF-1	DF	NA	20181217	Draft Site
Turkey Hill Pond Dam	H	DF-2	DF	NA	20181217	
Kettle Brook Res. Dam	H	DF-3	DF	NA	20181217	
Asnebumskit Pond Dam	H	DF-4	DF	NA	20181217	
Small Pond Dam	H	DF-5	DF	NA	20181217	
Earthen dam of concern	H	DF-6	DF	NA	20211222	
8in Water Main	CI/H	EQ-1	EQ	N	20240726	Water distribution system is a concern. 8in water main near Shenandoah Drive.
Marshall Street Evacuation Route	CI/H	ER-1	FL	Y	20240724	
Hill St Flooding	H	FL-1	FL	NA	20181217	
Flood Area	H	FL-11	FL	NA	20211222	
Flood Area	H	FL-12	FL	NA	20211222	
Black Hill Road Culvert	H	FL-13	FL	Y	20240717	Cross culvert near Black Hill Rd (planning to be addressed in next 5 years)
Potential Flood Area	H	FL-14	FL	NA	20240719	Second culvert on Nanigian Road
Hill St Flooding	H	FL-2	FL	NA	20181217	
Flood Area	H	FL-3	FL	NA	20211222	
Flood Area	H	FL-4	FL	NA	20211222	
Flood Area	H	FL-6	FL	NA	20211222	
Flood Area	H	FL-7	FL	NA	20211222	
Flood Area	H	FL-8	FL	NA	20211222	
Flood Area	H	FL-9	FL	NA	20211222	Undersized culvert
Beaver Flooding Area	H	FL-9	FL	NA	20240610	
Asnebumskit Hill snow clearing for radio tower	H	SS-1	SS	NA	20181217	
Paxton Town Hall	CI/H	SS-2	SS	Y	20240715	Flat roof concerns

Paxton Senior Center	CI/H	SS-3	SS, EQ	Y	20240717	Senior Center for heating and cooling center. Also concern for snowstorms and earthquakes.
1953 Tornado	H	ST-1	ST	NA	20211222	
Wildfire Risk Area	H	WF-01	WF	NA	20240612	
Wildfire 2016	H	WF-02	WF	NA	20240612	
Moore State Park	CI/H	WF-1	WF	Y	20240717	
Water Tank	CI/H	WF-2	WF	N	20240717	
Boynton Park	CI/H	WF-2	WF	Y	20240722	vulnerable unhoused population

APPENDIX B:

Public Survey Materials and Results

Appendix B helps meet the following FEMA local mitigation plan requirements:

- *A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?" (Requirement 44 CFR § 201.6(c)(1))*
- *A2. "Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process?" (Requirement 44 CFR § 201.6(b)(2)); and*
- *A3. "Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval?" (Requirement 44 CFR § 201.6(b)(1))*

Survey Responses Needed!

The Central MA Regional Planning Commission is currently working with The Town of Paxton on a Hazard Mitigation Planand we need your input!

We want to hear from you about:

- How you have been affected by natural hazards in and around Town
- What natural hazards are you most concerned about
- How you think climate change and natural hazards will affect Paxton
- Your suggestions for mitigating the effects of climate change and natural hazards to Paxton

Answer the survey by June 30, 2024 using the QR code below:

TIP: Open your phone camera, point at QR code, and click on pop-up link to take the survey, OR type the link below into your web browser:

https://www.surveymonkey.com/r/JSV3S9P

Paxton Hazard Mitigation Plan Community Survey

Paxton Hazard Mitigation Plan

In October 2021, the Town of Paxton started the planning process to update its Hazard Mitigation Plan (HMP). An updated HMP will help the town identify strategies to reduce its vulnerability to hazards like flooding, winter storms, and drought. Climate change may shift the extent and severity of certain natural hazards, including those that already impact Paxton.

By participating in this survey, you will help the Town of Paxton understand the current and future natural hazards that residents are most concerned about. Survey responses will be accepted until June 30th, 2024.

1. Check all that apply.

- [ ] I live in Paxton.
- [ ] I work in Paxton.
- [ ] I frequently visit Paxton.

2. Has your family or property, in Paxton, been impacted by any of the following natural hazards? Select all that apply:

- [ ] I have not been impacted by natural hazards in Paxton
- [ ] Winter Storms / Ice
- [ ] Thunderstorms, Microbursts, and/or Extreme Wind
- [ ] Tornadoes
- [ ] Flooding
- [ ] Extreme Heat / Extreme Cold
- [ ] Drought
- [ ] Wildfire / Brushfire
- [ ] Hurricanes
- [ ] Earthquakes
- [ ] Poor Air Quality
- [ ] Other (please specify)

3. Where have you observed hazard impacts in Paxton, and what were those impacts?

Examples: flooding on specific roads, drought/effects on water supply, extended power outages, trees down on roads, beaver dams affecting property and septic systems due to flooding from dams.

4. How much do you think the impacts of natural hazards and climate change will threaten your personal health, safety, or property?

- ◯ I think natural hazards and climate change will negatively impact my life.
- ◯ I'm not sure how natural hazards and climate change will impact my life.
- ◯ I don't think that I personally will be impacted by natural hazards and climate change.

5. If you are concerned about impacts to your life from natural hazards and/or climate change, what impacts are you most concerned about?

Examples: basement flooding, wells drying out / contamination of wells, ability to grow food

6. How concerned are you about the impacts that natural hazards and climate change will have on the Town of Paxton (the local infrastructure, economy, environment, and/or town residents)?

- ◯ Very concerned
- ◯ Somewhat concerned
- ◯ Unsure
- ◯ Somewhat unconcerned
- ◯ Not concerned at all

7. What community assets are you most concerned about when you consider the potential impact of natural hazards and climate change on the Town of Paxton? Rank the responses below in order from most concerned (1) to least concerned (5).

- ≡ ▲▼ Local natural resources and environments
- ≡ ▲▼ Resident health, safety, and property
- ≡ ▲▼ Local infrastructure
- ≡ ▲▼ Local business and the town economy
- ≡ ▲▼ Local government resources

8. Which of the following aspects of natural hazards and climate change would you like to learn more about? Select all that you are interested in.

- [ ] Impacts on well water quantity / quality
- [ ] Future flood risks
- [ ] Impacts on infrastructure
- [ ] Sustainability initiatives
- [ ] Public health impacts like increased risks of vector-borne disease (ex. Lyme disease, West Nile Virus, EEE - Eastern equine encephalitis)
- [ ] Impacts on town budget and finances
- [ ] Impacts on wildlife
- [ ] Impacts on the health of local forests
- [ ] Impacts on future development
- [ ] Other (please specify)

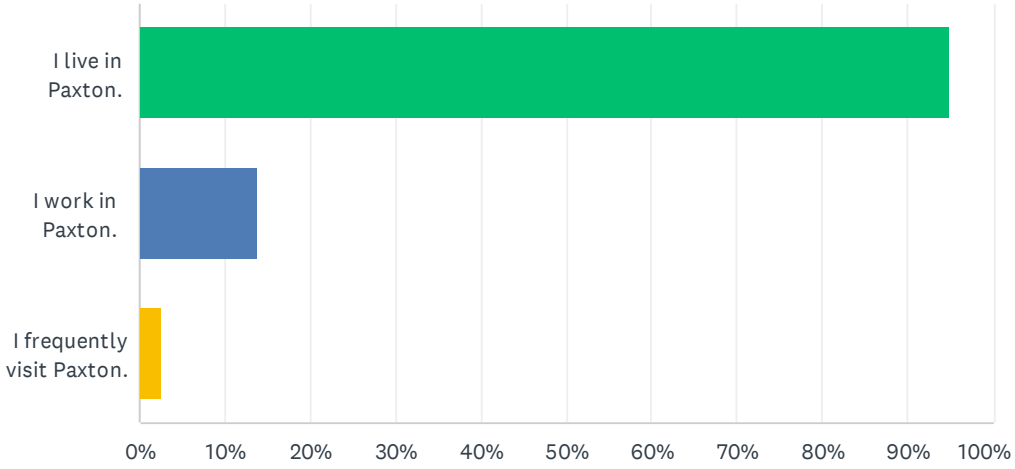
9. What actions should the Town of Paxton take to cultivate local resilience to natural hazards?

Examples: increase local capacity to apply for hazard mitigation grant funding and implement hazard mitigation projects; improve storm water management; provide more education and outreach about how climate change could impact my life; encourage planting climate-resilient tree species; encourage cutting/trimming dead trees beside/hanging over roads; etc.

10. If you would like to stay informed about other opportunities to participate in Paxton's Hazard Mitigation planning process, please enter your E-mail address below.

Q1 Check all that apply.

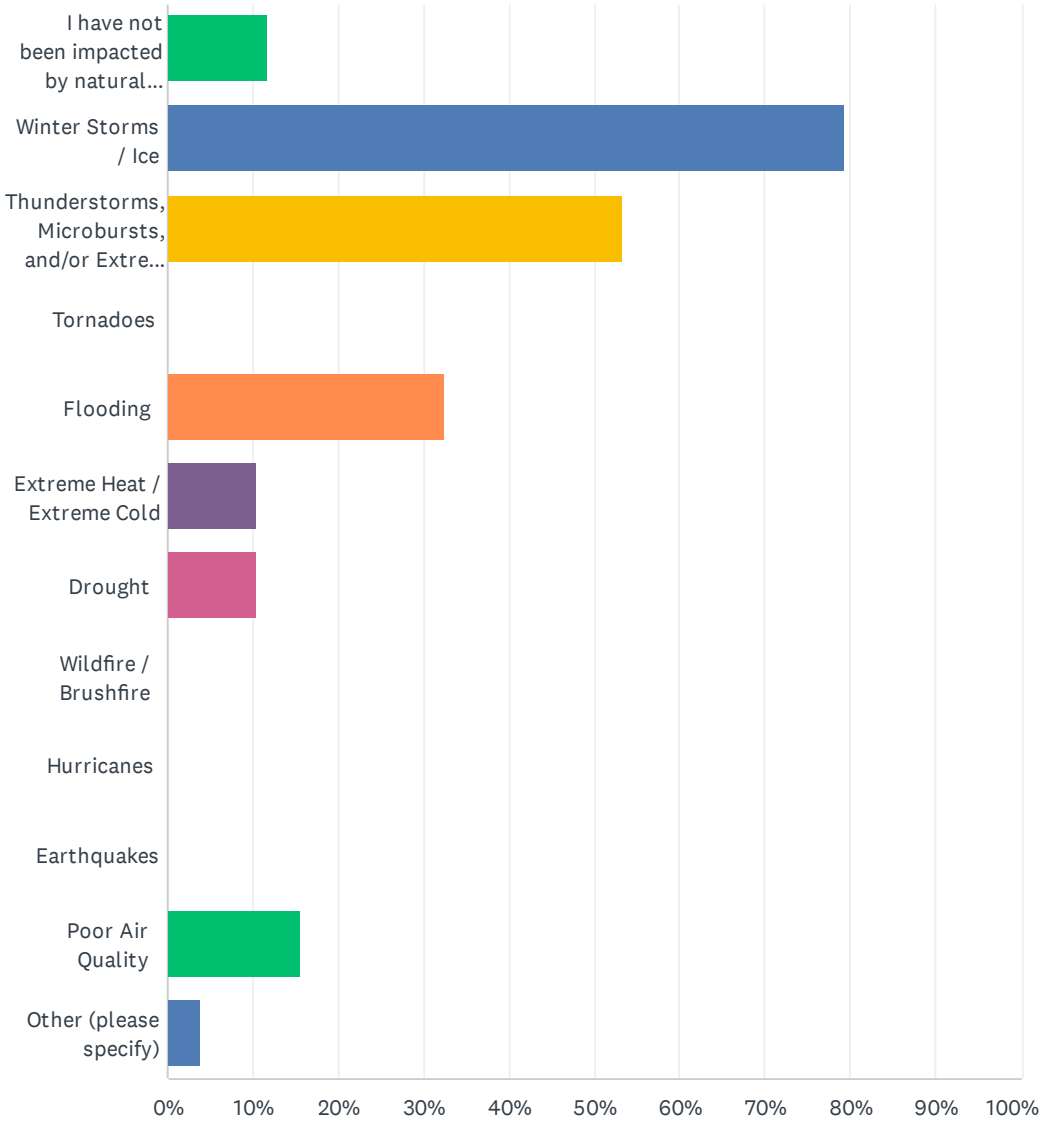
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
I live in Paxton.	94.94%	75
I work in Paxton.	13.92%	11
I frequently visit Paxton.	2.53%	2
Total Respondents: 79		

Q2 Has your family or property, in Paxton, been impacted by any of the following natural hazards? Select all that apply:

Answered: 77 Skipped: 2



ANSWER CHOICES	RESPONSES	
I have not been impacted by natural hazards in Paxton	11.69%	9
Winter Storms / Ice	79.22%	61
Thunderstorms, Microbursts, and/or Extreme Wind	53.25%	41
Tornadoes	0.00%	0
Flooding	32.47%	25
Extreme Heat / Extreme Cold	10.39%	8
Drought	10.39%	8
Wildfire / Brushfire	0.00%	0
Hurricanes	0.00%	0
Earthquakes	0.00%	0
Poor Air Quality	15.58%	12
Other (please specify)	3.90%	3
Total Respondents: 77		

#	OTHER (PLEASE SPECIFY)	DATE
1	spread of invasive plants especially Japanese Knot weed	3/30/2024 8:26 AM
2	Water Main breaks (Route 30)	3/29/2024 12:27 PM
3	Basement water	3/29/2024 10:04 AM

Q3 Where have you observed hazard impacts in Paxton, and what were those impacts?Examples: flooding on specific roads, drought/effects on water supply, extended power outages, trees down on roads, beaver dams affecting property and septic systems due to flooding from dams.

Answered: 60 Skipped: 19

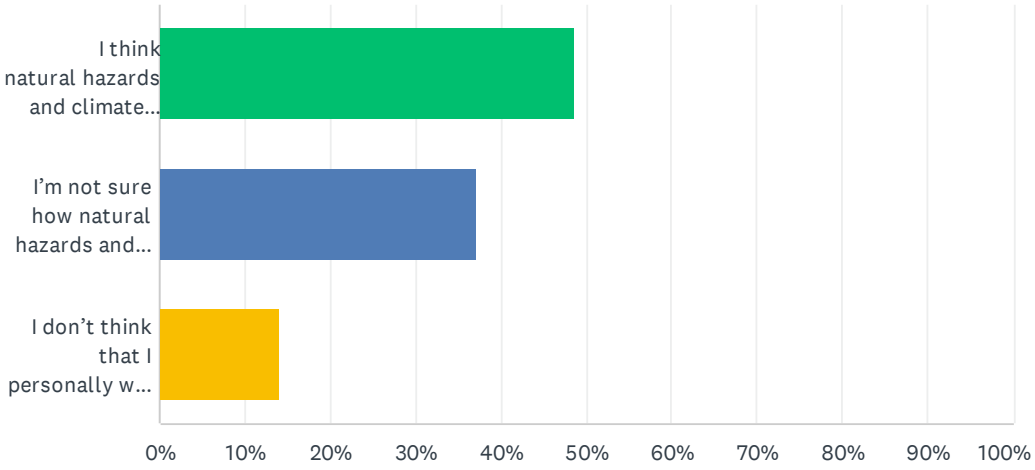
#	RESPONSES	DATE
1	Have not seen anything	4/22/2024 8:35 PM
2	Downed trees and power lines	4/14/2024 8:48 PM
3	flooded portions of road	4/9/2024 1:48 PM
4	Flooding	4/4/2024 9:22 PM
5	Trees down on the roads.	4/4/2024 9:00 AM
6	I have worked at PCS fro 25 years. School cancellations have occurred for cold, flooding, and snow, and we have had students in school during hazardous air quality conditions without the ventilation systems needed to provide acceptable indoor AQ. The schools eason is not impacted by heat on both ends without the air conditioning needed to make it an effective and at time reasonably comfortable environment. given this is expected to get worse(hotter), planning for building upgrades are needed.	4/1/2024 5:32 PM
7	Water daming flooding our property on Grove street.	4/1/2024 12:07 PM
8	Trees down on roads	4/1/2024 11:29 AM
9	Drainage flooding of my both front and back of my yard, heavily at the corner of Alrene and Berkshire (DPW has been out, but has not yet been able to fully stop the constant flow of water)	3/31/2024 10:07 PM
10	Trees down and large branches in roadway along upper mower street Poor drainage along walnut street	3/31/2024 10:06 PM
11	Winter/Ice storms used to have frequent power outages towards the Paxton-Spencer line, however since the substation was placed on Pleasantdale Rd, power and restore times have been greatly improved.	3/31/2024 8:57 PM
12	Crowningshield neighborhood. Thunderstorms/wind leading to trees down; suspected lightning strike leading to surge damaging electronics. Ice storms leading to trees down and ice dams/buildup around roof/gutters.	3/31/2024 8:46 PM
13	Haven't seen anything like that. Town does great job	3/31/2024 10:42 AM
14	Trees down from ice storm. Power outage.	3/31/2024 4:00 AM
15	The apron on my driveway along 122 was not done correctly by the state, so water comes pouring down my driveway on one side of the property and the other side gets flooded from the sidewalks pooling water in my yard and into my basement. I just had extensive foundation repair performed to start fixing this.	3/30/2024 9:58 PM
16	Flooding on Suomi street near our house 168- trees down on Suomi street from storms both rain, wind ice	3/30/2024 2:04 PM
17	Downed trees on Grove St several times have cut power and prevented our ability to return home on Pond St, once for many hours (we have disabled people in the household). It has been addressed quickly each time and we're grateful. The only option I can think of would be to create a continuation of Pond St for secondary access, and that seems unlikely.	3/30/2024 1:42 PM
18	Trees down in roads and beaver dams effecting property & septic systems due to flooding	3/30/2024 12:57 PM

19	Fallen trees/branches. Strong winds impacting power and internet access which impacts my work from home time	3/30/2024 9:28 AM
20	The spread of invasive plants such as Japanese knot weed should be considered a hazard for the town of Paxton. It displaces native plants contributing to erosion, overgrows roadsides limiting visibility. Its roots can cause property damage to roadways, sidewalks, house foundations, etc.	3/30/2024 8:26 AM
21	Roads are a disaster.	3/30/2024 8:26 AM
22	Down trees, poor air quality during the Canada Wildfires	3/30/2024 7:49 AM
23	We've had many big branches knocked down by recent windstorms.	3/29/2024 10:48 PM
24	trees and branches down on Mower St, Pleasant Street and environs. This is usually due to high winds and/or ice storms	3/29/2024 10:46 PM
25	The runoff and dispersal of water during storms from the top of Glen Ellen Street has impacted much of the even numbered homes on orchard drive. Even after the repavement it's an issue	3/29/2024 5:11 PM
26	Trees in rough shape throughout town due to the ice storm years ago.	3/29/2024 5:07 PM
27	Flooding in Hill St	3/29/2024 4:47 PM
28	Trees down on Pleasant Street and Davis Hill Rd, lightening strike on our personal property affected internet access and communications for our home	3/29/2024 2:22 PM
29	Lots of dead trees near my house	3/29/2024 2:22 PM
30	Davis Hill Rd- trees down	3/29/2024 2:18 PM
31	Trees falling, water main breaks (due to sinking roads) Roads flooding and causing sink holes.	3/29/2024 2:10 PM
32	Trees down on Pleasant Street in Davis Hill Rd area	3/29/2024 2:06 PM
33	Extended power outage and tree damage to property on Pierce circle during snow and ice storms	3/29/2024 1:45 PM
34	Eames Pond water level. Rainfall causing significant puddles and wet areas in hay fields and garden.	3/29/2024 1:29 PM
35	Power outages, downed trees	3/29/2024 1:10 PM
36	Downed trees and limbs, along with power loss.	3/29/2024 1:08 PM
37	Trees down on Marshall Street and Suomi street, flooding at the reservoir area of Marshall Street, ice/wind damage to trees,	3/29/2024 12:59 PM
38	Flooding in yard, reservoir area of Marshall, ice/wind damage to trees, water bans (most recent 2 yrs ago)	3/29/2024 12:59 PM
39	West st	3/29/2024 12:55 PM
40	Power outages due to winter storms	3/29/2024 12:43 PM
41	Power outages, downed trees/limbs causing significant property damage and impassable roads during ice storms - 2008, 2015, 2017, 2021, 2023 and 2024.	3/29/2024 12:42 PM
42	Short power outages due to trees down on Grove St; draught effect on available groundwater	3/29/2024 12:22 PM
43	Flooding on corner of property due to storm drain passing under the road being beyond capacity at 46 Brooks Rd. Lots of tree branches on roads throughout the town	3/29/2024 11:44 AM
44	There is some sort of drain system near the street on either side of our property. Sometimes that gets blocked by natural debris. Our yard can become saturated with water sometimes and then the basement floods. I've also seen cars sliding down our street from ice. This winter, the whole street was backed up with vehicles from a flash ice storm. We had to get several trees cut down this year because we were afraid the harsh winds would blow them down onto our home. A wind storm destroyed a temporary shed we had as well.	3/29/2024 10:57 AM
45	Limbs hitting powerlines on Nanigian Rd, erosion in Nanigian rd, causing large cracks, holes and issue in the asphalt.	3/29/2024 10:52 AM

46	Trees down on Richards Ave, Pleasant St, large limbs down on most streets. Flooding on Richards Ave near drains.	3/29/2024 10:39 AM
47	Flooding in the Forestdale/Glen Ellen neighborhood	3/29/2024 10:38 AM
48	trees down in roads, lots of pooling of water in yards on certain streets	3/29/2024 10:31 AM
49	Ice damage to trees, wind damage to trees	3/29/2024 10:16 AM
50	downed tress due to ice storms, thunderstorms, and high winds	3/29/2024 10:09 AM
51	During the ice storm in 2008, we lost power for 9 days and were unable to get out for several days due to downed trees and power lines along Laurel Street. Additionally there is nearly constant pooling of water on Laurel Street near Terrace Place.	3/29/2024 10:08 AM
52	Drought and water supply and garden production	3/29/2024 10:04 AM
53	We have a lot of fallen trees on our road and on our property due to the ice storms, the house has been struck by lighting a few times so we needed to put in a grounder.	3/29/2024 10:00 AM
54	Tree limbs down when there is an ice storm	3/29/2024 9:58 AM
55	Paxton has no natural problems.	3/29/2024 9:57 AM
56	Holbrook Ln	3/29/2024 9:56 AM
57	Fields surrounding PCS frequently flooded, downed (non active) power lines on the ground in the parking lot for months, water in the building low quality.	3/29/2024 9:54 AM
58	Flooding and high winds on Burtenmar Circle.	3/29/2024 9:53 AM
59	Freezing rain leading to branches down and icy roads/ slippery conditions.	3/29/2024 9:51 AM
60	Flooded streets, beaver dams, down trees and limbs as well as overflowing streams	3/29/2024 9:47 AM

Q4 How much do you think the impacts of natural hazards and climate change will threaten your personal health, safety, or property?

Answered: 78 Skipped: 1



ANSWER CHOICES	RESPONSES	
I think natural hazards and climate change will negatively impact my life.	48.72%	38
I'm not sure how natural hazards and climate change will impact my life.	37.18%	29
I don't think that I personally will be impacted by natural hazards and climate change.	14.10%	11
TOTAL		78

Q5 If you are concerned about impacts to your life from natural hazards and/or climate change, what impacts are you most concerned about? Examples: basement flooding, wells drying out / contamination of wells, ability to grow food

Answered: 57 Skipped: 22

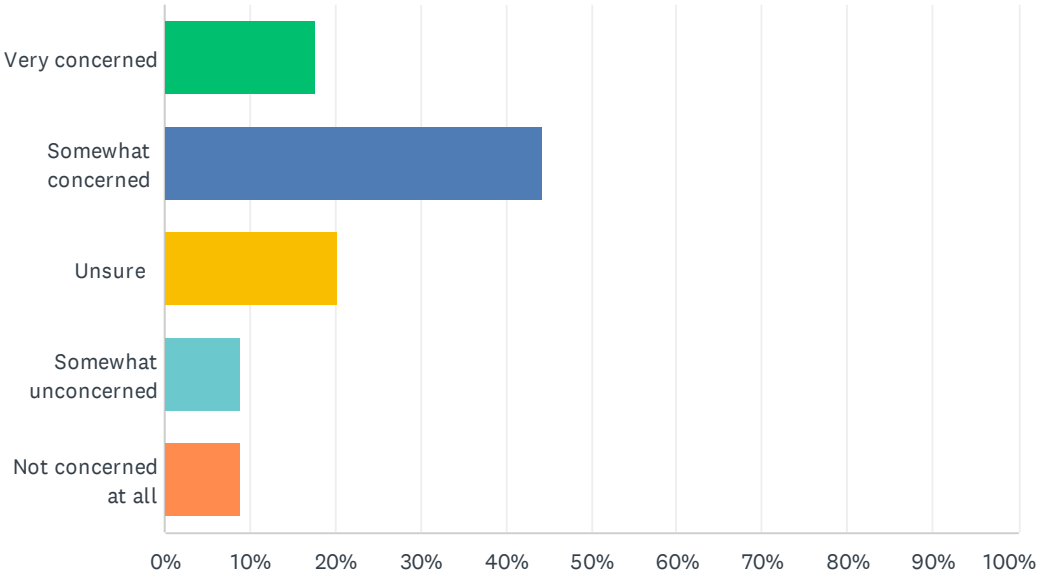
#	RESPONSES	DATE
1	The government messing with nature	4/22/2024 8:35 PM
2	basement flooding contamination	4/9/2024 1:48 PM
3	Basement flooding	4/4/2024 9:22 PM
4	Well drying out, access to clean food	4/4/2024 9:00 AM
5	Excess heat. Ice storms feel like they may be more frequent but I have not seen data substantiate this. Extreme precipitation is predicted to increase and data has suggested this is indeed happening. I am still amazed we lost one day this year to flooding), albeit a district issue not centered in Paxton).	4/1/2024 5:32 PM
6	Yard and basement flooding. Well being contaminated.	4/1/2024 12:07 PM
7	Basement flooding	4/1/2024 12:03 PM
8	Trees falling	4/1/2024 11:29 AM
9	Flooding with the Paxton clay soil, impact to house foundation	3/31/2024 10:07 PM
10	Death! Falling trees and limbs causing property damage or injury. Severe storms knocking out power.	3/31/2024 10:06 PM
11	Heavy windstorm	3/31/2024 5:30 AM
12	Basement flooding and a compromised foundation to my house.	3/30/2024 9:58 PM
13	Contamination to wells , ability to grow food	3/30/2024 2:04 PM
14	1. Contamination of well water; biggest concerns are high arsenic, pesticide runoff, and PFAS (need less expensive access to annual well water testing and consideration of banning the most dangerous pesticides and plastics) 2. With climate change, New England will experience tornadic storms of greater frequency and intensity sooner than anyone expects. A warning system including tornado sirens can be installed and can also act as civil defense warnings (different tones). Perhaps a system can be planned with the first siren installed downtown and annually add an additional siren based on higher density population areas. I've lived in Oklahoma and Tennessee, where we've had outbreaks of more than 100 tornadoes in one day, including EF 4s and 5s, and where people have been killed outdoors because Nashville was slow to place sirens. In Paxton, we already have a great system for text, call, and email emergency and routine notifications. But we need sirens to alert persons who are outdoors to check their phones. 3. Light pollution is much worse than it should be this far from Worcester. Municipal lighting should be replaced (by attrition, as needed) with dark-sky friendly downlighting and encouragement (and perhaps incentives) for business and residential residents to do the same. 4. Flooding hasn't impacted us personally. Yet. But should be addressed.	3/30/2024 1:42 PM
15	Contaminated wells and/or wells drying out.	3/30/2024 12:57 PM
16	Flooding since my property borders a creek and has a pond and wet areas surrounding	3/30/2024 11:04 AM
17	Flooding	3/30/2024 9:37 AM
18	Basement flooding Tree damage	3/30/2024 9:28 AM

19	Loss of native plant species.	3/30/2024 8:26 AM
20	Ability to grow food	3/30/2024 7:49 AM
21	Flooding	3/29/2024 10:48 PM
22	I'm concerned about trees and large branches taking out power lines and/or falling on our home. And although we haven't seen fires, we live across from Boynton Park, which is full of ready fuel if a fire comes.	3/29/2024 10:46 PM
23	Flooding is the only real issue. Worried about power loss as well, but only in how it will effect dunno pumps etc...	3/29/2024 5:11 PM
24	I think as a community, we should be more mindful of water consumption.	3/29/2024 5:07 PM
25	Water contamination and air quality	3/29/2024 3:15 PM
26	Water supplies with either drought or flooding, tree hazards are a big one right now	3/29/2024 2:22 PM
27	Trees down, poison ivy, ticks, mosquitoes	3/29/2024 2:18 PM
28	Basement flooding, yard flooding Sinking yards	3/29/2024 2:10 PM
29	Increased severity of storms with wind/water damage, higher temps leading to greater need/costs for cooling	3/29/2024 2:06 PM
30	natural hazards are part of life on this earth and will affect all of us at one time or another in our lifetimes.	3/29/2024 2:01 PM
31	I am not concerned	3/29/2024 1:48 PM
32	Contamination of wells from flooding. Loss of the last of the local farmers. Damage caused by Downed trees from increased rainfall and high wind events.	3/29/2024 1:29 PM
33	Downed trees hitting house, basement water	3/29/2024 1:10 PM
34	Basement flooding, loss of land, and long term power outages	3/29/2024 1:08 PM
35	Ability to grow food, maintain a a comfortable climate in my home, domestic/farm animal safety	3/29/2024 12:59 PM
36	Falling trees, water contamination, ability to grow food, domestic/farm animal safety	3/29/2024 12:59 PM
37	Damage to homes	3/29/2024 12:55 PM
38	Wells drying out	3/29/2024 12:43 PM
39	Contamination, crop damage, stormwater causing water main breaks and impact on the local economy	3/29/2024 12:42 PM
40	Groundwater levels and contamination (ability to drink and grow food)	3/29/2024 12:22 PM
41	Basement flooding	3/29/2024 11:44 AM
42	Basement flooding, well water contamination (we had to put in a whole house filtration system for our well water)	3/29/2024 10:57 AM
43	Well drying out, septic system inundated with run off water, erosion of property and driveway, basement flooding, oil usage in extreme weather.	3/29/2024 10:52 AM
44	Damage to property from downed trees, flooding	3/29/2024 10:39 AM
45	Basement flooding	3/29/2024 10:38 AM
46	basement flooding, water damage to earth causing houses to sink/tilt, road pavement cracking.	3/29/2024 10:31 AM
47	basement flooding	3/29/2024 10:14 AM
48	I anticipate flooding becoming a bigger and bigger issue because of climate change - both damage to property and to roadways.	3/29/2024 10:09 AM
49	Lack of snow pack leading to lower water levels, well drying out, excessive heat, loss of ecosystem for native plants and animals.	3/29/2024 10:08 AM

50	Growing food, food for helpful insects and ground bacteria, wildlife diseases, Street flooding and contamination in runoff coming onto our property	3/29/2024 10:04 AM
51	The air quality last year was concerning.	3/29/2024 10:00 AM
52	trees/limbs falling on my house/ property.	3/29/2024 9:58 AM
53	Leave us alone, Mother Nature will take care of its self.	3/29/2024 9:57 AM
54	Mold, Basement Flooding.	3/29/2024 9:56 AM
55	Drainage in the parking lot not taken care of.	3/29/2024 9:54 AM
56	Basement flooding	3/29/2024 9:53 AM
57	Water contamination, property damage	3/29/2024 9:47 AM

Q6 How concerned are you about the impacts that natural hazards and climate change will have on the Town of Paxton (the local infrastructure, economy, environment, and/or town residents)?

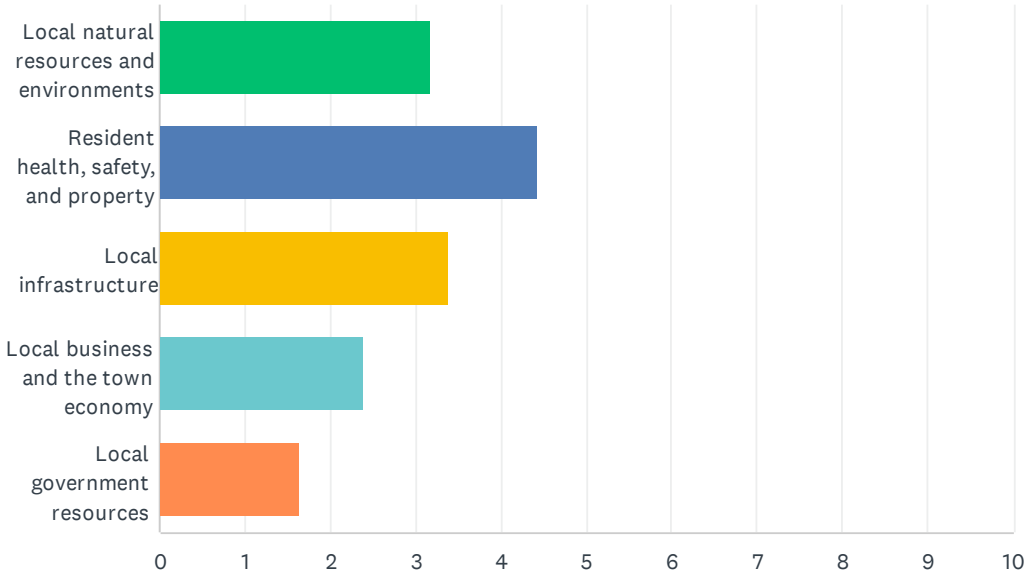
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very concerned	17.72%	14
Somewhat concerned	44.30%	35
Unsure	20.25%	16
Somewhat unconcerned	8.86%	7
Not concerned at all	8.86%	7
TOTAL		79

Q7 What community assets are you most concerned about when you consider the potential impact of natural hazards and climate change on the Town of Paxton? Rank the responses below in order from most concerned (1) to least concerned (5).

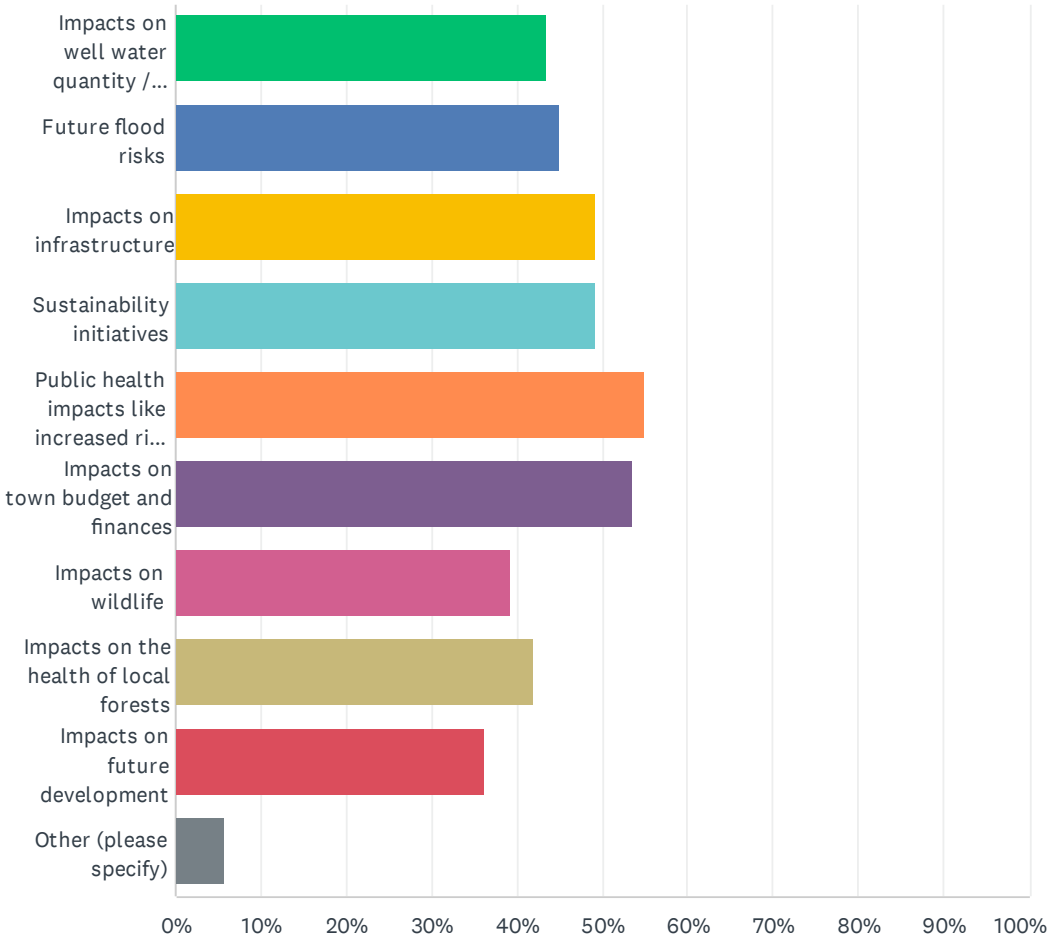
Answered: 72 Skipped: 7



	1	2	3	4	5	TOTAL	SCORE
Local natural resources and environments	18.06% 13	25.00% 18	29.17% 21	12.50% 9	15.28% 11	72	3.18
Resident health, safety, and property	59.72% 43	27.78% 20	9.72% 7	1.39% 1	1.39% 1	72	4.43
Local infrastructure	16.67% 12	30.56% 22	31.94% 23	15.28% 11	5.56% 4	72	3.38
Local business and the town economy	2.78% 2	11.11% 8	22.22% 16	48.61% 35	15.28% 11	72	2.38
Local government resources	2.78% 2	5.56% 4	6.94% 5	22.22% 16	62.50% 45	72	1.64

Q8 Which of the following aspects of natural hazards and climate change would you like to learn more about? Select all that you are interested in.

Answered: 69 Skipped: 10



ANSWER CHOICES	RESPONSES	
Impacts on well water quantity / quality	43.48%	30
Future flood risks	44.93%	31
Impacts on infrastructure	49.28%	34
Sustainability initiatives	49.28%	34
Public health impacts like increased risks of vector-borne disease (ex. Lyme disease, West Nile Virus, EEE - Eastern equine encephalitis)	55.07%	38
Impacts on town budget and finances	53.62%	37
Impacts on wildlife	39.13%	27
Impacts on the health of local forests	42.03%	29
Impacts on future development	36.23%	25
Other (please specify)	5.80%	4
Total Respondents: 69		

#	OTHER (PLEASE SPECIFY)	DATE
1	Climate change is a myth	3/30/2024 8:26 AM
2	None	3/29/2024 1:48 PM
3	I	3/29/2024 1:08 PM
4	This is not a concern	3/29/2024 10:24 AM

Q9 What actions should the Town of Paxton take to cultivate local resilience to natural hazards?Examples: increase local capacity to apply for hazard mitigation grant funding and implement hazard mitigation projects; improve storm water management; provide more education and outreach about how climate change could impact my life; encourage planting climate-resilient tree species; encourage cutting/trimming dead trees beside/hanging over roads; etc.

Answered: 41 Skipped: 38

#	RESPONSES	DATE
1	Encourage planting native species. Keep up with dead trees. No spraying.	4/22/2024 8:35 PM
2	Encourage cutting/trimming dead trees beside/hanging over roads. I think having a central market area would be a good idea. Could bring together local farmers, crafts, merchants, and maybe entertainment?	4/4/2024 9:00 AM
3	I would like to see the roof and grass bank behind the Middle school developed with a town solar field along with grid scale battery to support an emergency center in the school for the town. The battery could be cycled to reduce the town's cost for peak electricity with positive payback for the town MLP and provide electrical support for the school to be used as an emergency center. Technology and costs are now making this practical.	4/1/2024 5:32 PM
4	Increase visibility of grant funding or other resources that might be available to residents on these topics	4/1/2024 12:07 PM
5	Encourage cutting/trimming dead trees hanging over roads as well as power lines	4/1/2024 12:03 PM
6	All of above.	4/1/2024 11:29 AM
7	Hardening of town infrastructure e.g., electricity and drainage (that Paxton clay soil!)	3/31/2024 10:07 PM
8	Tree maintenance Road drainage Water management	3/31/2024 10:06 PM
9	Continue cutting/trimming dead trees, especially near power lines	3/31/2024 10:42 AM
10	The tree trimming mentioned in the prompt would be nice. Developing our business property tax base would be nice to help enhance the town budget and help reduce the tax load on residents.	3/30/2024 9:58 PM
11	Wrote all suggestions in answer to question #5 above	3/30/2024 1:42 PM
12	Storm water management, improve parks, removal dead trees, road overhang	3/30/2024 11:04 AM
13	Provide additional educational resources	3/30/2024 9:37 AM
14	Taking care of trees and finding methods to incentivize community. Financial aid in addressing the issue due to economic impact on individuals trying to maintain their properties though encountering flooding, ongoing concerns about water quality, and safety risks associated with deteriorating trees and strong winds.	3/30/2024 9:28 AM
15	Educate town residents and public works how to properly treat Japanese knot weed and prevent its spread. The town yard waste drop off site is particularly at risk and a potential source of spread. Knot weed is already surrounding the town cemetery and only getting worse	3/30/2024 8:26 AM
16	Cut down dead trees, but not at the exorbitant cost Tree Warden Robert’s did it for.	3/30/2024 8:26 AM
17	Educate and encourage residents about what is within our control today to be proactive about hazards; cutting dead trees, better water utilization	3/30/2024 7:49 AM

18	Information about how to prevent flooding	3/29/2024 10:48 PM
19	Tree and forest management is getting urgent; putting power lines underground so that we don't have the kinds of electricity-sparked fires that have occurred in other states;	3/29/2024 10:46 PM
20	Actually listen to the residents who have complained about the flooding issue for years in the above affected areas	3/29/2024 5:11 PM
21	Plant new trees, take out dead ones	3/29/2024 2:22 PM
22	Trimming trees, alternate power sources (ex solar, wind)	3/29/2024 2:18 PM
23	Cleaning up roads Water trenches (culverts)	3/29/2024 2:10 PM
24	Increased hazard mitigation grant applications, trimming dead trees, long-term resilience strategies	3/29/2024 2:06 PM
25	Provided as much information as possible to its residents	3/29/2024 1:45 PM
26	Better staffing of essential services, dpw, fire, and police departments.	3/29/2024 1:08 PM
27	Trimming damaged trees, encourage planting climate resistant trees, improve watersheds,	3/29/2024 12:59 PM
28	Encourage planting climate resistant tree species, cutting and trimming dead and damaged trees near roads and hanging over roads	3/29/2024 12:59 PM
29	all of the above. Also this information should be available and accessible to all on the town website	3/29/2024 12:42 PM
30	Ensuring eligibility for state and federal aid when needs arise.	3/29/2024 12:22 PM
31	Increase money to towns to take care of the infrastructure	3/29/2024 11:44 AM
32	Cutting dead trees, possible moving power lines underground, increase drainage abilities in the roads, road maintenance, town wide leaf cleanup and sweeping of roads, to keep organic matter dams from building up.	3/29/2024 10:52 AM
33	Education on climate resilient trees, trimming where necessary, inspecting drains regularly	3/29/2024 10:39 AM
34	funding to proactively identify issues. cutting/trimming dead trees	3/29/2024 10:31 AM
35	Improve storm water management, increase reserve water supply, inprove town service response to hazards ie.. police, fire, highway dept	3/29/2024 10:16 AM
36	increase capacity to apply for grant funding, proactively cutting down trees that might pose a hazard in storms, building up local infrastructure such as water guards/drainage around major roads, etc.	3/29/2024 10:09 AM
37	PLD already does a god job of trimming branches back from power lines. I noticed the town abandoned their project of removing sick/dying trees. That should get funded.	3/29/2024 10:09 AM
38	Encourage cutting /trimming dead trees, water management, free local utilities (pine power like Princeton or more solar power)	3/29/2024 10:00 AM
39	The town needs to apply for more grants; work on cutting/trimming more dead trees/limbs hanging over roads and power lines - especially to people's houses.	3/29/2024 9:58 AM
40	Continue high quality road management and prevention against tree damage that could cause road or electrical issues (safety).	3/29/2024 9:51 AM
41	Increased capability and mitigation by removing dead / dying trees, overhanging limbs and adding culverts on Marshall St properties	3/29/2024 9:47 AM

APPENDIX C:

Meetings

Appendix C helps meet the following FEMA local mitigation plan requirements:

- *A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?" (Requirement 44 CFR § 201.6(c)(1))*
- *A2. "Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process?" (Requirement 44 CFR § 201.6(b)(2)); and*
- *A3. "Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval?" (Requirement 44 CFR § 201.6(b)(1))*

Paxton Hazard Mitigation Plan Update
Local Planning Team Meeting #1

Date/Time: **Wednesday, August 25, 2021 at 10:00 am**
Location: **Public Safety Complex, 576 Pleasant St., Paxton, MA**

AGENDA

I. Introductions

II. Plan Background

- Review of DLTA Proposal
- Hazard mitigation basics
- Existing 2016 HMP
- Roles and responsibilities

III. Project Phases & Preliminary Schedule

Phase	Completion (est.)
Assembly of local planning team, kickoff	August 2021
Information gathering	April 2017
▪ Natural hazards	
▪ Critical infrastructure and facilities	
Mitigation strategy development	
Stakeholder and public involvement	Spring/Summer 2017
Plan narrative development	
Plan submission (initial)	Sept./Oct. 2017
Plan adoption	Nov./Dec. 2017

IV. Local Planning Team Meetings/Council Presentations

- Meeting #1 (kickoff)
- Meeting #2 (hazards and critical infrastructure/facilities)
- Meeting #3 (mitigation strategies)
- Meeting#4 (next steps)

V. Next Meeting

- Date/location
- What to prepare

Paxton Hazard Mitigation Plan Update
Continuation Meeting

Date/Time: **February 21st , 2024 12:00pm – 1:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. **Welcome/Sign-in**

II. **Recap of the Current Status of the HMP**

III. **Discussion of Remaining Tasks**
   a. Remaining Tasks
      i. Schedule Full Team Meeting
      ii. Review new FEMA Guidance for Hazard Mitigation Planning
      iii. Public Engagement – Survey, reaching out to community lifelines, ect.
      iv. Review Mitigation Strategies from previous plan
      v. Update Mitigation strategies
      vi. Board of Selectman Presentations
   b. Timeline
      i. Combo Critical Infrastructure and Natural Hazards meeting
         1. to include any items that may have happened since initial draft of the new plan,
         2. FEMA Guidance review for the planning team
      ii. HMP Strategies Meeting (following public outreach completion ideally)

IV. **Draft Hazard Mitigation Plan**
   a. Sections 1-6 review

V. **Next Steps/Closing**
   a. Schedule Full Team Meeting
   b. Survey

Paxton Hazard Mitigation Plan Update
Continuation Meeting

Date/Time: **February 21st , 2024 12:00pm – 1:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. **Welcome/Sign-in**

II. **Recap of the Current Status of the HMP**

III. **Discussion of Remaining Tasks**
   a. Remaining Tasks
      i. Schedule Full Team Meeting
      ii. Review new FEMA Guidance for Hazard Mitigation Planning
      iii. Public Engagement – Survey, reaching out to community lifelines, ect.
      iv. Review Mitigation Strategies from previous plan
      v. Update Mitigation strategies
      vi. Board of Selectman Presentations
   b. Timeline
      i. Interim Updates and Mitigation Strategies review meeting
         1. to include any items that may have happened since initial draft of the new plan,
         2. FEMA Guidance review for the planning team
         3. Review the Current HMP Strategies
      ii. HMP Strategies Update Meeting
      iii. Draft Plan Presentation to Select Board

IV. **Draft Hazard Mitigation Plan**
   a. Sections 1-6 review

V. **Next Steps/Closing**
   a. Schedule Full Team Meeting
   b. Survey

PAXTON HAZARD MITIGATION PLAN 2021 UPDATE

PROJECT SUMMARY AND RECOMMENDATIONS

December 31, 2021

Carol Riches, Town Administrator, Town of Paxton
Local Hazard Mitigation Team
Dani Marini, Associate Planner, CMRPC

Introduction

The Paxton Hazard Mitigation Plan (HMP) update project was funded by a grant through the District Local Technical Assistance (DLTA) program. In summer 2021, the Town of Paxton contacted the Central Massachusetts Regional Planning Commission (CMRPC) to solicit help in funding and preparing a HMP update. CMRPC assisted the Town in applying for the third round of DLTA funding for a partial HMP update. This update would include a review of natural hazards and risks the Town faces or may face, as well as an inventory of critical infrastructure and assets within town. In addition, CMRPC and the Team would identify potential funding sources for remaining tasks of the plan.

Summary of Activities

On August 25, 2021, CMRPC staff and the Local Hazard Mitigation Team met to kickoff the Hazard Mitigation Plan update. At this meeting, the Team discussed the DLTA proposal and developed a timeline for the project.

At a second meeting held on October 19, 2021, CMRPC staff and the Team met to review and assess natural hazards that the Town has been or might be impacted by. Of the natural hazards listed in the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, the Team identified the following hazards as those that impact the Town of Paxton:

- Flooding
- Severe Snowstorms, Ice Storms, and Nor'easters
- Hurricanes
- Severe Thunderstorms, Wind, and Tornadoes
- Wildfires and Brush Fires
- Earthquakes
- Dam Failure
- Drought
- Extreme Temperatures

The Team also discussed other potential hazards, such as invasive species, cyber security, and terrorism. In assessing each of these hazards, the Team identified where these hazards have occurred in Town before, discussed historically significant storms that have occurred in Town, and determined future impacts based regional on climate projections.

During a third meeting held on November 30, 2021, CMRPC staff and the Team developed an inventory of critical infrastructure, facilities, and other assets in Town. Critical facilities were broken up into four different categories:

1. Category 1 - Emergency Response Facilities
2. Non-Emergency Response Facilities
3. Dams
4. Facilities/Populations to Protect

For each category, the Team identified important infrastructure, facilities, or groups, the location of those assets, and described any known risks or hazards that have impacted those assets in the past.

The Team and CMRPC staff met a final time on December 14, 2021, to review the progress of this HMP update, to distribute a draft of sections 1-6 of the HMP update, and to discuss potential funding sources that the Town should apply for to complete any remaining tasks of the HMP. Following that meeting, the Team reviewed the draft HMP and sent corrections and edits to CMRPC staff.

Next Steps

This DLTA project only funded a partial update of the Town's Hazard Mitigation Plan. CMRPC advises the Town to seek additional funding to complete any remaining tasks needed for the HMP. Remaining tasks for the HMP include:

I. **Review Mitigation** - The Local Hazard Mitigation Team will need to review and update the mitigation strategies listed in the previous HMP. The Team should identify whether each task has been completed, has not occurred, or requires an ongoing effort.

II. **Public Engagement** - The Local Hazard Mitigation Team will need to provide public engagement opportunities to allow the residents of Paxton a chance to review and participate in this planning process. Recommended engagement opportunities include a Community Survey and a Community Workshop to discuss existing hazard concerns and identify new project ideas.

III. **Updated Mitigation Strategy Development** - Based on feedback gathered during the public engagement opportunities, the Local Hazard Mitigation Team will assemble a new mitigation strategy. For each action, the Team should identify which hazards will be addressed, who should be involved, potential funding sources, priority, impact, estimated cost, and timeline.

IV. **Board of Selectmen Presentations** - Once the draft plan is complete, the Local Hazard Mitigation Team will need to present the final plan to the Board of Selectmen for their review and approval. The Team will need to make a second presentation to the BOS once comments from MEMA/FEMA

have been received and corrected. At this second presentation, the Team will be asking the BOS to formally adopt the plan.

V. **MEMA/FEMA Review and Adoption** - Following the initial approval of the plan by the BOS, the Team will submit the draft HMP to MEMA/FEMA for their review. MEMA will initially review the plan and then pass it along to FEMA for their review. These agencies will return the plan back to the Town with a set of comments, questions, and edits. Once the Team has addressed all comments and received approval from the BOS, the Team will send the final HMP back to MEMA/FEMA for their formal approval and adoption of the plan.

Depending on when funding is received, the amount of funding given, and the review rate of MEMA and FEMA, these remaining tasks could take between 9 to 15 months to complete. CMRPC staff and the Local Hazard Mitigation Team identified potential funding sources that the Town could pursue to complete the HMP update. Those funding sources include:

- **Building Resilient Infrastructure and Communities (BRIC) Grant Program** - This grant program is funded by FEMA and administered through a partnership with MEMA. Eligible projects should aim to support proactive investment in community resilience and risk reduction from natural hazards. The next BRIC grant round will open in Fall 2022, and if approved, funding should be received in Winter 2024.
- **Local Planning Assistance (LPA) Hours** - LPA hours are provided by CMRPC to each municipality within the region. Paxton has a total of 12 hours that can be used for assistance with planning related activities. These hours can be utilized at any time with the Planning Board's approval.
- **District Local Technical Assistance Program** - This program is funded through the Baker-Polito Administration and the Massachusetts General Assembly. Through this program, CMRPC receives funding to support communities as they plan for housing or growth. Funding can also be provided for activities that support regional efficiency. Communities will likely be able to apply for funding through the DLTA program in late January.
- **Municipal Vulnerability Preparedness (MVP) Action Grant Program** - The MVP Action Grant program is administered by the Executive Office of Energy and Environmental Affairs (EEA). This program aids communities in advancing priority climate adaptation actions to address climate change impacts resulting from extreme weather, sea level rise, inland and coastal flooding, severe heat, and other climate impacts. The next round of MVP Action Grant funding is expected to open in spring 2022, though an Expression of Interest (EOI) round is open now, allowing municipalities to vet their project ideas with EEA staff.

Paxton Hazard Mitigation Plan

In October 2021, the Town of Paxton started the planning process to update its Hazard Mitigation Plan (HMP). An updated HMP will help the town identify strategies to reduce its vulnerability to hazards like flooding, winter storms, and drought. Climate change may shift the extent and severity of certain natural hazards, including those that already impact Paxton.

By participating in this survey, you will help the Town of Paxton understand the current and future natural hazards that residents are most concerned about. Survey responses will be accepted until _____, and may be extended as needed.

1. Check all that apply.

- [ ] I live in Paxton.
- [ ] I work in Paxton.
- [ ] I frequently visit Paxton.

2. Has your family or property, in Paxton, been impacted by any of the following natural hazards? Select all that apply:

- [ ] I have not been impacted by natural hazards in Paxton
- [ ] Winter Storms / Ice
- [ ] Thunderstorms, Microbursts, and/or Extreme Wind
- [ ] Tornadoes
- [ ] Flooding
- [ ] Extreme Heat / Extreme Cold
- [ ] Drought
- [ ] Wildfire / Brushfire
- [ ] Hurricanes
- [ ] Earthquakes
- [ ] Invasive Species
- [ ] Other (please specify)

3. Where have you observed natural hazard impacts in Paxton, and what were those impacts?

Examples: flooding on specific roads, drought/effects on water supply, trees down on roads, beaver dams affecting property and septic systems due to flooding from dams.

4. How much do you think the impacts of natural hazards and climate change will threaten your personal health, safety, or property?

- ◯ I think natural hazards and climate change will negatively impact my life.
- ◯ I'm not sure how natural hazards and climate change will impact my life.
- ◯ I don't think that I personally will be impacted by natural hazards and climate change.

5. If you are concerned about impacts to you or your community from natural hazards and/or climate change, what impacts are you most concerned about?

Examples: basement flooding, wells drying out / contamination of wells, ability to grow food, roads rendered impassable by flooding, extended power outages or loss of internet connectivity

6. How concerned are you about the impacts that natural hazards and climate change will have on the Town of Paxton (the local infrastructure, economy, environment, and/or town residents)?

- ◯ Very concerned
- ◯ Somewhat concerned
- ◯ Unsure
- ◯ Somewhat unconcerned
- ◯ Not concerned at all

7. What community assets are you most concerned about when you consider the potential impact of natural hazards and climate change on the Town of Paxton? Rank the responses below in order from most concerned (1) to least concerned (5).

- ≣ ☐ Local natural resources and public lands
- ≣ ☐ Resident health, safety, and property
- ≣ ☐ Local infrastructure
- ≣ ☐ Local business and the town economy
- ≣ ☐ Local government resources

8. Which of the following aspects of natural hazards and climate change would you like to learn more about? Select all that you are interested in.

- [ ] Impacts on water quantity / quality
- [ ] Future flood risks
- [ ] Impacts on infrastructure
- [ ] Sustainability initiatives
- [ ] Public health impacts like increased risks of vector-borne disease (ex. Lyme disease, West Nile Virus, EEE - Eastern equine encephalitis)
- [ ] Impacts on town budget and finances
- [ ] Impacts on wildlife
- [ ] Impacts on the health of local forests and public lands
- [ ] Impacts on future development
- [ ] Incursion by Invasive Species
- [ ] Other (please specify)

9. What actions should the Town of Paxton take to cultivate local resilience to natural hazards?

Examples: increase local capacity to apply for hazard mitigation grant funding and implement hazard mitigation projects; improve storm water management; provide more education and outreach about how climate change could impact my life; encourage planting climate-resilient tree species; encourage cutting/trimming dead trees beside/hanging over roads; etc.

10. If you would like to stay informed about other opportunities to participate in Boylston's Hazard Mitigation planning process, please enter your E-mail address below.

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: March 21st, 2024 10:00AM – 12:30PM
Location: Public Safety Complex, 576 Pleasant St, Paxton, MA 01612

AGENDA

I. **Introductions**

II. **Meeting #1 Recap**

III. **Community Lifelines**

IV. **Reference Documents**

V. **Natural Hazards Review**

a. Flooding
b. Severe Snowstorms, Ice Storms, and Nor'easters
c. Hurricanes
d. Severe Thunderstorms, Wind, and Tornadoes
e. Wildfires and Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Landslides
k. Invasive Species
l. Other Hazards

VI. Critical Infrastructure/Facilities and Vulnerable Populations Review

Category 1 – Emergency Response Facilities

Category 2 – Non-Emergency Response Facilities

Category 3 – Dams

Category 4 – Populations and Facilities to Protect

VII. Survey Review and Update

VIII. Next Meeting – Existing Protection Measures Review, Public Forum and Community Survey Planning

- Date/location
- What to prepare

Add more for Public school to Pulaski and Grove at 10

Thursday April 25th

Tentative may 2nd

Get started with community like last use

Hazards Since (or Soon Before) Last Plan Update in 2018

Flooding

- 8/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 9/30/2015 – Flood: A cold front moved across southern New England bringing heavy rain, strong winds, and periods of coastal flooding along the south coast.
- 10/30/17 – Flood: The remnants of Tropical Storm Phillipe merged with a mid-latitude system approaching the U.S. East Coast. Tropical moisture flowing north ahead of the cold front contributed to heavy downpours with one to five inches of rain reported.
- 11/3/2018 – Flood: Heavy rain occurred in the early morning hours, with generally 1.50 to 2.50 inches in eastern sections of southern New England and up to 3.66 inches in the slopes of the Berkshires.
- 7/6/19 – Flood: A cold front advanced into a very moist, almost tropical air mass in place across southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding.
- 7/9/21 – Flood: Tropical Storm Elsa made landfall in Rhode Island on Friday morning before moving into the Gulf of Maine. It interacted with a stalled frontal boundary and brought widespread heavy rainfall of 2 to 3.5 inches.
- 11/12/21 – Flood: Strong southerly wind flow out ahead of an advancing cold front produced strong to damaging wind gusts and some heavy rain that caused some street and basement flooding.
- 07/14/2023 – Flood: A cluster of thunderstorms moved northward into Connecticut during the morning ahead of a short-wave trough southwest of southern New England. The showers and thunderstorms spread northeastward into the early afternoon. One storm produced a lightning strike that started a house fire in northeast Massachusetts. Several roads were flooded in Worcester County. In Holden, Main St and several side streets were flooded in spots up to one ft.
- 09/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Leominster, flash flooding caused widespread damage to residences and municipal properties.

Sources:
Hopedale 2023 HMP
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Severe Snowstorms / Ice Storms / Nor'easters

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The Storm events listed below occurred throughout the Northeast region.

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

Rank	Start	End	NESIS	Category	Description	Map
2	2022-12-21	2022-12-26	2.66	2	Significant	December 21-26, 2022Dec 21-26, 2022
4	2022-12-13	2022-12-20	8.52	4	Crippling	December 13-20, 2022Dec 13-20, 2022
67	2022-01-28	2022-01-30	1.73	1	Notable	January 28-30, 2022Jan 28-30, 2022
72	2022-01-04	2022-01-07	1.60	1	Notable	January 4-7, 2022Jan 4-7, 2022
88	2022-01-01	2022-01-03	1.06	1	Notable	January 1-3, 2022Jan 1-3, 2022
25	2021-01-30	2021-02-03	4.93	3	Major	January 30 - February 3, 2021Jan 30 - Feb 3, 2021
46	2020-12-14	2020-12-18	3.21	2	Significant	December 14-18, 2020Dec 14-18, 2020

83	2019-03-03	2019-03-04	1.29	1	Notable	March 3-4, 2019Mar 3-4, 2019

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

Previous Instances of Declared Winter Storm Disasters in Massachussetts

- Severe Winter Storm, Snowstorm, and Flooding /FEMA-4214-DR-MA, April 2015
- Severe Winter Storm and Snowstorm/FEMA-4379-DR, March 2018

Sources:

2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate-adaptation-plan-appendix-b/download.

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

https://www.ncei.noaa.gov/monitoring-content/snow-and-ice/rsi/docs/kocin-and-uccellini-2004.pdf

Hurricanes High winds with tree issues (result)

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events.

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Andrea	2013	Extratropical Storm
Florence	2018	Extratropical Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Sources:
NOAA Historical Hurricane Tracks Map, https://coast.noaa.gov/hurricanes/#map=6.06/42.065/-71.688&search=eyJzZWFyY2hTdHJpbmciOiJNYXNzYWNodXNldHRzLCBVU0EiLCJzZWFyY2hUeXBlIjoiZ2VvY29kZWQiLCJvc21JRCI6IjYxMzE1IiwiY2F0ZWdvcmllcyI6WyJlNSIsIkg0IiwiSDMiLCJlMiIsIkgxIiwiVFMiLCJURCIsIkVUIl0sInllYXJzIjpbXSwibW9udGhzIjpbXSwiZW5zbyI6W10sInByZXNzdXJlIjp7InJhbmdlIjpbMCwxMDMwXSwiaW5jbHVkZVVua25vd25QcmVzc3VyZSI6dHJ1ZX0sImJ1ZmZlciI6NjAsImJ1ZmZlciUaXQiOlsiTmF1dGljYWwgTWlsZXMiXSwic29ydFNlbGVjdGlvbiI6eyJ2YWx1ZSI6InllYXJzX25ld2VzdCIsImxhYmVsIjoiWWVhciAoTmV3ZXN0KSJ9LCJhcHBseVRvQU9JIjp0cnVlLCJpc1N0b3JtTGFiZWxzVmlzaWJsZSI6dHJ1ZX0=.
Paxton Draft HMP Page 21

Tornadoes, Thunderstorms, and High Wind Events Butler Storm is on the up here Paxton

- In 1953, an F4 tornado struck the City of Worcester, directly southeast of Paxton. The event resulted in at least

Lightning strike in Worcester Ruthless Historically Pioneer Valley 79 Severe thunderstorm & tornados in Pioneer Valley

90 fatalities, and more than 1,200 injured. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton, south-southeast of Worcester, 18 miles southeast of Paxton.

- In 1970, a category F3 tornado traveled from the Towns of Hardwick to Littleton, missing Paxton only by a few miles.
- In 1981 an F3 tornado struck, resulting in just 3 injuries and very little reported property damage.
- July 19, 2007 Tornado (New Braintree), EF-0, light damage, no fatalities, no injuries
- August 31, 2014 Tornado (Worcester), EF-0, light damage, no fatalities, no injuries
- July 26, 2018 Tornadoes (East Douglas, Uxbridge, Whitinsville and Upton), both EF-1, moderate damage, no fatalities, no injuries
- October 23, 2018 Tornado (Hardwick), EF-1, moderate damage, no fatalities, no injuries
- August 19, 2021 Tornado (Webster), EF-0, light damage, no fatalities, no injuries
- August 23, 2021 Tornado (Marlborough, Southborough), light damage, EF-0, no fatalities, no Injuries

Source: ArcGIS Tornado Tracks Data, data from Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,
https://www.arcgis.com/apps/View/index.html?appid=01672085b139432e8fe1296a743f67d7.
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS
Paxton 2021 Draft HMP Plan

Wildfires / Bush Fires

Department	# of Incidents	# of Acres Burned (Fire Module)	# of Acres Burned (Wildland Module)	Total Acres Burned	Fire Service Injuries	Civilian Injuries	Fire Service Deaths	Civilian Deaths	Dollar Loss
PAXTON	12		1.7	1.7	0	0	0	0	$ -

Department	Total # of Brush Fires	2017	2018	2019	2020	2021	2022	2023
PAXTON	12	3	2		2		4	1

Source: Massachusetts Fire Incident Reporting System Natural Vegetation Fires Data, 2017-2023

Earthquakes

Events listed by Weston Observatory in Boston College were reviewed for all towns in Massachusetts. from 2015 to the present. Listed earthquakes above magnitude 2.0 include:

- 6/1/16 – 51 km ENE of Rockport, 2.4/2.7 [Mn*/Mc**]
- 9/6/17 – 2 km ESE of Athol, 1.5/2.0
- 8/18/18 – 83 km E of Nantucket, 2.5/2.9
- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1
- 12/23/18 – 4 km SW of Gardner, 2.1/2.3
- 1/28/19 – 4 km WSW of Gardner, 1.0/2.0
- 4/27/19 – 24 km NE of Rockport, 1.8/2.1
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 11/2/19 – 230 km ENE of Orleans, 2.2/2.9
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 7/24/20 – 20 km ESE of Woods Hole, 1.8/2.6
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
- 7/25/21 – 5 km W of Peabody, 1.4/2.5
- 1/1/22 – 13 km N of Rockport, 2.3/3.0
- 3/4/22 – 5 km WSW of Orange, 2.2/2.7
- 3/19/22 – 36 km ENE of Rockport, 1.4/2.2
- 9/24/22 – 6 km S of Litleton, 1.9/2.5
- 11/10/22 – 12 km NW of Nantucket, 2.6/3

  *Mn is the Nutli Magnitude (see below)

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

majority of houses stock pre 1920

where distribution system concern

sprinklers in the seconds

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

Source: Weston Observatory at Boston College New England Seismic Network (NESN) Recent Earthquakes Data, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl

Dam Failure

According to the Massachusetts Office of Dam Safety, there are according to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton.

National ID	Dam Name	Owner	Hazard Potential	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High	
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.
MA0196	Small Pond Dam	Private	N/A	
MA0196	Kauppila Pond Dam	Private	N/A	
MA0196	Arrowhead Pond Dam	Private	N/A	
MA0196	Cournoyer's Dam	Private	N/A	
MA0196	Rasvall Pond Dam	Private	N/A	
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.
MA0286	Turkey Hill Pond Dam	Private	N/A	

Inundation areas for these dams cover less than 10% of the town, or a "small" portion of its area.

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any dam failures having recently occurred in the CMRPC Region.

Sources:

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

MassGIS Data: Dams

Paxton Draft HMP 2021

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences: https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Drought

Year	Maximum Severity
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023 (to August)	D1 conditions in 0.2% of the state

Source: US Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln, https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

Extreme Temperatures

- 02/15/2015: Low pressure off the Delmarva peninsula intensified rapidly as it moved northeastward. Its path just southeast of Nantucket brought heavy snow to all of southern New England and blizzard conditions and coastal flooding to coastal areas. Near blizzard conditions occurred across much of eastern Massachusetts. The large amount of snow, combined with wintry, frigid temperatures resulted in snow piling up on roofs and numerous (250) roof collapses were reported to emergency management and to the National Weather Service in the days after this snowstorm. Fortunately no injuries to humans were reported. However, a large amount of snow fell off a Boston-area ice rink roof, burying a man and knocking down four others. No one was seriously hurt, but two of the people were taken to the hospital for evaluation. In barn collapses in Stoughton and Andover, a total of 40 horses were trapped and rescued. In another barn collapse in Westford, two horses died. In another who would have guessed scenario, a falling icicle ruptured a gas line causing an explosion at the Duxbury House, an Alzheimer's care facility in Duxbury. No one was injured. There were several indirect fatalities related to the snow. These include: a 57 year old man who died shoveling snow, a 57 year old woman hit by a snow plow, and a 60 year old man hit by a snow plow. The Automated Surface Observing System at Fitchburg Municipal Airport (KFIT) recorded wind chills as low as 31 below zero.
- 02/20/2015: High pressure to the west and low pressure to the east funneled winds through southern New England overnight. Coupled with

strong cold advection into the region, this resulted in wind chills well below zero overnight. The Automated Surface Observing System at Fitchburg Municipal Airport recorded wind chills below 25 degrees below zero for six hours.

- 02/13/2016: Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 37 below zero were reported at Fitchburg Airport.

According to the SHMCAP43 warm weather events have occurred across Massachusetts between 1995 and 2018. **The NOAA Storm Events database does not have Record Warmth/Heat or Excessive Heat events listed in the last decade for Northern Worcester County.** However, it should be noted that, in 2012, Massachusetts temperatures broke 27 heat records. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the Heat Index reached 100°F (NOAA Storm Events Database)

Source: Hopedale 2023 HMP

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

- 1/7/2015 - Extreme Cold/Wind Chill
- 1/30- 2/2/2015 - Cold/Wind Chill
- 2/5/2015 - Cold/Wind Chill
- 2/13/2015 - Cold/Wind Chill
- 2/15- 2/16/2015 - Extreme Cold/Wind Chill
- 2/19-2/20/2015 - Extreme Cold/Wind Chill
- 2/23/2015 - Cold/Wind Chill
- 2/13-2/14/16 - Extreme Cold/Wind Chill
- 12/15/2016 - Cold/Wind Chill
- 3/11/2017 - Cold/Wind Chill

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Landslides

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be caused by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas.

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any landslides/mudslides having recently occurred in Worcester County.

Source:

Paxton Daft HMP 2021

Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard- mitigation-and-climate-adaptation-plan-appendix-b/download.

Invasive Species

According to the MDAR Invasive Pest Dashboard Paxton hosts at least 1 invasive species: Emerald Ash Borer and Mile-A-Minute Vine. Beech Leaf Disease was also confirmed to have been found in Paxton in 2021 and Holden borders communities with Spotted Lanternfly. According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir.

Additionally, the Mitigation Team listed the Asian Longhorn Beetle, Pine Blight, and Emerald Ash Borer as invasive species/pests damaging and killing off trees.

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in 2020. Whether stocked intentionally or not, Black Crappie prey on threatened and endangered juvenile salmon that spawn in rivers of the Northwest United States and may further contribute to salmon decline through habitat alteration, though the extent of those impacts are unknown.

Source:

MDAR Invasive Pest Dashboard (arcgis.com)

Forest Health Atlas (uvm.edu)

Microsoft Word - AIS_Plan_2010.doc (mass.gov)

Nonindigenous Aquatic Species (usgs.gov)

Black Crappie (Pomoxis nigromaculatus) - Species Profile (usgs.gov)

Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation and Climate Adaptation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, nor'easters, and tsunamis. It was determined that these hazards are either irrelevant to Paxton due to the town's location, or in the case of nor'easters, that the hazard is already included within another hazard described above (severe winter storms).

The Hazard Mitigation Team also mentioned concerns regarding cyber security breaches, especially with the Town's electric and water operations. There is a risk that a terrorist attack could contaminate the water supply or damage transmission lines.

Sources:
Paxton HMP Draft 2021

Transporting issues, Putnam County access
Tanker, Oil tank Hazmat, small spills, more Fuel
Going into town
122, 31, On some seasonal streets (material, removal, Gravel)
- looking at subdivision bylaws,

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

I. Emergency Response Facilities needed in the event of a disaster
II. Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Paxton
III. Dams
IV. Facilities/Populations that the Team wishes to protect in the event of a disaster

CATEGORY 1, EMERGENCY RESPONSE FACILITIES

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations(/Communications) Center/Police Station/Fire Station**

EOC/ECC/Paxton Police and Fire Department	576 Pleasant Street
EOC/Paxton Police Department Dispatch	Holden, MA

The Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage. The EOC is also not fully equipped and is in need of more equipment, technology, and computers.

2. **Communications/Power Facilities**

Paxton Town Hall	697 Pleasant Street
Communications/Radio/Cell & Microwave Tower	Asnebumskit Road
Communications/Radio/Cell & Microwave Tower	Maple Street
Communications/Radio/Cell & Microwave Tower	Pleasant Street
Wentworth Power Station	Marshall Street
Fiber Connection from Holden St, Pleasant St Southbound, and Richards Ave	Route 31, Grove St, Maple

The Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage. The Communication Tower on Asnebumskit Road is utilized for the water system. Trees do cause issues for the communication towers, and the tower on Maple Street has experienced lightning strikes.

3. **Department of Public Works/Highway Department**

DPW/Highway	107 Holden Road

The DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.

4. **Municipal Light Department**

Light Department Headquarters	578 Pleasant Street

The Municipal Light Department also experiences snow load on the roof.

5. **Water Department**

Water Department	107 Holden Road
Maple Street Water Tank	Maple Street

The Maple Street Water Tank site stores supplies needed for water main repairs.

6. **Utilities**

Distribution Lines	(Runs SE-NW through Town)
Asnebumskit Hill Radio Towers	

7. **Primary Evacuation Routes**

Route 122
Route 56
Route 31

These evacuation routes are all two-lane roads, making evacuation in times of crisis more difficult and potentially congested. Additionally, there is a high water table along Route 31 near Spencer, MA.

8. **Shelters**

Paxton Center School - dispensing site	19 West Street
Anna Maria College - primary site	50 Sunset Lane
Congregational Church	1 Church Street
St. Columba Church	10 Richards Avenue

CATEGORY 2, NON-EMERGENCY RESPONSE FACILITIES

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton.

1. **Water Supply**

Maple Street Water Tank	Maple Street
Asnebumskit Pond	
Kettle Brook Reservoir #3	
Kettle Brook Reservoir #4	
Pine Hill Reservoir	
Asnebumskit Road Water Tank	

Pump station at City line

The Town of Paxton purchases 100% of their municipal water from the City of Worcester. There is concern that falling trees could damage these pre-fab buildings. - Small generator, not enough for both pump stations

2. **Town Facilities**

Town Hall	697 Pleasant Street

Of an appropriate size

The Paxton Town Hall has a backup generator; however, it is small and can likely only heat the building.

CATEGORY 3, DAMS

The third category is a listing of dams in Paxton.

National ID	Dam Name	Owner Type	Hazard Potential	Notes
MA00676	Eames Mill Pond Dam	Public	Significant	Had work done recently
MA00677	Kettle Brook Reservoir #4 Dam	Public	High	
MA00678	Streeter Pond Dam	Private	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Significant	Considered a High Hazard if let go
MA01962	Small Pond Dam	Private	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	
MA01965	Cournoyer's Dam	Private	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	Had work done recently
MA02540	Eames Mill Pond Dam #2	Public	N/A	Had work done recently
MA02375	Illig's Pond Dam	Public	N/A	Have had issues with beaver activity and cresting
MA02865	Turkey Hill Pond Dam	Private	N/A	Potentially a High Hazard dam

For additional information on dams and the dam failure hazard in Paxton, also see Section 4.

CATEGORY 4, FACILITIES/POPULATIONS TO PROTECT

1. Special Needs Population/Elderly Housing/Assisted Living

John Bauer Senior Center	17 West Street
Group Home	420 Pleasant Street
Group Home	54 Streeter Road
Group Home	270 Pleasant Street
Group Home	2 Pine Street
Group Home	157 Suomi Street
Group Home	132 Marshall Street
Group Home	60 Marshall Street
Group Home	33 Camp Street
50+ Community	260 Grove Street
Devereaux Group Home	461 Pleasant Street

These facilities experience issues with flooding as well as snow load on the roof.

2. Public Buildings/Areas

John Bauer Senior Center	17 West Street
Town Hall	697 Pleasant Street
Richards Memorial Library	44 Richards Avenue
Ten West Market	10 West Street

These facilities experience issues with flooding as well as snow load on the roof. Ten West Market has a generator~~, but it is not an adequate size to run all of the refrigerators.~~

3. Schools/Daycare

(Please note: The EMD has a list of current daycare facilities but these can change locations and addresses frequently, so this list should be revisited periodically.)

Paxton Center School	19 West Street
Anna Maria College	50 Sunset Lane
Creative Learning Center	170 Richards Avenue
Johansson, Leslie	22 Red Oak Street
Stepping Stones	66 Maple Street
Congregational Church	1 Church Street
Colorful Connections	140 West Street
Turn Back Time	250 Marshall Street

4. Historic Buildings/Sites

According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in November 2021, there are 4 Areas, 98 Buildings, 2 Burial Grounds, 19 Objects, and 5

Structures listed for Paxton. The Hazard Mitigation Team noted that the Town Hall is a historic building as well as the Records building.

5. Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD), the following table shows the largest employers in Paxton:

Largest Employers in Paxton - July 2016		
Company	**Location**	**No. of Employees**
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

6. Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton. While there are no EJ populations within Paxton, future considerations should be given to these populations. The Hazard Mitigation Team noted that approximately 8.7% of the population is disabled, and approximately 15.2% of the population speaks a language other than English in the home. It was also noted that many of the residents at the group and assisted living homes do not have vehicles. In times of crisis, it could be more difficult to evacuate these properties.

Fix this

Name	pdm_type	pdm_id	In_Hazard
Police Department	CI	1	N
Fire Department	CI	2	N
Pedi-Q Urgent Care	CI	12	Y
Carewell Urgent Care	CI	13	Y
Northborough Senior Center- WasteWater Pump Station present	CI	14	Y
PD & FD Receiver, FD repeater	CI	16	N
Communications Voter - Radio, Ball St	CI	18	Y
Communication - Voter, 300 West Main St	CI	22	N
Communications - Cell Site, 211 Main St, Police Station	CI	24	N
Communication - Roof Top Com Tower, on xtra storage	CI	25	N
Cell Tower - 386 West Main St, Fox Meadow Crossing	CI	26	N
Cable Access TV	CI	27	N
Verizon	CI	28	N
Communications - Cell Tower, Southwest Cutoff (Crown Castle)	CI	29	Y
Town Hall (Wastewater Pumping Station & Generator on site)	CI	30	N
Edmunds Hill 1MG Water Storage Tank	CI	32	Y
Northborough DPW Water Barn	CI	33	N
Northborough DPW Barn	CI	34	N
Hudson St. Public Water Supply, Former MWRA Connection	CI	35	N
Well - Public Brigham St. (Water/Sewer Department Building)	CI	36	N
Well - Public Crawford St.	CI	37	N
Well - Public Howard St.	CI	38	Y
Well - Public Lyman St.	CI	39	N
Cistern - Moore Ln	CI	40	N
Cistern - Old Colonial Rd	CI	42	N
Draft Site - Colburn St	CI	44	N
Draft Site - Green St	CI	45	Y
Draft Site - Hillside Rd	CI	46	N
Draft Site - Howard St	CI	47	Y
Draft Site - Howard St (2)	CI	48	N
Draft Site - Howe Lane	CI	49	N
Draft Site - Maynard St	CI	50	Y
Draft Site - Newton St	CI	51	N
Draft Site - Tomblin Hill Rd	CI	52	Y
Draft Site - West St (1)	CI	53	N
Draft Site - Smith Rd	CI	54	Y
Cell Tower #1	CI	55	Y
Draft Site - Ball St	CI	56	Y
Draft Site - Bearfoot Rd	CI	57	N
Draft Site - West St (2)	CI	58	Y
Draft Site - West St (3)	CI	59	N
MA Highway Depot #039	CI	60	N
Important Intersections: Church St & I-290	CI	61	Y

Important Roads - Hudson St & Marlborough Boundary	CI	62 Y
Important Intersections - Hudson St & Solomon Pond Rd	CI	63 N
Important Road - Rte 20 & Marlborough Boundary	CI	64 Y
Important Intersection - Rte 135 & West Main St	CI	65 Y
Important Intersection - Rte 20 & W. Main St.	CI	66 Y
Important Intersection - Rte 9 & Rte 20	CI	67 Y
Important Road - Rte 135 & Westborough Boundary	CI	68 Y
Important Intersection - Solomon Pond Rd & I-290	CI	69 N
Important Road - W. Main St & Shrewsbury Boundary	CI	70 N
Important Road - 68 Otis St	CI	71 N
Important Roads - Crawford St at stone bridge	CI	72 Y
Important Roads - 290 Overpass at Whitney St	CI	73 Y
RR Dock - private, Lyman St	CI	75 N
RR Crossing - Bearfoot Rd	CI	76 N
RR Crossing - Brigham St	CI	77 N
RR Crossing - Main St	CI	78 Y
RR Crossing - Pierce St	CI	79 Y
RR Crossing - School St	CI	80 N
Bridge - Allen St	CI	81 Y
Bridge - Church St	CI	82 Y
Bridge - CSX Rail Line (Lyman St)	CI	83 Y
Bridge - CSX Rail Line (Rice Ave)	CI	84 N
Bridge - CSX Rail Line (Whitney St)	CI	85 N
Bridge - Davis St	CI	86 Y
Bridge - I-290 Overpass	CI	87 Y
Culvert - Route 135	CI	88 Y
Bridge - Rte 20	CI	89 Y
Utilities - Crown Castle Northborough	CI	90 Y
Utilities - Verizon Communications Center	CI	91 N
Utilities - National Grid Northeast Service Center	CI	92 N
Utilities - National Grid Woodside (Hudson St)	CI	93 N
Services - Central MA Mosquito Project	CI	94 N
Services - TeamWorks, Inc.	CI	95 N
Services - The Bridge of Central MA	CI	96 N
Services - Juniper Hill Golf Course, Inc.	CI	97 N
Beamont/Whitney Place	CI	98 N
Coleman House	CI	99 N
Wastewater Pump Station - 11 Church St	CI	102 Y
Wastewater Pumping Station & Generator - Forbes Road	CI	103 N
Wastewater Pump Station - Hudson St	CI	104 Y
Wastewater Pump Station & Generator - Lincoln St	CI	105 N
Wastewater Pump Station - Otis St	CI	106 N
Wastewater Pump Station - Southwest Cutoff	CI	107 Y
Wastewater Pump Station - Wesson Terrace	CI	108 N

Water Booster Pump Station - Church St @ Autumn Lane	CI	109	Y
Water Booster Pump Station - Southwest Cutoff @ Shops Way	CI	110	Y
Wastewater Pump Station - West Main St	CI	111	N
U.S. Gov Post Office	CI	112	N
Dam - Assabet River	CI	116	Y
Dam - Bartlett Pond	CI	117	Y
Dam - Cider Mill Pond	CI	118	Y
Dam - Cold Harbor Brook	CI	119	Y
Dam - Ellis Pond	CI	120	Y
Dam - Farm Pond	CI	121	N
Dam - Old Adams Pond	CI	122	Y
Dam - Old Mill Pond (SW)	CI	123	N
Dam - Old Mill Pond	CI	124	N
Dam - Old Saw Mill Pond	CI	125	Y
Dam - Small Pond	CI	126	Y
Dam - Smith Pond	CI	127	N
Dam - Storage Pond	CI	128	Y
Dam - Wallace Pond	CI	129	Y
Dam - West Meadow Country Club Pond	CI	130	Y
Dam - Hop Brook	CI	131	Y
School - Robert E Melican Middle School, Emergency Shelter	CI	134	Y
School - ARHS (Comms Voter & Tower, WW Pump, Daycare, POD)	CI	135	N
Schools - Fitzgerald Institute	CI	136	N
School - Lincoln St (Northborough Extended Day Program)	CI	137	N
School - Peaslee	CI	138	N
School - Proctor (Northborough Extended Day Program on site)	CI	139	N
School - St. Bernadette	CI	140	N
School - Marion E Zeh	CI	141	Y
School - Cornerstone Academy	CI	142	N
Schools - Goddard School	CI	143	Y
Special Ed - AMEGO	CI	144	N
Daycare/Children's Program - Skribbles Learning Center	CI	145	N
Daycare/Children's Program - Skribbles Learning Center	CI	146	N
Apartments - Avalon Bay Apartments	CI	149	N
Faith Institution - Church of Christ	CI	152	N
Faith Institution - Church of the Nativity & Nursery School	CI	153	Y
Faith Institution - First Parish Unitarian Church	CI	154	Y
Faith Institution - Jehovah Witness Church	CI	155	N
Faith Institution - Rice Memorial Baptist Church	CI	156	N
Faith Institution - Seventh Day Adventist	CI	157	N
Faith Institution - Shri Gurusthan Sai Temple	CI	158	N
Faith Institution - St. Bernadette's Church	CI	159	N
Faith Institution - St. Rose of Lima Church	CI	160	N
Faith Institution - Trinity Church	CI	161	Y

Bartlett Crossing - 292 Main St.	CI	162 N
Cold Harbor Mall - 369 W. Main St.	CI	163 Y
Northboro Shopping Plaza - 247 West Main St.	CI	164 N
Post Road Marketplace - 318 Main St.	CI	165 N
Shopping Center - 308 Main St., Veenas	CI	166 N
Shopping Center (2) - 276 W. Main St., Picklehouse	CI	167 N
Times Square Plaza - 299 W. Main St.	CI	168 Y
Iron Mountain	CI	169 N
Advocates, Inc./ Northborough Housing Authority	CI	172 N
EconoLodge	CI	173 Y
Motel 6 Boston-Westborough	CI	174 N
Tier II Chem User - Closed Landfill	CI	176 Y
Tier II Chem User - A. Duie Pyle Inc.	CI	177 N
Tier II Chem User - National Grid-New England Distribution	CI	178 N
Tier II Chem User - FedEx Freight, Inc	CI	179 N
Tier II Chem User - Aspen Aerogels	CI	180 N
Tier II Chem User - NewCorr Pkg., LTD	CI	181 N
Tier II Chem User - St. Gobain Research & Development Center	CI	182 N
Tier II Chem User - Steris AST	CI	183 N
Tier II Chem User - Trelleborg Sealing Solutions	CI	184 N
Tier II Chem User - Sanofi Genzyme Northboro Operations Cntr	CI	185 N
Tier II Chem User - Walmart	CI	186 N
Tier II Chem User - Northborough Crossing Mall	CI	187 N
Tier II Chem User - Bigelow Nurseries, Inc.	CI	188 N
Tier II Chem User - Lakeside Oil Company	CI	189 N
Tier II Chem User - Northborough Oil Co., Inc.	CI	190 N
Tier II Chem User - BJ's Wholesale Club Gas Station	CI	191 N
Tier II Chem User - Cumberland Farms	CI	192 Y
Tier II Chem User - Northboro Center Mobile	CI	193 Y
Tier II Chem User - Northborough Sunoco	CI	194 N
Tier II Chem User - Peterson Northborough	CI	195 N
Tier II Chem User - Speed Energy	CI	196 N
Tier II Chem User - Top Energy	CI	197 Y
Tier II Chem User - Tradebe Treatment & Recycling	CI	198 N
Northborough Housing Authority - Heritage Village	CI	199 Y
Northborough Housing Authority -Rutland Rd	CI	200 Y
Northborough Housing Authority - Colonial Village	CI	201 N
Gale Library	CI	202 Y
Communications - Cell Tower, Bearfoot Rd	CI	203 Y
Northborough Manor	CI	207 Y
Aprende Spanish Immersion Daycare	CI	211 N
Boylston Emergency Management Cell Tower - 351 Ball Street	CI	212 Y
Otis Street Adult Daycare	CI	213 N
Nashoba Montessori School, Inc	CI	220 Y

CVS Urgent Care	CI		223	Y
Memory Care Facility	CI		225	Y
Communications Tower- 119 Colburn St	CI		226	Y
Highway Garage	CI		228	N
MWRA Connection	CI		229	N
Tougas Family Farm Worker Dorm	CI		230	Y
Alcohol/Substance Recovery Center- 144 W Main St	CI		231	N
Alcohol/Substance Recovery Center- 150 W Main St	CI		232	N
Luther Rice Home	CI		233	N
Justice Resource Institute Developing Abilities	CI		234	N
Community Resources for Justice	CI		235	N
Northborough Historical Society	CI		236	N
Residential Board and Cares Home-Vinfen Group Home	CI		237	Y
Residential Board and Cares- Advocates Inc 178 South Street	CI		238	N
Residential Board and Cares- Advocates Inc. 29 Thoreau Rd	CI		239	N
Residential Board and Cares- Advocates Inc 342 Boundary St	CI		240	N
Residential Board and Cares- Mentor Neuro Restorative	CI		241	N
Residential Board and Cares- 8 Saddle Hill Drive	CI		242	Y
RJ Devereaux Corp.	CI		243	N
Assabet Hill Comm Tower (lightning) and 3.5 MG Water Storage	CI/H	LG-1		Y
Severe Wind/Rain - Davidian Brothers Farm Lightning	H	LG-2		NA

Name	PDM_ID	PDM_Type	In_Hazard
Evacuation Route - Belmont Street	4	CI	Y
Evacuation Route - Main St @ Marlborough border to SWCutoff	6	CI	Y
Evacuation Route - 520 Main St to Shrewsbury border	7	CI	Y
Evacuation Route - 12 South St to Westborough border	8	CI	Y
Evacuation Route - I-290 Interchange	9	CI	Y
Evacuation Route - I-290 Interchange (2)	10	CI	Y
Evacuation Route - Rte 9 Interchange	11	CI	Y
CSX Rail Line	74	CI	Y
Aqueduct - Wachusett-Hultman	150	CI	Y
Aquaduct - Wachusett-Cosgrove	151	CI	N
Tier II Chem User - Natural Gas Line	175	CI	Y
Important Road- Bartlett St	208	CI	Y
Crawford Street Bridge/Evacuation route	209	CI	Y
Important Road- Cedar Hill Street	210	CI	N
Dam Failure - Wallace Pond Dam on Hudson St	DF-1	H	NA
Dam Failure-Bartlett Pond Dam (evacuation route)	DF-2	CI/H	Y
Dam Fail - Northboro Reservoir Dam on Castle & Reservoir Rd	DF-3	H	NA
Flooding - West St & Cherry St	FL-1	H	NA
Flooding- West St	FL-10	H	NA
Flooding- SW Cutoff	FL-11	H	NA
Flooding- Brewer St	FL-12	H	NA
Flooding - Fay Lane & Lower Pleasant St	FL-2	H	NA
Flooding - US-20 @ Tomblin Hill Rd	FL-3	H	NA
Flooding - Davis St & Davis Ave near Rte 135	FL-5	H	NA
Flooding - Boundary St/Town Line	FL-6	H	NA
Flooding- Howard St	FL-7	H	NA
Flooding- Green St	FL-8	H	NA
Flooding- Ball St	FL-9	H	NA
Severe Snow/Ice - Howard St old trees, power lines down	SS-1	H	NA
Ball Street winter hazard	SS-2	H	NA
Severe Wind/Rain - Davis St	ST-1	H	NA
Severe Wind/Rain - Northgate Rd	ST-2	H	NA
Wildfires â€“ I-290 border (I-290 is an evacuation route)	WF-4	CI/H	Y
Wildfire â€“ Church St (Church St is an evacuation route)	WF-5	CI/H	Y
Wildfire- Brewer St	WF-6	H	NA

Name	PDM_Type	PDM_ID	In_Hazard
Wildfire - Mt. Pisgah	H	WF-1	NA
Wildfire - Little Chauncy Pond Fires	H	WF-3	NA
Wildfire- Edmunds Hill	H	WF-7	NA

4.1. Element A: Planning Process

Overall Intent. The planning process section of the mitigation plan documents how the plan was developed, who was involved and what data and information were used to build or update the plan. A successful planning effort includes active participation and buy-in from community leaders, stakeholders and the public. The National Mitigation Framework emphasizes the valuable role of collaboration among various sectors to ensure that mitigation capabilities continue to grow and that comprehensive mitigation includes strategies for all community sectors. Examples of sectors with mitigation capabilities are those agencies and stakeholders responsible for:

- Emergency management.
- Economic development.
- Land use and development.
- Housing.
- Health and social services.
- Infrastructure (including transportation and other community lifelines).
- Natural and cultural resources.

In addition, FEMA's National Response Framework, 4th Edition identifies critical community lifelines, which are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. Community lifelines include the following:

- Safety and Security.
- Food, Water, Shelter.
- Health and Medical.
- Energy.
- Communications.
- Transportation.
- Hazardous Material.

Efforts to mitigate potential impacts to community lifelines are key to building resilience. These community lifelines connect to the sectors in the National Mitigation Framework and the Recovery Support Functions under the National Disaster Recovery Framework; the same agencies and departments that support these sectors also often support community lifelines and the recovery mission.

Involving members from these key sectors in the planning process will result in a shared understanding of risks. It will also help build widespread support for directing financial, technical and human resources toward natural hazard risk reduction.

Documenting the planning process is a crucial step for future plan updates. By building on the work that has already been done, the community can incorporate best practices and insights learned from previous processes while avoiding past challenges.

Element A Requirements
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))
A1-a. The plan must describe the current planning process. Documentation requirements typically are met with a narrative description, but may also include other records such as copies of meeting minutes, sign-in sheets or newspaper articles. When a narrative description is provided, supporting documentation such as meeting minutes, sign-in sheets, etc., does not need to be included in the plan itself. Planners are encouraged to retain supporting documentation in a Plan Appendix as a record of how decisions were made and who was involved. **Document** means to provide factual evidence for how the participants developed/updated the plan. **Involvement** means being engaged and actively participating in the development of the plan; providing input and directly providing, affecting or editing plan content as the representative of the participating jurisdiction(s) or organization. *If applicable, ensure that participating Community Rating System (CRS) jurisdictions maximize points throughout the planning process.*
A1-b. The plan must list the representatives from each of the participants in the current plan that will seek approval, and how they participated in the planning process. The plan must identify who participated, by agency and title. **Participant** means any local government or entity developing or updating a local mitigation plan. **Participation** means being engaged and having the chance to provide input on the plan. It can be defined and met in a variety of ways (such as attendance at meetings, reviewing and commenting on drafts, etc.).

Element A Requirements

A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))

A2-a. The plan must provide documentation of an opportunity for stakeholders to be involved in the current planning process. Documentation of this opportunity must identify how ***each*** of the following types of stakeholders were presented with this opportunity, as applicable.

1. Local and regional agencies involved in hazard mitigation activities:
   - Examples include public works, emergency management, local floodplain administration and Geographic Information Systems (GIS) departments.
2. Agencies that have the authority to regulate development:
   - Examples include: zoning, planning, community and economic development departments; building officials; planning commissions; or other elected officials.
3. Neighboring communities:
   - Examples include adjacent local governments, including special districts, such as those that are affected by similar hazard events or may share a mitigation action or project that crosses boundaries. Neighboring communities may be partners in hazard mitigation and response activities, or may be where critical assets, such as dams, are located.
4. Representatives of businesses, academia, and other private organizations:
   - Examples include private utilities or major employers that sustain community lifelines.
5. Representatives of nonprofit organizations, including community-based organizations, that work directly with and/or provide support to underserved communities and socially vulnerable populations, among others:
   - Examples include housing, healthcare or social service agencies.

An **opportunity to be involved** in the planning process means that these stakeholders are invited to be engaged or are asked to provide information or input to inform the plan's content. Different communities may necessitate more targeted outreach and engagement, especially underserved communities.

Community Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. The integrated network of assets, services and capabilities that provide community lifeline services are used day to day to support recurring needs. Lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security, as described in the National Response Framework, 4th Edition.

The specific entities may be defined by each jurisdiction based on the unique characteristics of the local government, including special districts. The purpose of inviting input is to integrate natural hazard risk reduction across all community systems, as well as encourage implementation of mitigation actions.

Element A Requirements
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))
A3-a. The plan must document how the public had an opportunity to be involved in the current planning process, and what that participation entailed, including how underserved communities and vulnerable populations within the planning area were provided an opportunity to be involved. The opportunity must occur during the plan's development, which means prior to the plan's submission for formal review. In addition, the plan must document how public feedback was included throughout the planning process. *Examples of documentation include, but are not limited to, narratives, materials from open meetings, screenshots of social media postings and/or interactive websites with drafts for public review and comment, questionnaires or surveys through utility bills, etc.*
A4. Does the plan describe the review and incorporation of existing plans, studies, reports and technical information? (Requirement 44 CFR § 201.6(b)(3))
A4-a. The plan must document what existing plans, studies, reports and technical information were reviewed and how they were incorporated, if appropriate, into the development/update of the plan. For jurisdictions with structures for which National Flood Insurance Program (NFIP) coverage is available, regulatory flood mapping products [13] are required to be incorporated, if appropriate. *Participants may use other jurisdiction-specific materials, including non-regulatory flood mapping products, that improve upon NFIP regulatory flood mapping products.* *Gaps and limitations may be addressed as actions in the mitigation strategy, in particular for items that require additional assistance.* **Incorporate** means to reference or include information from other existing sources to form the content of the mitigation plan. *The documentation requirement may be met with narrative or citations (i.e., footnotes, in-text citations or a bibliography). Examples of the types of existing sources include, but are not limited to: the state hazard mitigation plan; local plans (such as comprehensive/master/general land use, economic development, capital improvement, affordable housing, resource management, resilience, climate, etc.); and hazard-specific reports and plans (such as Community Wildfire Protection Plans).*

[13] **Regulatory flood mapping products** are intended to be used as the basis for official actions required by the NFIP (https://www.fema.gov/flood-maps/products-tools/products). These can be found via the FEMA Map Service Center (https://msc.fema.gov/portal/home).

State and Local Mitigation Planning Policy Guides: Summary of Changes

The State and Local Mitigation Planning Policy Guides (policies) are the official interpretation of the requirements in the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended and other federal statutes as well as in federal regulations, specifically Title 44 Code of Federal Regulations (CFR) Section 201-Mitigation Planning. This summary presents the key changes to the two policies released in April 2022.

Update Highlights

The 2022 policies clarify what FEMA requires for state and local mitigation planning, respectively. The updated policies become effective for all mitigation plan approvals one year from the official release date, April 2022.

State Mitigation Planning Policy Guide

The state policy applies to state governments that update, maintain and implement state mitigation plans. The primary users are state staff that oversee mitigation plan updates and the FEMA officials that review and approve those plans. There are two kinds of state plans: standard and enhanced. All states must meet the standard plan requirements. Enhanced states must meet the standard and enhanced state requirements.

STANDARD STATE UPDATES

The state policy:

- Requires that state plans consider equity and climate change impacts.
- Outlines participants in the state planning process. The process involves a broad range of state and other partners. This includes community lifelines and climate change experts. It also includes state agencies and others that support underserved communities.
- Requires states to describe building code adoption and enforcement, land use, National Flood Insurance Program (NFIP) administration and flood risk mapping in the capability assessment.
- Includes existing mitigation plan requirements for the High Hazard Potential Dams (HHPD) grant program to include all dam risks. Removes the optional Repetitive Loss Strategy.

FEMA

- Includes existing mitigation plan requirements for the Fire Management Assistance Grants program.

ENHANCED STATE UPDATES

The state policy:

- Introduces more advanced lead times and pre-submission coordination for new enhanced states. Provides a more detailed plan submission and review process.
- Requires states that wish to become enhanced to first show they can meet Hazard Mitigation Assistance (HMA) grant performance requirements.
- Requires that states demonstrate local jurisdictions have approved mitigation plans as part of the state's commitment to mitigation. The state must show how it supports the update and adoption of these plans before expiration.
- Strongly encourages enhanced states to adopt and enforce building codes that advance mitigation and resilience.

Local Mitigation Planning Policy Guide

The local policy applies to local governments that develop, update, maintain and implement their own mitigation plans. The primary users of this guide are local staff that oversee mitigation plans and the federal and state officials who review and approve those plans. The local policy includes the following changes:

- Defines who local governments must include in the planning process. This includes representatives from a broad range of sectors, community lifelines, the public and community-based organizations that support underserved communities.
- Requires local governments to include the effects of climate change and other future conditions in the risk assessment.
- Recognizes the important role of adopting and enforcing building codes and land use and development ordinances in the local government's ability to improve mitigation capabilities.
- Facilitates stronger alignment with other FEMA mitigation programs such as the National Flood Insurance Program (NFIP), Community Rating System and flood risk mapping program.
- Explains the need to right-size the scope of a plan update, consider both current and future risks, and complete the planning process with plan adoption.
- Includes existing mitigation plan requirements for the High Hazard Potential Dams (HHPD) grant program to include all dam risks. Removes the optional Repetitive Loss Strategy.
- Reorganized requirements for ease of use.

Other Updates

Both policies reflect program and administrative changes to other FEMA programs. This includes programs for which a mitigation plan is a condition of eligibility. For example, references to the Pre-Disaster Mitigation program have been deleted and new grant programs including Building Resilient Infrastructure and Communities have been added.

Both policies connect mitigation planning with community resilience. They also align with FEMA's 2022-2026 Strategic Plan. These priorities include promoting climate change and equity.

For More Information

Download the State Mitigation Planning Policy Guide on FEMA's state mitigation planning resources page.

Download the Local Mitigation Planning Policy Guide on FEMA's local mitigation planning resources page.

This fact sheet summarizes important changes to the State and Local Mitigation Planning Policy Guides. Users should read each guide, including the narrative and the requirements tables.

Questions? Contact the lead Community Planner in the Mitigation Division of your FEMA regional office.

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton HMP meeting CI+NH Community: Paxton
Location: Paxton Public Safety Building Date: March 21st, 2024 Meeting Time: 10 am

Participant Name	Organization	Title	E-Mail
Marc Gramato	CMRPC	emergency prep. Planner	mgramato@cmrpc.org
Jeff Olson	Paxton Fire	Lt / Assistant EMD	Jolson@townofpaxton.net
Travis Thibault	Paxton DPW	Director	tthibault@townofpaxton.net
Michael Pingitore	Paxton Fire	Chief / EMD	mpingitore@townofpaxton.net
Forrest Thorpe	Paxton PD	Sgt.	fthorpe@townofpaxton.net
Mark Wilde	WRSD	Fac. Director	mark_wilde@wrsd.net

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **March 21st , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions

II. Meeting #1 Recap

III. Community Lifelines

IV. Reference Documents

V. Natural Hazards Review

a. Flooding
b. Severe Snowstorms, Ice Storms, and Nor'easters
c. Hurricanes
d. Severe Thunderstorms, Wind, and Tornadoes
e. Wildfires and Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Landslides
k. Invasive Species
l. Other Hazards

VI. Critical Infrastructure/Facilities and Vulnerable Populations Review

Category 1 – Emergency Response Facilities

Category 2 – Non-Emergency Response Facilities

Category 3 – Dams

Category 4 – Populations and Facilities to Protect

VII. Survey Review and Update

VIII. Next Meeting – Existing Protection Measures Review, Public Forum and Community Survey Planning

- Date/location
- What to prepare

Hazards Since (or Soon Before) Last Plan Update in 2018

Flooding

- 8/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 9/30/2015 – Flood: A cold front moved across southern New England bringing heavy rain, strong winds, and periods of coastal flooding along the south coast.
- 10/30/17 – Flood: The remnants of Tropical Storm Phillipe merged with a mid-latitude system approaching the U.S. East Coast. Tropical moisture flowing north ahead of the cold front contributed to heavy downpours with one to five inches of rain reported.
- 11/3/2018 – Flood: Heavy rain occurred in the early morning hours, with generally 1.50 to 2.50 inches in eastern sections of southern New England and up to 3.66 inches in the slopes of the Berkshires.
- 7/6/19 – Flood: A cold front advanced into a very moist, almost tropical air mass in place across southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding.
- 7/9/21 – Flood: Tropical Storm Elsa made landfall in Rhode Island on Friday morning before moving into the Gulf of Maine. It interacted with a stalled frontal boundary and brought widespread heavy rainfall of 2 to 3.5 inches.
- 11/12/21 – Flood: Strong southerly wind flow out ahead of an advancing cold front produced strong to damaging wind gusts and some heavy rain that caused some street and basement flooding.
- 07/14/2023 – Flood: A cluster of thunderstorms moved northward into Connecticut during the morning ahead of a short-wave trough southwest of southern New England. The showers and thunderstorms spread northeastward into the early afternoon. One storm produced a lightning strike that started a house fire in northeast Massachusetts. Several roads were flooded in Worcester County. In Holden, Main St and several side streets were flooded in spots up to one ft.
- 09/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Leominster, flash flooding caused widespread damage to residences and municipal properties.

Sources:
Hopedale 2023 HMP
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Severe Snowstorms / Ice Storms / Nor'easters

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The Storm events listed below occurred throughout the Northeast region.

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

Rank	Start	End	NESIS	Category	Description	Map
2	2022-12-21	2022-12-26	2.66	2	Significant	December 21-26, 2022Dec 21-26, 2022
4	2022-12-13	2022-12-20	8.52	4	Crippling	December 13-20, 2022Dec 13-20, 2022
67	2022-01-28	2022-01-30	1.73	1	Notable	January 28-30, 2022Jan 28-30, 2022
72	2022-01-04	2022-01-07	1.60	1	Notable	January 4-7, 2022Jan 4-7, 2022
88	2022-01-01	2022-01-03	1.06	1	Notable	January 1-3, 2022Jan 1-3, 2022
25	2021-01-30	2021-02-03	4.93	3	Major	January 30 - February 3, 2021Jan 30 - Feb 3, 2021
46	2020-12-14	2020-12-18	3.21	2	Significant	December 14-18, 2020Dec 14-18, 2020

83	2019-03-03	2019-03-04	1.29	1	Notable	March 3-4, 2019Mar 3-4, 2019

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

Previous Instances of Declared Winter Storm Disasters in Massachussetts

- Severe Winter Storm, Snowstorm, and Flooding /FEMA-4214-DR-MA, April 2015
- Severe Winter Storm and Snowstorm/FEMA-4379-DR, March 2018

Sources:

2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate-adaptation-plan-appendix-b/download.

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

https://www.ncei.noaa.gov/monitoring-content/snow-and-ice/rsi/docs/kocin-and-uccellini-2004.pdf

Hurricanes

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events.

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Andrea	2013	Extratropical Storm
Florence	2018	Extratropical Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Sources:
NOAA Historical Hurricane Tracks Map, https://coast.noaa.gov/hurricanes/#map=6.06/42.065/-71.688&search=eyJzZWFyY2hTdHJpbmciOiJNYXNzYWNodXNldHRzLCBVU0EiLCJzZWFyY2hUeXBlIjoiZ2VvY29kZWQiLCJvc21JRCI6IjYxMzE1IiwiY2F0ZWdvcmllcyI6WyJINSIsIkg0IiwiSDMiLCJIMiIsIkgxIiwiVFMiLCJURCIsIkVUIl0sInllYXJzIjpbXSwibW9udGhzIjpbXSwiZW5zbyI6W10sInByZXNzdXJlIjp7InJhbmdlIjpbMCwxMDMwXSwiaW5jbHVkZVVua25vd25QcmVzc3VyZSI6dHJ1ZX0sImJ1ZmZlciI6NjAsImJ1ZmZlclVuaXQiOlsiTmF1dGljYWwgTWlsZXMiXSwic29ydFNlbGVjdGlvbiI6eyJ2YWx1ZSI6InllYXJzX25ld2VzdCIsImxhYmVsIjoiWWVhciAoTmV3ZXN0KSJ9LCJhcHBseVRvQU9JIjp0cnVlLCJpc1N0b3JtTGFiZWxzVmlzaWJsZSI6dHJ1ZX0=.
Paxton Draft HMP Page 21

Tornadoes, Thunderstorms, and High Wind Events

- In 1953, an F4 tornado struck the City of Worcester, directly southeast of Paxton. The event resulted in at least

90 fatalities, and more than 1,200 injured. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton, south-southeast of Worcester, 18 miles southeast of Paxton.

- In 1970, a category F3 tornado traveled from the Towns of Hardwick to Littleton, missing Paxton only by a few miles.
- In 1981 an F3 tornado struck, resulting in just 3 injuries and very little reported property damage.
- July 19, 2007 Tornado (New Braintree), EF-0, light damage, no fatalities, no injuries
- August 31, 2014 Tornado (Worcester), EF-0, light damage, no fatalities, no injuries
- July 26, 2018 Tornadoes (East Douglas, Uxbridge, Whitinsville and Upton), both EF-1, moderate damage, no fatalities, no injuries
- October 23, 2018 Tornado (Hardwick), EF-1, moderate damage, no fatalities, no injuries
- August 19, 2021 Tornado (Webster), EF-0, light damage, no fatalities, no injuries
- August 23, 2021 Tornado (Marlborough, Southborough), light damage, EF-0, no fatalities, no Injuries

Source: ArcGIS Tornado Tracks Data, data from Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,
https://www.arcgis.com/apps/View/index.html?appid=01672085b139432e8fe1296a743f67d7.
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS
Paxton 2021 Draft HMP Plan

Wildfires / Bush Fires

Department	# of Incidents	# of Acres Burned (Fire Module)	# of Acres Burned (Wildland Module)	Total Acres Burned	Fire Service Injuries	Civilian Injuries	Fire Service Deaths	Civilian Deaths	Dollar Loss
PAXTON	12		1.7	1.7	0	0	0	0	$ -

Department	Total # of Brush Fires	2017	2018	2019	2020	2021	2022	2023
PAXTON	12	3	2		2		4	1

Source: Massachusetts Fire Incident Reporting System Natural Vegetation Fires Data, 2017-2023

Earthquakes

Events listed by Weston Observatory in Boston College were reviewed for all towns in Massachusetts. from 2015 to the present. Listed earthquakes above magnitude 2.0 include:

- 6/1/16 – 51 km ENE of Rockport, 2.4/2.7 [Mn*/Mc**]
- 9/6/17 – 2 km ESE of Athol, 1.5/2.0
- 8/18/18 – 83 km E of Nantucket, 2.5/2.9
- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1
- 12/23/18 – 4 km SW of Gardner, 2.1/2.3
- 1/28/19 – 4 km WSW of Gardner, 1.0/2.0
- 4/27/19 – 24 km NE of Rockport, 1.8/2.1
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 11/2/19 – 230 km ENE of Orleans, 2.2/2.9
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 7/24/20 – 20 km ESE of Woods Hole, 1.8/2.6
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
- 7/25/21 – 5 km W of Peabody, 1.4/2.5
- 1/1/22 – 13 km N of Rockport, 2.3/3.0
- 3/4/22 – 5 km WSW of Orange, 2.2/2.7
- 3/19/22 – 36 km ENE of Rockport, 1.4/2.2
- 9/24/22 – 6 km S of Litleton, 1.9/2.5
- 11/10/22 – 12 km NW of Nantucket, 2.6/3
  *Mn is the Nutli Magnitude (see below)
  **Mc is the Coda Duration Magnitude (see below)

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

Source: Weston Observatory at Boston College New England Seismic Network (NESN) Recent Earthquakes Data, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl

Dam Failure

According to the Massachusetts Office of Dam Safety, there are according to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton.

National ID	Dam Name	Owner	Hazard Potential	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High	
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.
MA0196	Small Pond Dam	Private	N/A	
MA0196	Kauppila Pond Dam	Private	N/A	
MA0196	Arrowhead Pond Dam	Private	N/A	
MA0196	Cournoyer's Dam	Private	N/A	
MA0196	Rasvall Pond Dam	Private	N/A	
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.
MA0286	Turkey Hill Pond Dam	Private	N/A	

Inundation areas for these dams cover less than 10% of the town, or a "small" portion of its area.

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any dam failures having recently occurred in the CMRPC Region.

Sources:

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

MassGIS Data: Dams

Paxton Draft HMP 2021

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences: https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Drought

Year	Maximum Severity
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023 (to August)	D1 conditions in 0.2% of the state

Source: US Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln, https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

Extreme Temperatures

- 02/15/2015: Low pressure off the Delmarva peninsula intensified rapidly as it moved northeastward. Its path just southeast of Nantucket brought heavy snow to all of southern New England and blizzard conditions and coastal flooding to coastal areas. Near blizzard conditions occurred across much of eastern Massachusetts. The large amount of snow, combined with wintry, frigid temperatures resulted in snow piling up on roofs and numerous (250) roof collapses were reported to emergency management and to the National Weather Service in the days after this snowstorm. Fortunately no injuries to humans were reported. However, a large amount of snow fell off a Boston-area ice rink roof, burying a man and knocking down four others. No one was seriously hurt, but two of the people were taken to the hospital for evaluation. In barn collapses in Stoughton and Andover, a total of 40 horses were trapped and rescued. In another barn collapse in Westford, two horses died. In another who would have guessed scenario, a falling icicle ruptured a gas line causing an explosion at the Duxbury House, an Alzheimer's care facility in Duxbury. No one was injured. There were several indirect fatalities related to the snow. These include: a 57 year old man who died shoveling snow, a 57 year old woman hit by a snow plow, and a 60 year old man hit by a snow plow. The Automated Surface Observing System at Fitchburg Municipal Airport (KFIT) recorded wind chills as low as 31 below zero.
- 02/20/2015: High pressure to the west and low pressure to the east funneled winds through southern New England overnight. Coupled with

strong cold advection into the region, this resulted in wind chills well below zero overnight. The Automated Surface Observing System at Fitchburg Municipal Airport recorded wind chills below 25 degrees below zero for six hours.

- 02/13/2016: Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 37 below zero were reported at Fitchburg Airport.

According to the SHMCAP43 warm weather events have occurred across Massachusetts between 1995 and 2018. **The NOAA Storm Events database does not have Record Warmth/Heat or Excessive Heat events listed in the last decade for Northern Worcester County.** However, it should be noted that, in 2012, Massachusetts temperatures broke 27 heat records. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the Heat Index reached 100°F (NOAA Storm Events Database)

Source: Hopedale 2023 HMP

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

- 1/7/2015 - Extreme Cold/Wind Chill
- 1/30- 2/2/2015 - Cold/Wind Chill
- 2/5/2015 - Cold/Wind Chill
- 2/13/2015 - Cold/Wind Chill
- 2/15- 2/16/2015 - Extreme Cold/Wind Chill
- 2/19-2/20/2015 - Extreme Cold/Wind Chill
- 2/23/2015 - Cold/Wind Chill
- 2/13-2/14/16 - Extreme Cold/Wind Chill
- 12/15/2016 - Cold/Wind Chill
- 3/11/2017 - Cold/Wind Chill

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Landslides

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be caused by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas.

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any landslides/mudslides having recently occurred in Worcester County.

Source:

Paxton Daft HMP 2021

Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard- mitigation-and-climate-adaptation-plan-appendix-b/download.

Invasive Species

According to the MDAR Invasive Pest Dashboard Paxton hosts at least 1 invasive species: Emerald Ash Borer and Mile-A-Minute Vine. Beech Leaf Disease was also confirmed to have been found in Paxton in 2021 and Holden borders communities with Spotted Lanternfly. According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir.

Additionally, the Mitigation Team listed the Asian Longhorn Beetle, Pine Blight, and Emerald Ash Borer as invasive species/pests damaging and killing off trees.

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in 2020. Whether stocked intentionally or not, Black Crappie prey on threatened and endangered juvenile salmon that spawn in rivers of the Northwest United States and may further contribute to salmon decline through habitat alteration, though the extent of those impacts are unknown.

Source:

MDAR Invasive Pest Dashboard (arcgis.com)

Forest Health Atlas (uvm.edu)

Microsoft Word - AIS_Plan_2010.doc (mass.gov)

Nonindigenous Aquatic Species (usgs.gov)

Black Crappie (Pomoxis nigromaculatus) - Species Profile (usgs.gov)

Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation and Climate Adaptation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, nor'easters, and tsunamis. It was determined that these hazards are either irrelevant to Paxton due to the town's location, or in the case of nor'easters, that the hazard is already included within another hazard described above (severe winter storms).

The Hazard Mitigation Team also mentioned concerns regarding cyber security breaches, especially with the Town's electric and water operations. There is a risk that a terrorist attack could contaminate the water supply or damage transmission lines.

Sources:
Paxton HMP Draft 2021

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

I. Emergency Response Facilities needed in the event of a disaster
II. Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Paxton
III. Dams
IV. Facilities/Populations that the Team wishes to protect in the event of a disaster

CATEGORY 1, EMERGENCY RESPONSE FACILITIES

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations(/Communications) Center/Police Station/Fire Station**

EOC/ECC/Paxton Police and Fire Department	576 Pleasant Street
EOC/Paxton Police Department Dispatch	Holden, MA

The Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage. The EOC is also not fully equipped and is in need of more equipment, technology, and computers.

2. **Communications/Power Facilities**

Paxton Town Hall	697 Pleasant Street
Communications/Radio/Cell & Microwave Tower	Asnebumskit Road
Communications/Radio/Cell & Microwave Tower	Maple Street
Communications/Radio/Cell & Microwave Tower	Pleasant Street
Wentworth Power Station	Marshall Street
Fiber Connection from Holden	Route 31, Grove St, Maple
St, Pleasant St Southbound, and Richards Ave	

The Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage. The Communication Tower on Asnebumskit Road is utilized for the water system. Trees do cause issues for the communication towers, and the tower on Maple Street has experienced lightning strikes.

3. **Department of Public Works/Highway Department**

DPW/Highway	107 Holden Road

The DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.

4. **Municipal Light Department**

Light Department Headquarters	578 Pleasant Street

The Municipal Light Department also experiences snow load on the roof.

5. **Water Department**

Water Department	107 Holden Road
Maple Street Water Tank	Maple Street

The Maple Street Water Tank site stores supplies needed for water main repairs.

6. **Utilities**

Distribution Lines	(Runs SE-NW through Town)
Asnebumskit Hill Radio Towers	

7. **Primary Evacuation Routes**

Route 122
Route 56
Route 31

These evacuation routes are all two-lane roads, making evacuation in times of crisis more difficult and potentially congested. Additionally, there is a high water table along Route 31 near Spencer, MA.

8. **Shelters**

Paxton Center School - dispensing site	19 West Street
Anna Maria College - primary site	50 Sunset Lane
Congregational Church	1 Church Street
St. Columba Church	10 Richards Avenue

CATEGORY 2, NON-EMERGENCY RESPONSE FACILITIES

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton.

1. **Water Supply**

Maple Street Water Tank	Maple Street
Asnebumskit Pond	
Kettle Brook Reservoir #3	
Kettle Brook Reservoir #4	
Pine Hill Reservoir	
Asnebumskit Road Water Tank	

The Town of Paxton purchases 100% of their municipal water from the City of Worcester. There is concern that falling trees could damage these pre-fab buildings.

2. **Town Facilities**

Town Hall	697 Pleasant Street

The Paxton Town Hall has a backup generator; however, it is small and can likely only heat the building.

CATEGORY 3, DAMS

The third category is a listing of dams in Paxton.

National ID	Dam Name	Owner Type	Hazard Potential	Notes
MA00676	Eames Mill Pond Dam	Public	Significant	Had work done recently
MA00677	Kettle Brook Reservoir #4 Dam	Public	High	
MA00678	Streeter Pond Dam	Private	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Significant	Considered a High Hazard if let go
MA01962	Small Pond Dam	Private	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	
MA01965	Cournoyer's Dam	Private	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	Had work done recently
MA02540	Eames Mill Pond Dam #2	Public	N/A	Had work done recently
MA02375	Illig's Pond Dam	Public	N/A	Have had issues with beaver activity and cresting
MA02865	Turkey Hill Pond Dam	Private	N/A	Potentially a High Hazard dam

For additional information on dams and the dam failure hazard in Paxton, also see Section 4.

CATEGORY 4, FACILITIES/POPULATIONS TO PROTECT

1. Special Needs Population/Elderly Housing/Assisted Living

John Bauer Senior Center	17 West Street
Group Home	420 Pleasant Street
Group Home	54 Streeter Road
Group Home	270 Pleasant Street
Group Home	2 Pine Street
Group Home	157 Suomi Street
Group Home	132 Marshall Street
Group Home	60 Marshall Street
Group Home	33 Camp Street
50+ Community	260 Grove Street
Devereaux Group Home	461 Pleasant Street

These facilities experience issues with flooding as well as snow load on the roof.

2. Public Buildings/Areas

John Bauer Senior Center	17 West Street
Town Hall	697 Pleasant Street
Richards Memorial Library	44 Richards Avenue
Ten West Market	10 West Street

These facilities experience issues with flooding as well as snow load on the roof. Ten West Market has a generator, but it is not an adequate size to run all of the refrigerators.

3. Schools/Daycare

(Please note: The EMD has a list of current daycare facilities but these can change locations and addresses frequently, so this list should be revisited periodically.)

Paxton Center School	19 West Street
Anna Maria College	50 Sunset Lane
Creative Learning Center	170 Richards Avenue
Johansson, Leslie	22 Red Oak Street
Stepping Stones	66 Maple Street
Congregational Church	1 Church Street
Colorful Connections	140 West Street
Turn Back Time	250 Marshall Street

4. Historic Buildings/Sites

According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in November 2021, there are 4 Areas, 98 Buildings, 2 Burial Grounds, 19 Objects, and 5

Structures listed for Paxton. The Hazard Mitigation Team noted that the Town Hall is a historic building as well as the Records building.

5. Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD), the following table shows the largest employers in Paxton:

Largest Employers in Paxton - July 2016		
Company	**Location**	**No. of Employees**
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

6. Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton. While there are no EJ populations within Paxton, future considerations should be given to these populations. The Hazard Mitigation Team noted that approximately 8.7% of the population is disabled, and approximately 15.2% of the population speaks a language other than English in the home. It was also noted that many of the residents at the group and assisted living homes do not have vehicles. In times of crisis, it could be more difficult to evacuate these properties.

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **March 21st , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions

II. Meeting #1 Recap

III. Community Lifelines

IV. Reference Documents

V. Natural Hazards Review

a. Flooding
b. Severe Snowstorms, Ice Storms, and Nor'easters
c. Hurricanes
d. Severe Thunderstorms, Wind, and Tornadoes
e. Wildfires and Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Landslides
k. Invasive Species
l. Other Hazards

VI. Critical Infrastructure/Facilities and Vulnerable Populations Review

Category 1 – Emergency Response Facilities

Category 2 – Non-Emergency Response Facilities

Category 3 – Dams

Category 4 – Populations and Facilities to Protect

VII. Survey Review and Update

VIII. Next Meeting – Existing Protection Measures Review, Public Forum and Community Survey Planning

- Date/location
- What to prepare

Hazards Since (or Soon Before) Last Plan Update in 2018

Flooding

- 8/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 9/30/2015 – Flood: A cold front moved across southern New England bringing heavy rain, strong winds, and periods of coastal flooding along the south coast.
- 10/30/17 – Flood: The remnants of Tropical Storm Phillipe merged with a mid-latitude system approaching the U.S. East Coast. Tropical moisture flowing north ahead of the cold front contributed to heavy downpours with one to five inches of rain reported.
- 11/3/2018 – Flood: Heavy rain occurred in the early morning hours, with generally 1.50 to 2.50 inches in eastern sections of southern New England and up to 3.66 inches in the slopes of the Berkshires.
- 7/6/19 – Flood: A cold front advanced into a very moist, almost tropical air mass in place across southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding.
- 7/9/21 – Flood: Tropical Storm Elsa made landfall in Rhode Island on Friday morning before moving into the Gulf of Maine. It interacted with a stalled frontal boundary and brought widespread heavy rainfall of 2 to 3.5 inches.
- 11/12/21 – Flood: Strong southerly wind flow out ahead of an advancing cold front produced strong to damaging wind gusts and some heavy rain that caused some street and basement flooding.
- 07/14/2023 – Flood: A cluster of thunderstorms moved northward into Connecticut during the morning ahead of a short-wave trough southwest of southern New England. The showers and thunderstorms spread northeastward into the early afternoon. One storm produced a lightning strike that started a house fire in northeast Massachusetts. Several roads were flooded in Worcester County. In Holden, Main St and several side streets were flooded in spots up to one ft.
- 09/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Leominster, flash flooding caused widespread damage to residences and municipal properties.

Sources:
Hopedale 2023 HMP
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Severe Snowstorms / Ice Storms / Nor'easters

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The Storm events listed below occurred throughout the Northeast region.

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

Rank	Start	End	NESIS	Category	Description	Map
2	2022-12-21	2022-12-26	2.66	2	Significant	December 21-26, 2022Dec 21-26, 2022
4	2022-12-13	2022-12-20	8.52	4	Crippling	December 13-20, 2022Dec 13-20, 2022
67	2022-01-28	2022-01-30	1.73	1	Notable	January 28-30, 2022Jan 28-30, 2022
72	2022-01-04	2022-01-07	1.60	1	Notable	January 4-7, 2022Jan 4-7, 2022
88	2022-01-01	2022-01-03	1.06	1	Notable	January 1-3, 2022Jan 1-3, 2022
25	2021-01-30	2021-02-03	4.93	3	Major	January 30 - February 3, 2021Jan 30 - Feb 3, 2021
46	2020-12-14	2020-12-18	3.21	2	Significant	December 14-18, 2020Dec 14-18, 2020

83	2019-03-03	2019-03-04	1.29	1	Notable	March 3-4, 2019Mar 3-4, 2019

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

Previous Instances of Declared Winter Storm Disasters in Massachussetts

- Severe Winter Storm, Snowstorm, and Flooding /FEMA-4214-DR-MA, April 2015
- Severe Winter Storm and Snowstorm/FEMA-4379-DR, March 2018

Sources:

2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate-adaptation-plan-appendix-b/download.

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

https://www.ncei.noaa.gov/monitoring-content/snow-and-ice/rsi/docs/kocin-and-uccellini-2004.pdf

Hurricanes

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events.

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Andrea	2013	Extratropical Storm
Florence	2018	Extratropical Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Sources:
NOAA Historical Hurricane Tracks Map, https://coast.noaa.gov/hurricanes/#map=6.06/42.065/-71.688&search=eyJzZWFyY2hTdHJpbmciOiJNYXNzYWNodXNldHRzLCBVU0EiLCJzZWFyY2hUeXBlIjoiZ2VvY29kZWQiLCJvc21JRCI6IjYxMzE1IiwiY2F0ZWdvcmllcyI6WyJINSIsIkg0IiwiSDMiLCJIMiIsIkgxIiwiVFMiLCJURCIsIkVUIl0sInllYXJzIjpbXSwibW9udGhzIjpbXSwiZW5zbyI6W10sInByZXNzdXJlIjp7InJhbmdlIjpbMCwxMDMwXSwiaW5jbHVkZVVua25vd25QcmVzc3VyZSI6dHJ1ZX0sImJ1ZmZlciI6NjAsImJ1ZmZlclVuaXQiOlsiTmF1dGljYWwgTWlsZXMiXSwic29ydFNlbGVjdGlvbiI6eyJ2YWx1ZSI6InllYXJzX25ld2VzdCIsImxhYmVsIjoiWWVhciAoTmV3ZXN0KSJ9LCJhcHBseVRvQU9JIjp0cnVlLCJpc1N0b3JtTGFiZWxzVmlzaWJsZSI6dHJ1ZX0=.
Paxton Draft HMP Page 21

Tornadoes, Thunderstorms, and High Wind Events

- In 1953, an F4 tornado struck the City of Worcester, directly southeast of Paxton. The event resulted in at least

90 fatalities, and more than 1,200 injured. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton, south-southeast of Worcester, 18 miles southeast of Paxton.

- In 1970, a category F3 tornado traveled from the Towns of Hardwick to Littleton, missing Paxton only by a few miles.
- In 1981 an F3 tornado struck, resulting in just 3 injuries and very little reported property damage.
- July 19, 2007 Tornado (New Braintree), EF-0, light damage, no fatalities, no injuries
- August 31, 2014 Tornado (Worcester), EF-0, light damage, no fatalities, no injuries
- July 26, 2018 Tornadoes (East Douglas, Uxbridge, Whitinsville and Upton), both EF-1, moderate damage, no fatalities, no injuries
- October 23, 2018 Tornado (Hardwick), EF-1, moderate damage, no fatalities, no injuries
- August 19, 2021 Tornado (Webster), EF-0, light damage, no fatalities, no injuries
- August 23, 2021 Tornado (Marlborough, Southborough), light damage, EF-0, no fatalities, no Injuries

Source: ArcGIS Tornado Tracks Data, data from Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,
https://www.arcgis.com/apps/View/index.html?appid=01672085b139432e8fe1296a743f67d7.
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS
Paxton 2021 Draft HMP Plan

Wildfires / Bush Fires

Department	# of Incidents	# of Acres Burned (Fire Module)	# of Acres Burned (Wildland Module)	Total Acres Burned	Fire Service Injuries	Civilian Injuries	Fire Service Deaths	Civilian Deaths	Dollar Loss
PAXTON	12		1.7	1.7	0	0	0	0	$ -

Department	Total # of Brush Fires	2017	2018	2019	2020	2021	2022	2023
PAXTON	12	3	2		2		4	1

Source: Massachusetts Fire Incident Reporting System Natural Vegetation Fires Data, 2017-2023

Earthquakes

Events listed by Weston Observatory in Boston College were reviewed for all towns in Massachusetts. from 2015 to the present. Listed earthquakes above magnitude 2.0 include:

- 6/1/16 – 51 km ENE of Rockport, 2.4/2.7 [Mn*/Mc**]
- 9/6/17 – 2 km ESE of Athol, 1.5/2.0
- 8/18/18 – 83 km E of Nantucket, 2.5/2.9
- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1
- 12/23/18 – 4 km SW of Gardner, 2.1/2.3
- 1/28/19 – 4 km WSW of Gardner, 1.0/2.0
- 4/27/19 – 24 km NE of Rockport, 1.8/2.1
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 11/2/19 – 230 km ENE of Orleans, 2.2/2.9
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 7/24/20 – 20 km ESE of Woods Hole, 1.8/2.6
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
- 7/25/21 – 5 km W of Peabody, 1.4/2.5
- 1/1/22 – 13 km N of Rockport, 2.3/3.0
- 3/4/22 – 5 km WSW of Orange, 2.2/2.7
- 3/19/22 – 36 km ENE of Rockport, 1.4/2.2
- 9/24/22 – 6 km S of Litleton, 1.9/2.5
- 11/10/22 – 12 km NW of Nantucket, 2.6/3
  *Mn is the Nutli Magnitude (see below)
  **Mc is the Coda Duration Magnitude (see below)

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

Source: Weston Observatory at Boston College New England Seismic Network (NESN) Recent Earthquakes Data, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl

Dam Failure

According to the Massachusetts Office of Dam Safety, there are according to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton.

National ID	Dam Name	Owner	Hazard Potential	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High	
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.
MA0196	Small Pond Dam	Private	N/A	
MA0196	Kauppila Pond Dam	Private	N/A	
MA0196	Arrowhead Pond Dam	Private	N/A	
MA0196	Cournoyer's Dam	Private	N/A	
MA0196	Rasvall Pond Dam	Private	N/A	
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.
MA0286	Turkey Hill Pond Dam	Private	N/A	

Inundation areas for these dams cover less than 10% of the town, or a "small" portion of its area.

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any dam failures having recently occurred in the CMRPC Region.

Sources:

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

MassGIS Data: Dams

Paxton Draft HMP 2021

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences: https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Drought

Year	Maximum Severity
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023 (to August)	D1 conditions in 0.2% of the state

Source: US Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln, https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

Extreme Temperatures

- 02/15/2015: Low pressure off the Delmarva peninsula intensified rapidly as it moved northeastward. Its path just southeast of Nantucket brought heavy snow to all of southern New England and blizzard conditions and coastal flooding to coastal areas. Near blizzard conditions occurred across much of eastern Massachusetts. The large amount of snow, combined with wintry, frigid temperatures resulted in snow piling up on roofs and numerous (250) roof collapses were reported to emergency management and to the National Weather Service in the days after this snowstorm. Fortunately no injuries to humans were reported. However, a large amount of snow fell off a Boston-area ice rink roof, burying a man and knocking down four others. No one was seriously hurt, but two of the people were taken to the hospital for evaluation. In barn collapses in Stoughton and Andover, a total of 40 horses were trapped and rescued. In another barn collapse in Westford, two horses died. In another who would have guessed scenario, a falling icicle ruptured a gas line causing an explosion at the Duxbury House, an Alzheimer's care facility in Duxbury. No one was injured. There were several indirect fatalities related to the snow. These include: a 57 year old man who died shoveling snow, a 57 year old woman hit by a snow plow, and a 60 year old man hit by a snow plow. The Automated Surface Observing System at Fitchburg Municipal Airport (KFIT) recorded wind chills as low as 31 below zero.

- 02/20/2015: High pressure to the west and low pressure to the east funneled winds through southern New England overnight. Coupled with

strong cold advection into the region, this resulted in wind chills well below zero overnight. The Automated Surface Observing System at Fitchburg Municipal Airport recorded wind chills below 25 degrees below zero for six hours.

- 02/13/2016: Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 37 below zero were reported at Fitchburg Airport.

According to the SHMCAP43 warm weather events have occurred across Massachusetts between 1995 and 2018. **The NOAA Storm Events database does not have Record Warmth/Heat or Excessive Heat events listed in the last decade for Northern Worcester County.** However, it should be noted that, in 2012, Massachusetts temperatures broke 27 heat records. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the Heat Index reached 100°F (NOAA Storm Events Database)

Source: Hopedale 2023 HMP

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

- 1/7/2015 - Extreme Cold/Wind Chill
- 1/30- 2/2/2015 - Cold/Wind Chill
- 2/5/2015 - Cold/Wind Chill
- 2/13/2015 - Cold/Wind Chill
- 2/15- 2/16/2015 - Extreme Cold/Wind Chill
- 2/19-2/20/2015 - Extreme Cold/Wind Chill
- 2/23/2015 - Cold/Wind Chill
- 2/13-2/14/16 - Extreme Cold/Wind Chill
- 12/15/2016 - Cold/Wind Chill
- 3/11/2017 - Cold/Wind Chill

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Landslides

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be caused by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas.

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any landslides/mudslides having recently occurred in Worcester County.

Source:

Paxton Daft HMP 2021

Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard- mitigation-and-climate-adaptation-plan-appendix-b/download.

Invasive Species

According to the MDAR Invasive Pest Dashboard Paxton hosts at least 1 invasive species: Emerald Ash Borer and Mile-A-Minute Vine. Beech Leaf Disease was also confirmed to have been found in Paxton in 2021 and Holden borders communities with Spotted Lanternfly. According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir.

Additionally, the Mitigation Team listed the Asian Longhorn Beetle, Pine Blight, and Emerald Ash Borer as invasive species/pests damaging and killing off trees.

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in 2020. Whether stocked intentionally or not, Black Crappie prey on threatened and endangered juvenile salmon that spawn in rivers of the Northwest United States and may further contribute to salmon decline through habitat alteration, though the extent of those impacts are unknown.

Source:

MDAR Invasive Pest Dashboard (arcgis.com)

Forest Health Atlas (uvm.edu)

Microsoft Word - AIS_Plan_2010.doc (mass.gov)

Nonindigenous Aquatic Species (usgs.gov)

Black Crappie (Pomoxis nigromaculatus) - Species Profile (usgs.gov)

Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation and Climate Adaptation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, nor'easters, and tsunamis. It was determined that these hazards are either irrelevant to Paxton due to the town's location, or in the case of nor'easters, that the hazard is already included within another hazard described above (severe winter storms).

The Hazard Mitigation Team also mentioned concerns regarding cyber security breaches, especially with the Town's electric and water operations. There is a risk that a terrorist attack could contaminate the water supply or damage transmission lines.

Sources:
Paxton HMP Draft 2021

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

I. Emergency Response Facilities needed in the event of a disaster
II. Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Paxton
III. Dams
IV. Facilities/Populations that the Team wishes to protect in the event of a disaster

CATEGORY 1, EMERGENCY RESPONSE FACILITIES

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations(/Communications) Center/Police Station/Fire Station**

EOC/ECC/Paxton Police and Fire Department	576 Pleasant Street
EOC/Paxton Police Department Dispatch	Holden, MA

The Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage. The EOC is also not fully equipped and is in need of more equipment, technology, and computers.

2. **Communications/Power Facilities**

Paxton Town Hall	697 Pleasant Street
Communications/Radio/Cell & Microwave Tower	Asnebumskit Road
Communications/Radio/Cell & Microwave Tower	Maple Street
Communications/Radio/Cell & Microwave Tower	Pleasant Street
Wentworth Power Station	Marshall Street
Fiber Connection from Holden	Route 31, Grove St, Maple
St, Pleasant St Southbound, and Richards Ave	

The Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage. The Communication Tower on Asnebumskit Road is utilized for the water system. Trees do cause issues for the communication towers, and the tower on Maple Street has experienced lightning strikes.

3. **Department of Public Works/Highway Department**

DPW/Highway	107 Holden Road

The DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.

4. **Municipal Light Department**

Light Department Headquarters	578 Pleasant Street

The Municipal Light Department also experiences snow load on the roof.

5. **Water Department**

Water Department	107 Holden Road
Maple Street Water Tank	Maple Street

The Maple Street Water Tank site stores supplies needed for water main repairs.

6. **Utilities**

Distribution Lines	(Runs SE-NW through Town)
Asnebumskit Hill Radio Towers	

7. **Primary Evacuation Routes**

Route 122
Route 56
Route 31

These evacuation routes are all two-lane roads, making evacuation in times of crisis more difficult and potentially congested. Additionally, there is a high water table along Route 31 near Spencer, MA.

8. **Shelters**

Paxton Center School - dispensing site	19 West Street
Anna Maria College - primary site	50 Sunset Lane
Congregational Church	1 Church Street
St. Columba Church	10 Richards Avenue

CATEGORY 2, NON-EMERGENCY RESPONSE FACILITIES

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton.

1. **Water Supply**

Maple Street Water Tank	Maple Street
Asnebumskit Pond	
Kettle Brook Reservoir #3	
Kettle Brook Reservoir #4	
Pine Hill Reservoir	
Asnebumskit Road Water Tank	

The Town of Paxton purchases 100% of their municipal water from the City of Worcester. There is concern that falling trees could damage these pre-fab buildings.

2. **Town Facilities**

Town Hall	697 Pleasant Street

The Paxton Town Hall has a backup generator; however, it is small and can likely only heat the building.

CATEGORY 3, DAMS

The third category is a listing of dams in Paxton.

National ID	Dam Name	Owner Type	Hazard Potential	Notes
MA00676	Eames Mill Pond Dam	Public	Significant	Had work done recently
MA00677	Kettle Brook Reservoir #4 Dam	Public	High	
MA00678	Streeter Pond Dam	Private	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Significant	Considered a High Hazard if let go
MA01962	Small Pond Dam	Private	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	
MA01965	Cournoyer's Dam	Private	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	Had work done recently
MA02540	Eames Mill Pond Dam #2	Public	N/A	Had work done recently
MA02375	Illig's Pond Dam	Public	N/A	Have had issues with beaver activity and cresting
MA02865	Turkey Hill Pond Dam	Private	N/A	Potentially a High Hazard dam

For additional information on dams and the dam failure hazard in Paxton, also see Section 4.

CATEGORY 4, FACILITIES/POPULATIONS TO PROTECT

1. Special Needs Population/Elderly Housing/Assisted Living

John Bauer Senior Center	17 West Street
Group Home	420 Pleasant Street
Group Home	54 Streeter Road
Group Home	270 Pleasant Street
Group Home	2 Pine Street
Group Home	157 Suomi Street
Group Home	132 Marshall Street
Group Home	60 Marshall Street
Group Home	33 Camp Street
50+ Community	260 Grove Street
Devereaux Group Home	461 Pleasant Street

These facilities experience issues with flooding as well as snow load on the roof.

2. Public Buildings/Areas

John Bauer Senior Center	17 West Street
Town Hall	697 Pleasant Street
Richards Memorial Library	44 Richards Avenue
Ten West Market	10 West Street

These facilities experience issues with flooding as well as snow load on the roof. Ten West Market has a generator, but it is not an adequate size to run all of the refrigerators.

3. Schools/Daycare

(Please note: The EMD has a list of current daycare facilities but these can change locations and addresses frequently, so this list should be revisited periodically.)

Paxton Center School	19 West Street
Anna Maria College	50 Sunset Lane
Creative Learning Center	170 Richards Avenue
Johansson, Leslie	22 Red Oak Street
Stepping Stones	66 Maple Street
Congregational Church	1 Church Street
Colorful Connections	140 West Street
Turn Back Time	250 Marshall Street

4. Historic Buildings/Sites

According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in November 2021, there are 4 Areas, 98 Buildings, 2 Burial Grounds, 19 Objects, and 5

Structures listed for Paxton. The Hazard Mitigation Team noted that the Town Hall is a historic building as well as the Records building.

5. Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD), the following table shows the largest employers in Paxton:

Largest Employers in Paxton - July 2016		
Company	**Location**	**No. of Employees**
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

6. Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton. While there are no EJ populations within Paxton, future considerations should be given to these populations. The Hazard Mitigation Team noted that approximately 8.7% of the population is disabled, and approximately 15.2% of the population speaks a language other than English in the home. It was also noted that many of the residents at the group and assisted living homes do not have vehicles. In times of crisis, it could be more difficult to evacuate these properties.

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: April 25th, 2024 10:00AM – 12:30PM
Location: Public Safety Complex, 576 Pleasant St, Paxton, MA 01612

I. Introductions

II. Meeting #3 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

	Action Plan/Descriptions	Hazards Addressed	Who agencies involved	Potential Funding Sources	Priority Political and economic viability: High/Med/Low	Impact Mitigation impact: High/Med/Low	Estimate High/Me
	A. Structure & Infrastructure Strategies						
1	Raise Hill Street (3 feet high, 1,000-1,500 feet long) to eliminate flooding and allow emergency vehicles to pass.	FL, SS, ST, HU	DPW, Conservation	~~Local~~, Federal Grants (HMGP/PDM), State Grants (Various)	Medium	Medium	Hig $2.5-$5
2	Implement actions of Asnebumskit Pond Dam Phase 1 Inspection and Evaluation Report to prevent dam failure.	DF, FL, ST, HU	DPW, Water, Conservation	Local, State Grants (Dam & Seawall)	Medium	Medium	Hig
3	Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	FL, SS, ST, HU	DPW, Light	Local, State, Federal Grants	Medium	Medium	Med
4	Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.	FL, SS, ST, HU	National Grid, Town (DPW, Light), Private	Utility (National Grid), Local, Private (property owners)	High	High	Med
5	Replace emergency generator at ~~Asnebumskit hill~~ and relocate to most utilized emergency shelter (to provide power to building and food storage and preparation areas) in the case of power going out.	All	Local Emergency Management	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High	High	Med
	Install Fire protection System in Paxton Center School among other upgrades to the heating/cooling systems, to enhance the resiliency of the municipally owned facility to prevent damage in the event of catestophic fire or other hazard events.	WF	Tahanto School District, Fire Department, Town Administration	Local, Federal Grants (HMGP/PDM), State Grants (Various)			

	Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought	All	Town Administration, DPW, Water Department	Local, Federal Grants (HMGP/PDM), State Grants (Various)			
	Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarentine invasives.	IS, WF, HW	DPW, Conservation				
	B. Preparedness, Coordination & Response Action Strategies						
	Create a plan to ensure that shelters open immediately and completely within four hours of	FL, SS, ST, HU	DPW, Light, Local				

2	Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	High	High	Lo
3	Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	Low	Low	Lo
4	Road information coordination and planning for snow removal.	SS	DPW; MassDOT; Mass State Police; CMRPC	Local, Federal Grants (HMGP/PDM), State Grants (Various), Private Contracts	High	High	Lo
5	Evacuation Plan updates.	All	Local Emergency Management, DPW, CMRPC, MassDOT	Local, Federal Grants (Homeland Security via MEMA and CRHSAC)	High	High	Lo
6	Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR	WF	Fire Department, DPW, GWLT, DCR	Local	Medium	Medium	Lo

	C. Education & Awareness Strategies						
1	Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	FL, SS, ST, HU	DPW, Light Dept., Planning, Local Emergency Management	Local	Medium	Low	Lo
2	Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	DR, WF	DPW, Conservation, Water	Local, Private (water companies)	High	Medium	Lo
3	Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	All	Local Emergency Management	Local	Medium	Medium	Lo
4	Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.	WF	Fire Department	Local	Medium	Medium	Lo

	D. Local Plan & Regulation Strategies						
1	Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's needs.	DR	DPW, Water Department, Conservation	Local	Medium	Low	Lo
2	Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	All	All Town Departments	Local	Medium	High	Lo
3	Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply.	FL, DR	Conservation, Water, DPW	Local	Medium	Medium	Lo
4	Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	DF, FL, ST, EQ	DPW, Water, Conservation, Local Emergency Management	Local, State Grants (Various)	Medium	Medium	More infc required, b likely "Me "High" a dams remc significar and low rating, a other dan Not App (N /

5	Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve.	All	All Town Departments	Local	High	High	Lo
6	Implement Firewood Sourcing bylaw stipulating that firewood must be bought from within a specific geographic area to prevent the spread of invasives.	IS	Town Administration				

local norms and does not suggest a level of vulnerability that would impair household disaster preparations or response, no special action is recommended other than specifically targeting this area for emergency preparedness and response educational and outreach programs, which are listed in the Mitigation Strategies table on page 72. The location of this EJ area is shown in Map 1 in Appendix A.

More information regarding the identification of Environmental Justice and Vulnerable populations in the Central Massachusetts region can be found online at www.cmrpc.org/mobility2040.

6.0 EXISTING PROTECTION

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process.

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands, stormwater management through the Central Mass Stormwater Coalition, tree maintenance coordinated by the Municipal Light Department and the recently hired Lewis Tree Company, etc.... Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, a Water Superintendent, a Conservation Agent, and a Municipal Light Department Manager who acts as a Tree Warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan, and it is working now to implement its Master Plan. Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted in to fire protection mutual aid agreements through MEMA. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief

description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

Element C: Mitigation Strategy Requirements

C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))

C2-a. The plan must describe participation in the NFIP for each participant, as applicable, in accordance with NFIP regulatory requirements. The following information must be provided for each participant.[14]

1. Adoption of NFIP minimum floodplain management criteria via local regulation.
2. Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable.
3. Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs.
4. Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP.
5. Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event.

Simply stating, "The community will continue to comply with the NFIP" is not sufficient to meet the requirement.

Jurisdictions not currently participating in the NFIP, where a Flood Hazard Boundary Map or FIRM has been issued, may meet this requirement by describing why the community does not participate in the NFIP.

For jurisdictions that voluntarily participate in the CRS, it is highly recommended that this description also include related activities and address any issues raised during community assistance and monitoring activities.

[14] For jurisdictions that voluntarily participate in the NFIP, note that floodplain management criteria for flood-prone areas is described in 44 CFR § 60.3.

6.1 Existing Protection Matrix

Table 29

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP) - Review NFIP Bylaw on town website	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code. Add NFIP Guidelines	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 100-year flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP.
Floodplain Zoning District bylaw in place	Requires all development to be in compliance with state building code requirements for construction in floodplains	Paxton has a Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw. This Chapter was last updated in May of 2014.	Very effective No changes recommended
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge.	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition.	Very effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Local Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee started to update this plan in 2013.	Somewhat effective Paxton should prepare its plan update per Mass. Division of Conservation Resources Requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve capacity and quality.	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

Existing Measure	Description	Action	Effectiveness & Recommendations
Drainage system maintenance and repair program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order	Paxton performs street sweeping from April to May, and catch basin cleaning year round.	Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices
Tree Trimming and tree wire installation	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. Lewis Tree Company was hired by the Paxton Light Department in August 2016 to trim trees. Tree wire is being installed to further reduce the effects of damaging storms.	Very Effective No changes recommended
Culvert Maintenance and Replacement	Maintain existing culverts through regular maintenance and (in some cases) beaver controls; replace/expand culverts where needed to allow for adequate stormwater flow.	The Town has historically maintained and replaced problem culverts when needed and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Somewhat effective Current efforts are limited by lack of resources and systematic approach. Paxton should develop a prioritized inventory of problem culverts for use in seeking external financial support. Planning must comply with 2014 Mass. Wetlands Protection Act update; culverts may not be replaced in-kind.

Existing Measure	Description	Action	Effectiveness & Recommendations
Dam Inspection and Evaluation Reporting	Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life.	In 2012, Paxton hired Lenart Consulting Service to inspect and evaluation Asnebumskit Dam, a Significant Hazard Dam. The Dam was found to be in "fair" condition, and the report listed 11 actions to be taken. Studies of this kind should be undertaken for the remaining Significant Hazard Dam in Town, as well as the High Hazard Dam in Town.	Somewhat effective. Plans are only as effective as their implementation. Town should continue to implement actions suggested by Lenart Consulting Service as mentioned in their report. Additional studies should be sought to address other noted hazardous dams in Town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association	These two fire and emergency response groups serve as organized systems for fire departments to work together across municipal boundaries.	Paxton joined these groups in recent years and have benefitted from doing so.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.
Continue to upgrade, improve, or secure secondary sources of power to eliminate outages as electrical feed from Worcester periodically goes down from hurricanes and severe snowstorms.	The Town relies on power coming from the City of Worcester. When this power supply is cut, the Town experiences not only power outages but also flooding, as many rely on sump pumps in their basements.	Work with National Grid to devise system for secondary sources of power to turn on as feed from Worcester goes out.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.

Existing Measure	Description	Action	Effectiveness & Recommendations
Relocate Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town's Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town..	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

Name	pdm_type	pdm_id	haz_type
Maple Street Water Tank	CI	1	<Null>
Richards Memorial Library	CI	2	<Null>
Anna Maria College	CI	3	<Null>
John Bauer Senior Center	CI	4	<Null>
First Congregational Church	CI	5	<Null>
St. Columba Church	CI	6	<Null>
Asnebumskit Communications Tower	CI	8	<Null>
Paxton Public Works Dept.	CI	11	<Null>
Pleasant St Pump Station	CI	7	<Null>
Maple St Communications Tower	CI	10	<Null>
Pleasant St Communications Tower	CI	9	<Null>
Richards Ave Electric Transformer	CI	12	<Null>
Worcester WTAG	CI	52	<Null>
Hill St Flooding	H	FL-1	FL
Hill St Flooding	H	FL-2	FL
Eames Mill Pond Dam	H	DF-1	DF
Turkey Hill Pond Dam	H	DF-2	DF
Kettle Brook Res. Dam	H	DF-3	DF
Asnebumskit Pond Dam	H	DF-4	DF
Small Pond Dam	H	DF-5	DF
Asnebumskit Hill snow clearing for radio tower	H	SS-1	SS

Bill

Follow up email

- Bric Grant
- Mitigation strategy – explain how it is a 360
- look into NFIP By law for town
- Appendices of acronyms Cheat sheet
- Follow up on DLTA for engineering

Name	PDM_ID	PDM_Type
Flood Area	FL-4	H
Flood Area	FL-8	H
1953 Tornado	ST-1	H

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **April 25th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #3 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

	Action Plan/Descriptions	Hazards Addressed	Who agencies involved	Potential Funding Sources	Priority Political and economic viability: High/Med/Low	Impact Mitigation impact: High/Med/Low	Estimated Cost High/Med/Low	Timeline
	A. Structure & Infrastructure Strategies							
1	Raise Hill Street (3 feet high, 1,000-1,500 feet long) to eliminate flooding and allow emergency vehicles to pass.	FL, SS, ST, HU	DPW, Conservation	Local, Federal Grants (HMGP/PDM), State Grants (Various)	Medium	Medium	High $2.5-$5 million	3-5 years
2	Implement actions of Asnebumskit Pond Dam Phase 1 Inspection and Evaluation Report to prevent dam failure.	DF, FL, ST, HU	DPW, Water, Conservation	Local, State Grants (Dam & Seawall)	Medium	Medium	High	2-5 years
3	Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	FL, SS, ST, HU	DPW, Light	Local, State, Federal Grants	Medium	Medium	Medium	Implement-ation underway Fall 2016, ongoing
4	Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.	FL, SS, ST, HU	National Grid, Town (DPW, Light), Private	Utility (National Grid), Local, Private (property owners)	High	High	Medium	Implement-ation underway Fall 2016, ongoing
5	Replace emergency generator at Asnebumskit hill and relocate to most utilized emergency shelter (to provide power to building and food storage and preparation areas) in the case of power going out.	All	Local Emergency Management	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High	High	Medium	1-2 Years
	Install Fire protection System in Paxton Center School among other upgrades to the heating/cooling systems, to enhance the resiliency of the municipally owned facility to prevent damage in the event of catestophic fire or other hazard events.	WF	Tahanto School District, Fire Department, Town Administration	Local, Federal Grants (HMGP/PDM), State Grants (Various)				

	Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought	All	Town Administration, DPW, Water Department	Local, Federal Grants (HMGP/PDM), State Grants (Various)				
	Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarentine invasives.	IS, WF, HW	DPW, Conservation					

	B. Preparedness, Coordination & Response Action Strategies							
1	Create a plan to ensure that shelters open immediately and completely within four hours of Town-wide power outages for the sake of Paxton's vulnerable populations (elderly and minors).	FL, SS, ST, HU, EQ	DPW, Light, Local Emergency Management	Local	Medium	Medium	Low	1-2 years

2	Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	High	High	Low	Ongoing
3	Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	Low	Low	Low	1-2 Years
4	Road information coordination and planning for snow removal.	SS	DPW; MassDOT; Mass State Police; CMRPC	Local, Federal Grants (HMGP/PDM), State Grants (Various), Private Contracts	High	High	Low	Ongoing
5	Evacuation Plan updates.	All	Local Emergency Management, DPW, CMRPC, MassDOT	Local, Federal Grants (Homeland Security via MEMA and CRHSAC)	High	High	Low	1-2 Years (update every 5 Years)
6	Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR	WF	Fire Department, DPW, GWLT, DCR	Local	Medium	Medium	Low	1 year

	C. Education & Awareness Strategies							
1	Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	FL, SS, ST, HU	DPW, Light Dept., Planning, Local Emergency Management	Local	Medium	Low	Low	1-2 years
2	Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	DR, WF	DPW, Conservation, Water	Local, Private (water companies)	High	Medium	Low	Ongoing
3	Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	All	Local Emergency Management	Local	Medium	Medium	Low	1 year
4	Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.	WF	Fire Department	Local	Medium	Medium	Low	1 year

	D. Local Plan & Regulation Strategies							
1	Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's needs.	DR	DPW, Water Department, Conservation	Local	Medium	Low	Low	1-2 years
2	Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	All	All Town Departments	Local	Medium	High	Low	Ongoing
3	Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply.	FL, DR	Conservation, Water, DPW	Local	Medium	Medium	Low	1-2 years
4	Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	DF, FL, ST, EQ	DPW, Water, Conservation, Local Emergency Management	Local, State Grants (Various)	Medium	Medium	More information required, but cost is likely "Medium" to "High" as three dams remain with a significant, high, and low hazard rating, and nine other dams rated Not Applicable (N/A)	2-4 years

5	Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve.	All	All Town Departments	Local	High	High	Low	Ongoing
6	Implement Firewood Sourcing bylaw stipulating that firewood must be bought from within a specific geographic area to prevent the spread of invasives.	IS	Town Administration					

local norms and does not suggest a level of vulnerability that would impair household disaster preparations or response, no special action is recommended other than specifically targeting this area for emergency preparedness and response educational and outreach programs, which are listed in the Mitigation Strategies table on page 72. The location of this EJ area is shown in Map 1 in Appendix A.

More information regarding the identification of Environmental Justice and Vulnerable populations in the Central Massachusetts region can be found online at www.cmrpc.org/mobility2040.

6.0 EXISTING PROTECTION

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process.

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands, stormwater management through the Central Mass Stormwater Coalition, tree maintenance coordinated by the Municipal Light Department and the recently hired Lewis Tree Company, etc…. Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, a Water Superintendent, a Conservation Agent, and a Municipal Light Department Manager who acts as a Tree Warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan, and it is working now to implement its Master Plan. Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted in to fire protection mutual aid agreements through MEMA. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief

description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

Element C: Mitigation Strategy Requirements
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))
C2-a. The plan must describe participation in the NFIP for each participant, as applicable, in accordance with NFIP regulatory requirements. The following information must be provided for each participant.[14] 1. Adoption of NFIP minimum floodplain management criteria via local regulation. 2. Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable. 3. Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs. 4. Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP. 5. Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event. Simply stating, "The community will continue to comply with the NFIP" is not sufficient to meet the requirement. Jurisdictions not currently participating in the NFIP, where a Flood Hazard Boundary Map or FIRM has been issued, may meet this requirement by describing why the community does not participate in the NFIP. *For jurisdictions that voluntarily participate in the CRS, it is highly recommended that this description also include related activities and address any issues raised during community assistance and monitoring activities.*

[14] For jurisdictions that voluntarily participate in the NFIP, note that floodplain management criteria for flood-prone areas is described in 44 CFR § 60.3.

6.1 Existing Protection Matrix

Table 29

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP)	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code.	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 100-year flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP.
Floodplain Zoning District bylaw in place	Requires all development to be in compliance with state building code requirements for construction in floodplains	Paxton has a Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw. This Chapter was last updated in May of 2014.	Very effective No changes recommended
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge.	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition.	Very effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Local Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee started to update this plan in 2013.	Somewhat effective Paxton should prepare its plan update per Mass. Division of Conservation Resources Requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve capacity and quality.	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

Existing Measure	Description	Action	Effectiveness & Recommendations
Drainage system maintenance and repair program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order	Paxton performs street sweeping from April to May, and catch basin cleaning year round.	Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices
Tree Trimming and tree wire installation	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. Lewis Tree Company was hired by the Paxton Light Department in August 2016 to trim trees. Tree wire is being installed to further reduce the effects of damaging storms.	Very Effective No changes recommended
Culvert Maintenance and Replacement	Maintain existing culverts through regular maintenance and (in some cases) beaver controls; replace/expand culverts where needed to allow for adequate stormwater flow.	The Town has historically maintained and replaced problem culverts when needed and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Somewhat effective Current efforts are limited by lack of resources and systematic approach. Paxton should develop a prioritized inventory of problem culverts for use in seeking external financial support. Planning must comply with 2014 Mass. Wetlands Protection Act update; culverts may not be replaced in-kind.

Existing Measure	Description	Action	Effectiveness & Recommendations
Dam Inspection and Evaluation Reporting	Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life.	In 2012, Paxton hired Lenart Consulting Service to inspect and evaluation Asnebumskit Dam, a Significant Hazard Dam. The Dam was found to be in "fair" condition, and the report listed 11 actions to be taken. Studies of this kind should be undertaken for the remaining Significant Hazard Dam in Town, as well as the High Hazard Dam in Town.	Somewhat effective. Plans are only as effective as their implementation. Town should continue to implement actions suggested by Lenart Consulting Service as mentioned in their report. Additional studies should be sought to address other noted hazardous dams in Town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association	These two fire and emergency response groups serve as organized systems for fire departments to work together across municipal boundaries.	Paxton joined these groups in recent years and have benefitted from doing so.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.
Continue to upgrade, improve, or secure secondary sources of power to eliminate outages as electrical feed from Worcester periodically goes down from hurricanes and severe snowstorms.	The Town relies on power coming from the City of Worcester. When this power supply is cut, the Town experiences not only power outages but also flooding, as many rely on sump pumps in their basements.	Work with National Grid to devise system for secondary sources of power to turn on as feed from Worcester goes out.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.

Existing Measure	Description	Action	Effectiveness & Recommendations
Relocate Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town‘s Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town..	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

Name	pdm_type	pdm_id	haz_type
Maple Street Water Tank	CI	1	<Null>
Richards Memorial Library	CI	2	<Null>
Anna Maria College	CI	3	<Null>
John Bauer Senior Center	CI	4	<Null>
First Congregational Church	CI	5	<Null>
St. Columba Church	CI	6	<Null>
Asnebumskit Communications Tower	CI	8	<Null>
Paxton Public Works Dept.	CI	11	<Null>
Pleasant St Pump Station	CI	7	<Null>
Maple St Communications Tower	CI	10	<Null>
Pleasant St Communications Tower	CI	9	<Null>
Richards Ave Electric Transformer	CI	12	<Null>
Worcester WTAG	CI	52	<Null>
Hill St Flooding	H	FL-1	FL
Hill St Flooding	H	FL-2	FL
Eames Mill Pond Dam	H	DF-1	DF
Turkey Hill Pond Dam	H	DF-2	DF
Kettle Brook Res. Dam	H	DF-3	DF
Asnebumskit Pond Dam	H	DF-4	DF
Small Pond Dam	H	DF-5	DF
Asnebumskit Hill snow clearing for radio tower	H	SS-1	SS

Name	PDM_ID	PDM_Type
Flood Area	FL-4	H
Flood Area	FL-8	H
1953 Tornado	ST-1	H

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **April 25th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #3 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **April 25th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #3 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Mitigation Strategies and Existing Protection Measures Update Meeting

Date/Time: **June 13th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #4 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Mitigation Strategies and Existing Protection Measures Update Meeting

Date/Time: **June 13th , 2024 9:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #4 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Community Survey review and Public Presentation Planning

Date/Time: **July 18th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #5 Recap

III. Community Lifelines Review

IV. Reference Documents

V. Community Survey Review

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation Planning

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Community Survey review and Public Presentation Planning

Date/Time: **July 18th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #5 Recap

III. Community Lifelines Review

IV. Reference Documents

V. Community Survey Review

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation Planning

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Paxton Hazard Mitigation Plan Update
Local Planning Team Meeting #2

Date/Time: **October 19, 2021 11:30 AM – 1:00 PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions/Sign-in

II. Plan Background

III. Natural Hazards Review

Discussion of Hazards, Locations of Concern, and Past Impacts

a. Flooding
b. Severe Snowstorms/Ice Storms/Nor'easters
c. Hurricanes
d. Severe Thunderstorms/Wind/Tornadoes
e. Wildfires/Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Other Hazards (Landslides, etc.)

IV. Next Meeting

a. Date/Location
b. What to Prepare/Review

Paxton Hazard Mitigation Plan Update
Local Planning Team Meeting #2

Date/Time: **October 19, 2021 11:30 AM – 1:00 PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions/Sign-in

II. Plan Background

III. Natural Hazards Review

Discussion of Hazards, Locations of Concern, and Past Impacts

a. Flooding
b. Severe Snowstorms/Ice Storms/Nor'easters
c. Hurricanes
d. Severe Thunderstorms/Wind/Tornadoes
e. Wildfires/Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Other Hazards (Landslides, etc.)

IV. Next Meeting

a. Date/Location
b. What to Prepare/Review

Paxton Hazard Mitigation Plan Update
Local Planning Team Meeting #3

Date/Time: **November 30, 2021 9:00 am – 11:00 am**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. **Welcome/Sign-in**

II. **Brief Recap**

III. **Critical Infrastructure/Facilities/Populations Review**
Review previous CI/F/P lists and update as necessary
   a. Category 1 – Emergency Response Facilities
   b. Category 2 – Non-Emergency Response Facilities
   c. Category 3 – Dams
   d. Category 4 – Facilities/Populations to Protect

IV. **Existing Protection Measures Review**
Review/Update the Existing Protection Matrix

V. **Next Meeting**
   a. December 14th at 9:00 am, Public Safety Complex
   b. Topics
      i. Strategy to complete the remaining tasks
      ii. Review of draft HMP

Paxton Hazard Mitigation Plan Update
Local Planning Team Meeting #4

Date/Time: **December 14, 2021 9:00 am – 10:30 am**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. **Welcome/Sign-in**

II. **Brief Recap**

III. **Discussion of Remaining Tasks**
   a. Remaining Tasks
   b. Timeline
   c. Funding Opportunities

IV. **Draft Hazard Mitigation Plan**
   Receive paper copy of Sections 1 – 6 of the Hazard Mitigation Plan update
   a. Virtual copy: https://cmrpc-my.sharepoint.com/:w:/g/personal/dmarini_cmrpc_org/EYMLW4cn5EhFvkPCTVjFyNYBLXwgNLA_HA0yWRrDNjyBow?e=cqlugn
   b. Send any edits/suggestions to dmarini@cmrpc.org
   c. All comments are due by Monday, December 27th

V. **Next Steps/Closing**
   a. Review Draft Plan
   b. Review Completion Strategy

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **March 21st , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions

II. Meeting #1 Recap

III. Community Lifelines

IV. Reference Documents

V. Natural Hazards Review

a. Flooding
b. Severe Snowstorms, Ice Storms, and Nor'easters
c. Hurricanes
d. Severe Thunderstorms, Wind, and Tornadoes
e. Wildfires and Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Landslides
k. Invasive Species
l. Other Hazards

VI. Critical Infrastructure/Facilities and Vulnerable Populations Review

Category 1 – Emergency Response Facilities

Category 2 – Non-Emergency Response Facilities

Category 3 – Dams

Category 4 – Populations and Facilities to Protect

VII. Survey Review and Update

VIII. Next Meeting – Existing Protection Measures Review, Public Forum and Community Survey Planning

- Date/location
- What to prepare

Hazards Since (or Soon Before) Last Plan Update in 2018

Flooding

- 8/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 9/30/2015 – Flood: A cold front moved across southern New England bringing heavy rain, strong winds, and periods of coastal flooding along the south coast.
- 10/30/17 – Flood: The remnants of Tropical Storm Phillipe merged with a mid-latitude system approaching the U.S. East Coast. Tropical moisture flowing north ahead of the cold front contributed to heavy downpours with one to five inches of rain reported.
- 11/3/2018 – Flood: Heavy rain occurred in the early morning hours, with generally 1.50 to 2.50 inches in eastern sections of southern New England and up to 3.66 inches in the slopes of the Berkshires.
- 7/6/19 – Flood: A cold front advanced into a very moist, almost tropical air mass in place across southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding.
- 7/9/21 – Flood: Tropical Storm Elsa made landfall in Rhode Island on Friday morning before moving into the Gulf of Maine. It interacted with a stalled frontal boundary and brought widespread heavy rainfall of 2 to 3.5 inches.
- 11/12/21 – Flood: Strong southerly wind flow out ahead of an advancing cold front produced strong to damaging wind gusts and some heavy rain that caused some street and basement flooding.
- 07/14/2023 – Flood: A cluster of thunderstorms moved northward into Connecticut during the morning ahead of a short-wave trough southwest of southern New England. The showers and thunderstorms spread northeastward into the early afternoon. One storm produced a lightning strike that started a house fire in northeast Massachusetts. Several roads were flooded in Worcester County. In Holden, Main St and several side streets were flooded in spots up to one ft.
- 09/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Leominster, flash flooding caused widespread damage to residences and municipal properties.

Sources:
Hopedale 2023 HMP
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Severe Snowstorms / Ice Storms / Nor'easters

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The Storm events listed below occurred throughout the Northeast region.

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

Rank	Start	End	NESIS	Category	Description	Map
2	2022-12-21	2022-12-26	2.66	2	Significant	December 21-26, 2022Dec 21-26, 2022
4	2022-12-13	2022-12-20	8.52	4	Crippling	December 13-20, 2022Dec 13-20, 2022
67	2022-01-28	2022-01-30	1.73	1	Notable	January 28-30, 2022Jan 28-30, 2022
72	2022-01-04	2022-01-07	1.60	1	Notable	January 4-7, 2022Jan 4-7, 2022
88	2022-01-01	2022-01-03	1.06	1	Notable	January 1-3, 2022Jan 1-3, 2022
25	2021-01-30	2021-02-03	4.93	3	Major	January 30 - February 3, 2021Jan 30 - Feb 3, 2021
46	2020-12-14	2020-12-18	3.21	2	Significant	December 14-18, 2020Dec 14-18, 2020

83	2019-03-03	2019-03-04	1.29	1	Notable	March 3-4, 2019Mar 3-4, 2019

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

Previous Instances of Declared Winter Storm Disasters in Massachussetts

- Severe Winter Storm, Snowstorm, and Flooding /FEMA-4214-DR-MA, April 2015
- Severe Winter Storm and Snowstorm/FEMA-4379-DR, March 2018

Sources:

2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate-adaptation-plan-appendix-b/download.

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

https://www.ncei.noaa.gov/monitoring-content/snow-and-ice/rsi/docs/kocin-and-uccellini-2004.pdf

Hurricanes

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events.

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Andrea	2013	Extratropical Storm
Florence	2018	Extratropical Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Sources:
NOAA Historical Hurricane Tracks Map, https://coast.noaa.gov/hurricanes/#map=6.06/42.065/-71.688&search=eyJzZWFyY2hTdHJpbmciOiJNYXNzYWNodXNldHRzLCBVU0EiLCJzZWFyY2hUeXBlIjoiZ2VvY29kZWQiLCJvc21JRCI6IjYxMzE1IiwiY2F0ZWdvcmllcyI6WyJINSIsIkg0IiwiSDMiLCJIMiIsIkgxIiwiVFMiLCJURCIsIkVUIl0sInllYXJzIjpbXSwibW9udGhzIjpbXSwiZW5zbyI6W10sInByZXNzdXJlIjp7InJhbmdlIjpbMCwxMDMwXSwiaW5jbHVkZVVua25vd25QcmVzc3VyZSI6dHJ1ZX0sImJ1ZmZlciI6NjAsImJ1ZmZlclVuaXQiOlsiTmF1dGljYWwgTWlsZXMiXSwic29ydFNlbGVjdGlvbiI6eyJ2YWx1ZSI6InllYXJzX25ld2VzdCIsImxhYmVsIjoiWWVhciAoTmV3ZXN0KSJ9LCJhcHBseVRvQU9JIjp0cnVlLCJpc1N0b3JtTGFiZWxzVmlzaWJsZSI6dHJ1ZX0=.
Paxton Draft HMP Page 21

Tornadoes, Thunderstorms, and High Wind Events

- In 1953, an F4 tornado struck the City of Worcester, directly southeast of Paxton. The event resulted in at least

90 fatalities, and more than 1,200 injured. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton, south-southeast of Worcester, 18 miles southeast of Paxton.

- In 1970, a category F3 tornado traveled from the Towns of Hardwick to Littleton, missing Paxton only by a few miles.
- In 1981 an F3 tornado struck, resulting in just 3 injuries and very little reported property damage.
- July 19, 2007 Tornado (New Braintree), EF-0, light damage, no fatalities, no injuries
- August 31, 2014 Tornado (Worcester), EF-0, light damage, no fatalities, no injuries
- July 26, 2018 Tornadoes (East Douglas, Uxbridge, Whitinsville and Upton), both EF-1, moderate damage, no fatalities, no injuries
- October 23, 2018 Tornado (Hardwick), EF-1, moderate damage, no fatalities, no injuries
- August 19, 2021 Tornado (Webster), EF-0, light damage, no fatalities, no injuries
- August 23, 2021 Tornado (Marlborough, Southborough), light damage, EF-0, no fatalities, no Injuries

Source: ArcGIS Tornado Tracks Data, data from Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,
https://www.arcgis.com/apps/View/index.html?appid=01672085b139432e8fe1296a743f67d7.
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS
Paxton 2021 Draft HMP Plan

Wildfires / Bush Fires

Department	# of Incidents	# of Acres Burned (Fire Module)	# of Acres Burned (Wildland Module)	Total Acres Burned	Fire Service Injuries	Civilian Injuries	Fire Service Deaths	Civilian Deaths	Dollar Loss
PAXTON	12		1.7	1.7	0	0	0	0	$ -

Department	Total # of Brush Fires	2017	2018	2019	2020	2021	2022	2023
PAXTON	12	3	2		2		4	1

Source: Massachusetts Fire Incident Reporting System Natural Vegetation Fires Data, 2017-2023

Earthquakes

Events listed by Weston Observatory in Boston College were reviewed for all towns in Massachusetts. from 2015 to the present. Listed earthquakes above magnitude 2.0 include:

- 6/1/16 – 51 km ENE of Rockport, 2.4/2.7 [Mn*/Mc**]
- 9/6/17 – 2 km ESE of Athol, 1.5/2.0
- 8/18/18 – 83 km E of Nantucket, 2.5/2.9
- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1
- 12/23/18 – 4 km SW of Gardner, 2.1/2.3
- 1/28/19 – 4 km WSW of Gardner, 1.0/2.0
- 4/27/19 – 24 km NE of Rockport, 1.8/2.1
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 11/2/19 – 230 km ENE of Orleans, 2.2/2.9
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 7/24/20 – 20 km ESE of Woods Hole, 1.8/2.6
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
- 7/25/21 – 5 km W of Peabody, 1.4/2.5
- 1/1/22 – 13 km N of Rockport, 2.3/3.0
- 3/4/22 – 5 km WSW of Orange, 2.2/2.7
- 3/19/22 – 36 km ENE of Rockport, 1.4/2.2
- 9/24/22 – 6 km S of Litleton, 1.9/2.5
- 11/10/22 – 12 km NW of Nantucket, 2.6/3
  *Mn is the Nutli Magnitude (see below)
  **Mc is the Coda Duration Magnitude (see below)

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

Source: Weston Observatory at Boston College New England Seismic Network (NESN) Recent Earthquakes Data, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl

Dam Failure

According to the Massachusetts Office of Dam Safety, there are according to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton.

National ID	Dam Name	Owner	Hazard Potential	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High	
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.
MA0196	Small Pond Dam	Private	N/A	
MA0196	Kauppila Pond Dam	Private	N/A	
MA0196	Arrowhead Pond Dam	Private	N/A	
MA0196	Cournoyer's Dam	Private	N/A	
MA0196	Rasvall Pond Dam	Private	N/A	
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.
MA0286	Turkey Hill Pond Dam	Private	N/A	

Inundation areas for these dams cover less than 10% of the town, or a "small" portion of its area.

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any dam failures having recently occurred in the CMRPC Region.

Sources:

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

MassGIS Data: Dams

Paxton Draft HMP 2021

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences: https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Drought

Year	Maximum Severity
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023 (to August)	D1 conditions in 0.2% of the state

Source: US Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln, https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

Extreme Temperatures

- 02/15/2015: Low pressure off the Delmarva peninsula intensified rapidly as it moved northeastward. Its path just southeast of Nantucket brought heavy snow to all of southern New England and blizzard conditions and coastal flooding to coastal areas. Near blizzard conditions occurred across much of eastern Massachusetts. The large amount of snow, combined with wintry, frigid temperatures resulted in snow piling up on roofs and numerous (250) roof collapses were reported to emergency management and to the National Weather Service in the days after this snowstorm. Fortunately no injuries to humans were reported. However, a large amount of snow fell off a Boston-area ice rink roof, burying a man and knocking down four others. No one was seriously hurt, but two of the people were taken to the hospital for evaluation. In barn collapses in Stoughton and Andover, a total of 40 horses were trapped and rescued. In another barn collapse in Westford, two horses died. In another who would have guessed scenario, a falling icicle ruptured a gas line causing an explosion at the Duxbury House, an Alzheimer's care facility in Duxbury. No one was injured. There were several indirect fatalities related to the snow. These include: a 57 year old man who died shoveling snow, a 57 year old woman hit by a snow plow, and a 60 year old man hit by a snow plow. The Automated Surface Observing System at Fitchburg Municipal Airport (KFIT) recorded wind chills as low as 31 below zero.

- 02/20/2015: High pressure to the west and low pressure to the east funneled winds through southern New England overnight. Coupled with

strong cold advection into the region, this resulted in wind chills well below zero overnight. The Automated Surface Observing System at Fitchburg Municipal Airport recorded wind chills below 25 degrees below zero for six hours.

- 02/13/2016: Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 37 below zero were reported at Fitchburg Airport.

According to the SHMCAP43 warm weather events have occurred across Massachusetts between 1995 and 2018. **The NOAA Storm Events database does not have Record Warmth/Heat or Excessive Heat events listed in the last decade for Northern Worcester County.** However, it should be noted that, in 2012, Massachusetts temperatures broke 27 heat records. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the Heat Index reached 100°F (NOAA Storm Events Database)

Source: Hopedale 2023 HMP

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

- 1/7/2015 - Extreme Cold/Wind Chill
- 1/30- 2/2/2015 - Cold/Wind Chill
- 2/5/2015 - Cold/Wind Chill
- 2/13/2015 - Cold/Wind Chill
- 2/15- 2/16/2015 - Extreme Cold/Wind Chill
- 2/19-2/20/2015 - Extreme Cold/Wind Chill
- 2/23/2015 - Cold/Wind Chill
- 2/13-2/14/16 - Extreme Cold/Wind Chill
- 12/15/2016 - Cold/Wind Chill
- 3/11/2017 - Cold/Wind Chill

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Landslides

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be caused by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas.

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any landslides/mudslides having recently occurred in Worcester County.

Source:

Paxton Daft HMP 2021

Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard- mitigation-and-climate-adaptation-plan-appendix-b/download.

Invasive Species

According to the MDAR Invasive Pest Dashboard Paxton hosts at least 1 invasive species: Emerald Ash Borer and Mile-A-Minute Vine. Beech Leaf Disease was also confirmed to have been found in Paxton in 2021 and Holden borders communities with Spotted Lanternfly. According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir.

Additionally, the Mitigation Team listed the Asian Longhorn Beetle, Pine Blight, and Emerald Ash Borer as invasive species/pests damaging and killing off trees.

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in 2020. Whether stocked intentionally or not, Black Crappie prey on threatened and endangered juvenile salmon that spawn in rivers of the Northwest United States and may further contribute to salmon decline through habitat alteration, though the extent of those impacts are unknown.

Source:

MDAR Invasive Pest Dashboard (arcgis.com)

Forest Health Atlas (uvm.edu)

Microsoft Word - AIS_Plan_2010.doc (mass.gov)

Nonindigenous Aquatic Species (usgs.gov)

Black Crappie (Pomoxis nigromaculatus) - Species Profile (usgs.gov)

Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation and Climate Adaptation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, nor'easters, and tsunamis. It was determined that these hazards are either irrelevant to Paxton due to the town's location, or in the case of nor'easters, that the hazard is already included within another hazard described above (severe winter storms).

The Hazard Mitigation Team also mentioned concerns regarding cyber security breaches, especially with the Town's electric and water operations. There is a risk that a terrorist attack could contaminate the water supply or damage transmission lines.

Sources:
Paxton HMP Draft 2021

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

I. Emergency Response Facilities needed in the event of a disaster
II. Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Paxton
III. Dams
IV. Facilities/Populations that the Team wishes to protect in the event of a disaster

CATEGORY 1, EMERGENCY RESPONSE FACILITIES

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations(/Communications) Center/Police Station/Fire Station**

EOC/ECC/Paxton Police and Fire Department	576 Pleasant Street
EOC/Paxton Police Department Dispatch	Holden, MA

The Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage. The EOC is also not fully equipped and is in need of more equipment, technology, and computers.

2. **Communications/Power Facilities**

Paxton Town Hall	697 Pleasant Street
Communications/Radio/Cell & Microwave Tower	Asnebumskit Road
Communications/Radio/Cell & Microwave Tower	Maple Street
Communications/Radio/Cell & Microwave Tower	Pleasant Street
Wentworth Power Station	Marshall Street
Fiber Connection from Holden	Route 31, Grove St, Maple
St, Pleasant St Southbound, and Richards Ave	

The Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage. The Communication Tower on Asnebumskit Road is utilized for the water system. Trees do cause issues for the communication towers, and the tower on Maple Street has experienced lightning strikes.

3. **Department of Public Works/Highway Department**

DPW/Highway	107 Holden Road

The DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.

4. **Municipal Light Department**

Light Department Headquarters	578 Pleasant Street

The Municipal Light Department also experiences snow load on the roof.

5. **Water Department**

Water Department	107 Holden Road
Maple Street Water Tank	Maple Street

The Maple Street Water Tank site stores supplies needed for water main repairs.

6. **Utilities**

Distribution Lines	(Runs SE-NW through Town)
Asnebumskit Hill Radio Towers	

7. **Primary Evacuation Routes**

Route 122
Route 56
Route 31

These evacuation routes are all two-lane roads, making evacuation in times of crisis more difficult and potentially congested. Additionally, there is a high water table along Route 31 near Spencer, MA.

8. **Shelters**

Paxton Center School - dispensing site	19 West Street
Anna Maria College - primary site	50 Sunset Lane
Congregational Church	1 Church Street
St. Columba Church	10 Richards Avenue

CATEGORY 2, NON-EMERGENCY RESPONSE FACILITIES

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton.

1. **Water Supply**

Maple Street Water Tank	Maple Street
Asnebumskit Pond	
Kettle Brook Reservoir #3	
Kettle Brook Reservoir #4	
Pine Hill Reservoir	
Asnebumskit Road Water Tank	

The Town of Paxton purchases 100% of their municipal water from the City of Worcester. There is concern that falling trees could damage these pre-fab buildings.

2. **Town Facilities**

Town Hall	697 Pleasant Street

The Paxton Town Hall has a backup generator; however, it is small and can likely only heat the building.

CATEGORY 3, DAMS

The third category is a listing of dams in Paxton.

National ID	Dam Name	Owner Type	Hazard Potential	Notes
MA00676	Eames Mill Pond Dam	Public	Significant	Had work done recently
MA00677	Kettle Brook Reservoir #4 Dam	Public	High	
MA00678	Streeter Pond Dam	Private	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Significant	Considered a High Hazard if let go
MA01962	Small Pond Dam	Private	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	
MA01965	Cournoyer's Dam	Private	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	Had work done recently
MA02540	Eames Mill Pond Dam #2	Public	N/A	Had work done recently
MA02375	Illig's Pond Dam	Public	N/A	Have had issues with beaver activity and cresting
MA02865	Turkey Hill Pond Dam	Private	N/A	Potentially a High Hazard dam

For additional information on dams and the dam failure hazard in Paxton, also see Section 4.

CATEGORY 4, FACILITIES/POPULATIONS TO PROTECT

1. Special Needs Population/Elderly Housing/Assisted Living

John Bauer Senior Center	17 West Street
Group Home	420 Pleasant Street
Group Home	54 Streeter Road
Group Home	270 Pleasant Street
Group Home	2 Pine Street
Group Home	157 Suomi Street
Group Home	132 Marshall Street
Group Home	60 Marshall Street
Group Home	33 Camp Street
50+ Community	260 Grove Street
Devereaux Group Home	461 Pleasant Street

These facilities experience issues with flooding as well as snow load on the roof.

2. Public Buildings/Areas

John Bauer Senior Center	17 West Street
Town Hall	697 Pleasant Street
Richards Memorial Library	44 Richards Avenue
Ten West Market	10 West Street

These facilities experience issues with flooding as well as snow load on the roof. Ten West Market has a generator, but it is not an adequate size to run all of the refrigerators.

3. Schools/Daycare

(Please note: The EMD has a list of current daycare facilities but these can change locations and addresses frequently, so this list should be revisited periodically.)

Paxton Center School	19 West Street
Anna Maria College	50 Sunset Lane
Creative Learning Center	170 Richards Avenue
Johansson, Leslie	22 Red Oak Street
Stepping Stones	66 Maple Street
Congregational Church	1 Church Street
Colorful Connections	140 West Street
Turn Back Time	250 Marshall Street

4. Historic Buildings/Sites

According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in November 2021, there are 4 Areas, 98 Buildings, 2 Burial Grounds, 19 Objects, and 5

Structures listed for Paxton. The Hazard Mitigation Team noted that the Town Hall is a historic building as well as the Records building.

5. Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD), the following table shows the largest employers in Paxton:

Largest Employers in Paxton - July 2016		
Company	**Location**	**No. of Employees**
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

6. Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton. While there are no EJ populations within Paxton, future considerations should be given to these populations. The Hazard Mitigation Team noted that approximately 8.7% of the population is disabled, and approximately 15.2% of the population speaks a language other than English in the home. It was also noted that many of the residents at the group and assisted living homes do not have vehicles. In times of crisis, it could be more difficult to evacuate these properties.

Name	pdm_type	pdm_id	In_Hazard
Police Department	CI	1	N
Fire Department	CI	2	N
Pedi-Q Urgent Care	CI	12	Y
Carewell Urgent Care	CI	13	Y
Northborough Senior Center- WasteWater Pump Station present	CI	14	Y
PD & FD Receiver, FD repeater	CI	16	N
Communications Voter - Radio, Ball St	CI	18	Y
Communication - Voter, 300 West Main St	CI	22	N
Communications - Cell Site, 211 Main St, Police Station	CI	24	N
Communication - Roof Top Com Tower, on xtra storage	CI	25	N
Cell Tower - 386 West Main St, Fox Meadow Crossing	CI	26	N
Cable Access TV	CI	27	N
Verizon	CI	28	N
Communications - Cell Tower, Southwest Cutoff (Crown Castle)	CI	29	Y
Town Hall (Wastewater Pumping Station & Generator on site)	CI	30	N
Edmunds Hill 1MG Water Storage Tank	CI	32	Y
Northborough DPW Water Barn	CI	33	N
Northborough DPW Barn	CI	34	N
Hudson St. Public Water Supply, Former MWRA Connection	CI	35	N
Well - Public Brigham St. (Water/Sewer Department Building)	CI	36	N
Well - Public Crawford St.	CI	37	N
Well - Public Howard St.	CI	38	Y
Well - Public Lyman St.	CI	39	N
Cistern - Moore Ln	CI	40	N
Cistern - Old Colonial Rd	CI	42	N
Draft Site - Colburn St	CI	44	N
Draft Site - Green St	CI	45	Y
Draft Site - Hillside Rd	CI	46	N
Draft Site - Howard St	CI	47	Y
Draft Site - Howard St (2)	CI	48	N
Draft Site - Howe Lane	CI	49	N
Draft Site - Maynard St	CI	50	Y
Draft Site - Newton St	CI	51	N
Draft Site - Tomblin Hill Rd	CI	52	Y
Draft Site - West St (1)	CI	53	N
Draft Site - Smith Rd	CI	54	Y
Cell Tower #1	CI	55	Y
Draft Site - Ball St	CI	56	Y
Draft Site - Bearfoot Rd	CI	57	N
Draft Site - West St (2)	CI	58	Y
Draft Site - West St (3)	CI	59	N
MA Highway Depot #039	CI	60	N
Important Intersections: Church St & I-290	CI	61	Y

Important Roads - Hudson St & Marlborough Boundary	CI	62	Y
Important Intersections - Hudson St & Solomon Pond Rd	CI	63	N
Important Road - Rte 20 & Marlborough Boundary	CI	64	Y
Important Intersection - Rte 135 & West Main St	CI	65	Y
Important Intersection - Rte 20 & W. Main St.	CI	66	Y
Important Intersection - Rte 9 & Rte 20	CI	67	Y
Important Road - Rte 135 & Westborough Boundary	CI	68	Y
Important Intersection - Solomon Pond Rd & I-290	CI	69	N
Important Road - W. Main St & Shrewsbury Boundary	CI	70	N
Important Road - 68 Otis St	CI	71	N
Important Roads - Crawford St at stone bridge	CI	72	Y
Important Roads - 290 Overpass at Whitney St	CI	73	Y
RR Dock - private, Lyman St	CI	75	N
RR Crossing - Bearfoot Rd	CI	76	N
RR Crossing - Brigham St	CI	77	N
RR Crossing - Main St	CI	78	Y
RR Crossing - Pierce St	CI	79	Y
RR Crossing - School St	CI	80	N
Bridge - Allen St	CI	81	Y
Bridge - Church St	CI	82	Y
Bridge - CSX Rail Line (Lyman St)	CI	83	Y
Bridge - CSX Rail Line (Rice Ave)	CI	84	N
Bridge - CSX Rail Line (Whitney St)	CI	85	N
Bridge - Davis St	CI	86	Y
Bridge - I-290 Overpass	CI	87	Y
Culvert - Route 135	CI	88	Y
Bridge - Rte 20	CI	89	Y
Utilities - Crown Castle Northborough	CI	90	Y
Utilities - Verizon Communications Center	CI	91	N
Utilities - National Grid Northeast Service Center	CI	92	N
Utilities - National Grid Woodside (Hudson St)	CI	93	N
Services - Central MA Mosquito Project	CI	94	N
Services - TeamWorks, Inc.	CI	95	N
Services - The Bridge of Central MA	CI	96	N
Services - Juniper Hill Golf Course, Inc.	CI	97	N
Beamont/Whitney Place	CI	98	N
Coleman House	CI	99	N
Wastewater Pump Station - 11 Church St	CI	102	Y
Wastewater Pumping Station & Generator - Forbes Road	CI	103	N
Wastewater Pump Station - Hudson St	CI	104	Y
Wastewater Pump Station & Generator - Lincoln St	CI	105	N
Wastewater Pump Station - Otis St	CI	106	N
Wastewater Pump Station - Southwest Cutoff	CI	107	Y
Wastewater Pump Station - Wesson Terrace	CI	108	N

Water Booster Pump Station - Church St @ Autumn Lane	CI	109	Y
Water Booster Pump Station - Southwest Cutoff @ Shops Way	CI	110	Y
Wastewater Pump Station - West Main St	CI	111	N
U.S. Gov Post Office	CI	112	N
Dam - Assabet River	CI	116	Y
Dam - Bartlett Pond	CI	117	Y
Dam - Cider Mill Pond	CI	118	Y
Dam - Cold Harbor Brook	CI	119	Y
Dam - Ellis Pond	CI	120	Y
Dam - Farm Pond	CI	121	N
Dam - Old Adams Pond	CI	122	Y
Dam - Old Mill Pond (SW)	CI	123	N
Dam - Old Mill Pond	CI	124	N
Dam - Old Saw Mill Pond	CI	125	Y
Dam - Small Pond	CI	126	Y
Dam - Smith Pond	CI	127	N
Dam - Storage Pond	CI	128	Y
Dam - Wallace Pond	CI	129	Y
Dam - West Meadow Country Club Pond	CI	130	Y
Dam - Hop Brook	CI	131	Y
School - Robert E Melican Middle School, Emergency Shelter	CI	134	Y
School - ARHS (Comms Voter & Tower, WW Pump, Daycare, POD)	CI	135	N
Schools - Fitzgerald Institute	CI	136	N
School - Lincoln St (Northborough Extended Day Program)	CI	137	N
School - Peaslee	CI	138	N
School - Proctor (Northborough Extended Day Program on site)	CI	139	N
School - St. Bernadette	CI	140	N
School - Marion E Zeh	CI	141	Y
School - Cornerstone Academy	CI	142	N
Schools - Goddard School	CI	143	Y
Special Ed - AMEGO	CI	144	N
Daycare/Children's Program - Skribbles Learning Center	CI	145	N
Daycare/Children's Program - Skribbles Learning Center	CI	146	N
Apartments - Avalon Bay Apartments	CI	149	N
Faith Institution - Church of Christ	CI	152	N
Faith Institution - Church of the Nativity & Nursery School	CI	153	Y
Faith Institution - First Parish Unitarian Church	CI	154	Y
Faith Institution - Jehovah Witness Church	CI	155	N
Faith Institution - Rice Memorial Baptist Church	CI	156	N
Faith Institution - Seventh Day Adventist	CI	157	N
Faith Institution - Shri Gurusthan Sai Temple	CI	158	N
Faith Institution - St. Bernadette's Church	CI	159	N
Faith Institution - St. Rose of Lima Church	CI	160	N
Faith Institution - Trinity Church	CI	161	Y

Bartlett Crossing - 292 Main St.	CI	162	N
Cold Harbor Mall - 369 W. Main St.	CI	163	Y
Northboro Shopping Plaza - 247 West Main St.	CI	164	N
Post Road Marketplace - 318 Main St.	CI	165	N
Shopping Center - 308 Main St., Veenas	CI	166	N
Shopping Center (2) - 276 W. Main St., Picklehouse	CI	167	N
Times Square Plaza - 299 W. Main St.	CI	168	Y
Iron Mountain	CI	169	N
Advocates, Inc./ Northborough Housing Authority	CI	172	N
EconoLodge	CI	173	Y
Motel 6 Boston-Westborough	CI	174	N
Tier II Chem User - Closed Landfill	CI	176	Y
Tier II Chem User - A. Duie Pyle Inc.	CI	177	N
Tier II Chem User - National Grid-New England Distribution	CI	178	N
Tier II Chem User - FedEx Freight, Inc	CI	179	N
Tier II Chem User - Aspen Aerogels	CI	180	N
Tier II Chem User - NewCorr Pkg., LTD	CI	181	N
Tier II Chem User - St. Gobain Research & Development Center	CI	182	N
Tier II Chem User - Steris AST	CI	183	N
Tier II Chem User - Trelleborg Sealing Solutions	CI	184	N
Tier II Chem User - Sanofi Genzyme Northboro Operations Cntr	CI	185	N
Tier II Chem User - Walmart	CI	186	N
Tier II Chem User - Northborough Crossing Mall	CI	187	N
Tier II Chem User - Bigelow Nurseries, Inc.	CI	188	N
Tier II Chem User - Lakeside Oil Company	CI	189	N
Tier II Chem User - Northborough Oil Co., Inc.	CI	190	N
Tier II Chem User - BJ's Wholesale Club Gas Station	CI	191	N
Tier II Chem User - Cumberland Farms	CI	192	Y
Tier II Chem User - Northboro Center Mobile	CI	193	Y
Tier II Chem User - Northborough Sunoco	CI	194	N
Tier II Chem User - Peterson Northborough	CI	195	N
Tier II Chem User - Speed Energy	CI	196	N
Tier II Chem User - Top Energy	CI	197	Y
Tier II Chem User - Tradebe Treatment & Recycling	CI	198	N
Northborough Housing Authority - Heritage Village	CI	199	Y
Northborough Housing Authority -Rutland Rd	CI	200	Y
Northborough Housing Authority - Colonial Village	CI	201	N
Gale Library	CI	202	Y
Communications - Cell Tower, Bearfoot Rd	CI	203	Y
Northborough Manor	CI	207	Y
Aprende Spanish Immersion Daycare	CI	211	N
Boylston Emergency Management Cell Tower - 351 Ball Street	CI	212	Y
Otis Street Adult Daycare	CI	213	N
Nashoba Montessori School, Inc	CI	220	Y

CVS Urgent Care	CI		223	Y
Memory Care Facility	CI		225	Y
Communications Tower- 119 Colburn St	CI		226	Y
Highway Garage	CI		228	N
MWRA Connection	CI		229	N
Tougas Family Farm Worker Dorm	CI		230	Y
Alcohol/Substance Recovery Center- 144 W Main St	CI		231	N
Alcohol/Substance Recovery Center- 150 W Main St	CI		232	N
Luther Rice Home	CI		233	N
Justice Resource Institute Developing Abilities	CI		234	N
Community Resources for Justice	CI		235	N
Northborough Historical Society	CI		236	N
Residential Board and Cares Home-Vinfen Group Home	CI		237	Y
Residential Board and Cares- Advocates Inc 178 South Street	CI		238	N
Residential Board and Cares- Advocates Inc. 29 Thoreau Rd	CI		239	N
Residential Board and Cares- Advocates Inc 342 Boundary St	CI		240	N
Residential Board and Cares- Mentor Neuro Restorative	CI		241	N
Residential Board and Cares- 8 Saddle Hill Drive	CI		242	Y
RJ Devereaux Corp.	CI		243	N
Assabet Hill Comm Tower (lightning) and 3.5 MG Water Storage	CI/H	LG-1		Y
Severe Wind/Rain - Davidian Brothers Farm Lightning	H	LG-2		NA

Name	PDM_ID	PDM_Type	In_Hazard
Evacuation Route - Belmont Street	4	CI	Y
Evacuation Route - Main St @ Marlborough border to SWCutoff	6	CI	Y
Evacuation Route - 520 Main St to Shrewsbury border	7	CI	Y
Evacuation Route - 12 South St to Westborough border	8	CI	Y
Evacuation Route - I-290 Interchange	9	CI	Y
Evacuation Route - I-290 Interchange (2)	10	CI	Y
Evacuation Route - Rte 9 Interchange	11	CI	Y
CSX Rail Line	74	CI	Y
Aqueduct - Wachusett-Hultman	150	CI	Y
Aquaduct - Wachusett-Cosgrove	151	CI	N
Tier II Chem User - Natural Gas Line	175	CI	Y
Important Road- Bartlett St	208	CI	Y
Crawford Street Bridge/Evacuation route	209	CI	Y
Important Road- Cedar Hill Street	210	CI	N
Dam Failure - Wallace Pond Dam on Hudson St	DF-1	H	NA
Dam Failure-Bartlett Pond Dam (evacuation route)	DF-2	CI/H	Y
Dam Fail - Northboro Reservoir Dam on Castle & Reservoir Rd	DF-3	H	NA
Flooding - West St & Cherry St	FL-1	H	NA
Flooding- West St	FL-10	H	NA
Flooding- SW Cutoff	FL-11	H	NA
Flooding- Brewer St	FL-12	H	NA
Flooding - Fay Lane & Lower Pleasant St	FL-2	H	NA
Flooding - US-20 @ Tomblin Hill Rd	FL-3	H	NA
Flooding - Davis St & Davis Ave near Rte 135	FL-5	H	NA
Flooding - Boundary St/Town Line	FL-6	H	NA
Flooding- Howard St	FL-7	H	NA
Flooding- Green St	FL-8	H	NA
Flooding- Ball St	FL-9	H	NA
Severe Snow/Ice - Howard St old trees, power lines down	SS-1	H	NA
Ball Street winter hazard	SS-2	H	NA
Severe Wind/Rain - Davis St	ST-1	H	NA
Severe Wind/Rain - Northgate Rd	ST-2	H	NA
Wildfires â€“ I-290 border (I-290 is an evacuation route)	WF-4	CI/H	Y
Wildfire â€“ Church St (Church St is an evacuation route)	WF-5	CI/H	Y
Wildfire- Brewer St	WF-6	H	NA

Name	PDM_Type	PDM_ID	In_Hazard
Wildfire - Mt. Pisgah	H	WF-1	NA
Wildfire - Little Chauncy Pond Fires	H	WF-3	NA
Wildfire- Edmunds Hill	H	WF-7	NA

4.1. Element A: Planning Process

Overall Intent. The planning process section of the mitigation plan documents how the plan was developed, who was involved and what data and information were used to build or update the plan. A successful planning effort includes active participation and buy-in from community leaders, stakeholders and the public. The National Mitigation Framework emphasizes the valuable role of collaboration among various sectors to ensure that mitigation capabilities continue to grow and that comprehensive mitigation includes strategies for all community sectors. Examples of sectors with mitigation capabilities are those agencies and stakeholders responsible for:

- Emergency management.
- Economic development.
- Land use and development.
- Housing.
- Health and social services.
- Infrastructure (including transportation and other community lifelines).
- Natural and cultural resources.

In addition, FEMA's National Response Framework, 4th Edition identifies critical community lifelines, which are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. Community lifelines include the following:

- Safety and Security.
- Food, Water, Shelter.
- Health and Medical.
- Energy.
- Communications.
- Transportation.
- Hazardous Material.

Efforts to mitigate potential impacts to community lifelines are key to building resilience. These community lifelines connect to the sectors in the National Mitigation Framework and the Recovery Support Functions under the National Disaster Recovery Framework; the same agencies and departments that support these sectors also often support community lifelines and the recovery mission.

Involving members from these key sectors in the planning process will result in a shared understanding of risks. It will also help build widespread support for directing financial, technical and human resources toward natural hazard risk reduction.

Documenting the planning process is a crucial step for future plan updates. By building on the work that has already been done, the community can incorporate best practices and insights learned from previous processes while avoiding past challenges.

Element A Requirements
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1))
A1-a. The plan must describe the current planning process. Documentation requirements typically are met with a narrative description, but may also include other records such as copies of meeting minutes, sign-in sheets or newspaper articles. When a narrative description is provided, supporting documentation such as meeting minutes, sign-in sheets, etc., does not need to be included in the plan itself. Planners are encouraged to retain supporting documentation in a Plan Appendix as a record of how decisions were made and who was involved. **Document** means to provide factual evidence for how the participants developed/updated the plan. **Involvement** means being engaged and actively participating in the development of the plan; providing input and directly providing, affecting or editing plan content as the representative of the participating jurisdiction(s) or organization. *If applicable, ensure that participating Community Rating System (CRS) jurisdictions maximize points throughout the planning process.*
A1-b. The plan must list the representatives from each of the participants in the current plan that will seek approval, and how they participated in the planning process. The plan must identify who participated, by agency and title. **Participant** means any local government or entity developing or updating a local mitigation plan. **Participation** means being engaged and having the chance to provide input on the plan. It can be defined and met in a variety of ways (such as attendance at meetings, reviewing and commenting on drafts, etc.).

Element A Requirements
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2))

A2-a. The plan must provide documentation of an opportunity for stakeholders to be involved in the current planning process. Documentation of this opportunity must identify how ***each*** of the following types of stakeholders were presented with this opportunity, as applicable.

1. Local and regional agencies involved in hazard mitigation activities:
   - Examples include public works, emergency management, local floodplain administration and Geographic Information Systems (GIS) departments.
2. Agencies that have the authority to regulate development:
   - Examples include: zoning, planning, community and economic development departments; building officials; planning commissions; or other elected officials.
3. Neighboring communities:
   - Examples include adjacent local governments, including special districts, such as those that are affected by similar hazard events or may share a mitigation action or project that crosses boundaries. Neighboring communities may be partners in hazard mitigation and response activities, or may be where critical assets, such as dams, are located.
4. Representatives of businesses, academia, and other private organizations:
   - Examples include private utilities or major employers that sustain community lifelines.
5. Representatives of nonprofit organizations, including community-based organizations, that work directly with and/or provide support to underserved communities and socially vulnerable populations, among others:
   - Examples include housing, healthcare or social service agencies.

An **opportunity to be involved** in the planning process means that these stakeholders are invited to be engaged or are asked to provide information or input to inform the plan's content. Different communities may necessitate more targeted outreach and engagement, especially underserved communities.

Community Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society to function. The integrated network of assets, services and capabilities that provide community lifeline services are used day to day to support recurring needs. Lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security, as described in the National Response Framework, 4th Edition.

The specific entities may be defined by each jurisdiction based on the unique characteristics of the local government, including special districts. The purpose of inviting input is to integrate natural hazard risk reduction across all community systems, as well as encourage implementation of mitigation actions.

Element A Requirements
A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1))
A3-a. The plan must document how the public had an opportunity to be involved in the current planning process, and what that participation entailed, including how underserved communities and vulnerable populations within the planning area were provided an opportunity to be involved. The opportunity must occur during the plan's development, which means prior to the plan's submission for formal review. In addition, the plan must document how public feedback was included throughout the planning process. *Examples of documentation include, but are not limited to, narratives, materials from open meetings, screenshots of social media postings and/or interactive websites with drafts for public review and comment, questionnaires or surveys through utility bills, etc.*
A4. Does the plan describe the review and incorporation of existing plans, studies, reports and technical information? (Requirement 44 CFR § 201.6(b)(3))
A4-a. The plan must document what existing plans, studies, reports and technical information were reviewed and how they were incorporated, if appropriate, into the development/update of the plan. For jurisdictions with structures for which National Flood Insurance Program (NFIP) coverage is available, regulatory flood mapping products [13] are required to be incorporated, if appropriate. *Participants may use other jurisdiction-specific materials, including non-regulatory flood mapping products, that improve upon NFIP regulatory flood mapping products.* *Gaps and limitations may be addressed as actions in the mitigation strategy, in particular for items that require additional assistance.* **Incorporate** means to reference or include information from other existing sources to form the content of the mitigation plan. *The documentation requirement may be met with narrative or citations (i.e., footnotes, in-text citations or a bibliography). Examples of the types of existing sources include, but are not limited to: the state hazard mitigation plan; local plans (such as comprehensive/master/general land use, economic development, capital improvement, affordable housing, resource management, resilience, climate, etc.); and hazard-specific reports and plans (such as Community Wildfire Protection Plans).*

[13] **Regulatory flood mapping products** are intended to be used as the basis for official actions required by the NFIP (https://www.fema.gov/flood-maps/products-tools/products). These can be found via the FEMA Map Service Center (https://msc.fema.gov/portal/home).

State and Local Mitigation Planning Policy Guides: Summary of Changes

The State and Local Mitigation Planning Policy Guides (policies) are the official interpretation of the requirements in the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended and other federal statutes as well as in federal regulations, specifically Title 44 Code of Federal Regulations (CFR) Section 201-Mitigation Planning. This summary presents the key changes to the two policies released in April 2022.

Update Highlights

The 2022 policies clarify what FEMA requires for state and local mitigation planning, respectively. The updated policies become effective for all mitigation plan approvals one year from the official release date, April 2022.

State Mitigation Planning Policy Guide

The state policy applies to state governments that update, maintain and implement state mitigation plans. The primary users are state staff that oversee mitigation plan updates and the FEMA officials that review and approve those plans. There are two kinds of state plans: standard and enhanced. All states must meet the standard plan requirements. Enhanced states must meet the standard and enhanced state requirements.

STANDARD STATE UPDATES

The state policy:

- Requires that state plans consider equity and climate change impacts.
- Outlines participants in the state planning process. The process involves a broad range of state and other partners. This includes community lifelines and climate change experts. It also includes state agencies and others that support underserved communities.
- Requires states to describe building code adoption and enforcement, land use, National Flood Insurance Program (NFIP) administration and flood risk mapping in the capability assessment.
- Includes existing mitigation plan requirements for the High Hazard Potential Dams (HHPD) grant program to include all dam risks. Removes the optional Repetitive Loss Strategy.

FEMA

- Includes existing mitigation plan requirements for the Fire Management Assistance Grants program.

ENHANCED STATE UPDATES

The state policy:

- Introduces more advanced lead times and pre-submission coordination for new enhanced states. Provides a more detailed plan submission and review process.
- Requires states that wish to become enhanced to first show they can meet Hazard Mitigation Assistance (HMA) grant performance requirements.
- Requires that states demonstrate local jurisdictions have approved mitigation plans as part of the state's commitment to mitigation. The state must show how it supports the update and adoption of these plans before expiration.
- Strongly encourages enhanced states to adopt and enforce building codes that advance mitigation and resilience.

Local Mitigation Planning Policy Guide

The local policy applies to local governments that develop, update, maintain and implement their own mitigation plans. The primary users of this guide are local staff that oversee mitigation plans and the federal and state officials who review and approve those plans. The local policy includes the following changes:

- Defines who local governments must include in the planning process. This includes representatives from a broad range of sectors, community lifelines, the public and community-based organizations that support underserved communities.
- Requires local governments to include the effects of climate change and other future conditions in the risk assessment.
- Recognizes the important role of adopting and enforcing building codes and land use and development ordinances in the local government's ability to improve mitigation capabilities.
- Facilitates stronger alignment with other FEMA mitigation programs such as the National Flood Insurance Program (NFIP), Community Rating System and flood risk mapping program.
- Explains the need to right-size the scope of a plan update, consider both current and future risks, and complete the planning process with plan adoption.
- Includes existing mitigation plan requirements for the High Hazard Potential Dams (HHPD) grant program to include all dam risks. Removes the optional Repetitive Loss Strategy.
- Reorganized requirements for ease of use.

Other Updates

Both policies reflect program and administrative changes to other FEMA programs. This includes programs for which a mitigation plan is a condition of eligibility. For example, references to the Pre-Disaster Mitigation program have been deleted and new grant programs including Building Resilient Infrastructure and Communities have been added.

Both policies connect mitigation planning with community resilience. They also align with FEMA's 2022-2026 Strategic Plan. These priorities include promoting climate change and equity.

For More Information

Download the State Mitigation Planning Policy Guide on FEMA's state mitigation planning resources page.

Download the Local Mitigation Planning Policy Guide on FEMA's local mitigation planning resources page.

This fact sheet summarizes important changes to the State and Local Mitigation Planning Policy Guides. Users should read each guide, including the narrative and the requirements tables.

Questions? Contact the lead Community Planner in the Mitigation Division of your FEMA regional office.

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: **March 21st , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

AGENDA

I. Introductions

II. Meeting #1 Recap

III. Community Lifelines

IV. Reference Documents

V. Natural Hazards Review

a. Flooding
b. Severe Snowstorms, Ice Storms, and Nor'easters
c. Hurricanes
d. Severe Thunderstorms, Wind, and Tornadoes
e. Wildfires and Brushfires
f. Earthquakes
g. Dam Failure
h. Drought
i. Extreme Temperatures
j. Landslides
k. Invasive Species
l. Other Hazards

VI. Critical Infrastructure/Facilities and Vulnerable Populations Review

Category 1 – Emergency Response Facilities

Category 2 – Non-Emergency Response Facilities

Category 3 – Dams

Category 4 – Populations and Facilities to Protect

VII. Survey Review and Update

VIII. Next Meeting – Existing Protection Measures Review, Public Forum and Community Survey Planning

- Date/location
- What to prepare

Community Lifeline Components



Multiple components and subcomponents establish the parameters of the lifeline; component-level assessment is required to determine the condition of each lifeline.

1. Safety and Security
- Law Enforcement/Security
- Fire Service
- Search and Rescue
- Government Service
- Community Safety

2. Food, Hydration, Shelter
- Food
- Hydration
- Shelter
- Agriculture

3. Health and Medical
- Medical Care
- Public Health
- Patient Movement
- Medical Supply Chain
- Fatality Management

4. Energy
- Power Grid
- Fuel

5. Communications
- Infrastructure
- Responder Communications
- Alerts, Warnings, and Messages
- Finance
- 911 and Dispatch

6. Transportation
- Highway/Roadway/Motor Vehicle
- Mass Transit
- Railway
- Aviation
- Maritime

7. Hazardous Material
- Facilities
- HAZMAT, Pollutants, Contaminants

8. Water Systems
- Potable Water Infrastructure
- Wastewater Management

ASSESSMENT	
Status	***"What?"***
Impact	***"So What?"***
Actions	***"Now What?"***
Limiting Factors	***"What's the Gap?"***
ETA to Green	***"When?"***

Community Lifelines

A "lifeline" enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security.

Why Lifelines?

FEMA developed the community lifelines construct to increase effectiveness in disaster operations and better position the Agency to respond to catastrophic incidents.

Lifelines are the most fundamental services in the community that, when stabilized, enable all other aspects of society. When disrupted, decisive intervention (e.g., rapid service re-establishment or employment of contingency response solutions) is required.

During initial response, priority efforts focus on understanding and addressing community impacts.

Lifelines provide an outcome-based, survivor- centric frame of reference that assists responders with:

- Root Cause Analysis
- Interdependencies
- Prioritization
- Ease of Communication

How Lifelines Were Developed

FEMA released initial guidance *(Lifelines Toolkit)* introducing the lifelines construct in February 2019, followed by significant stakeholder outreach and feedback including:

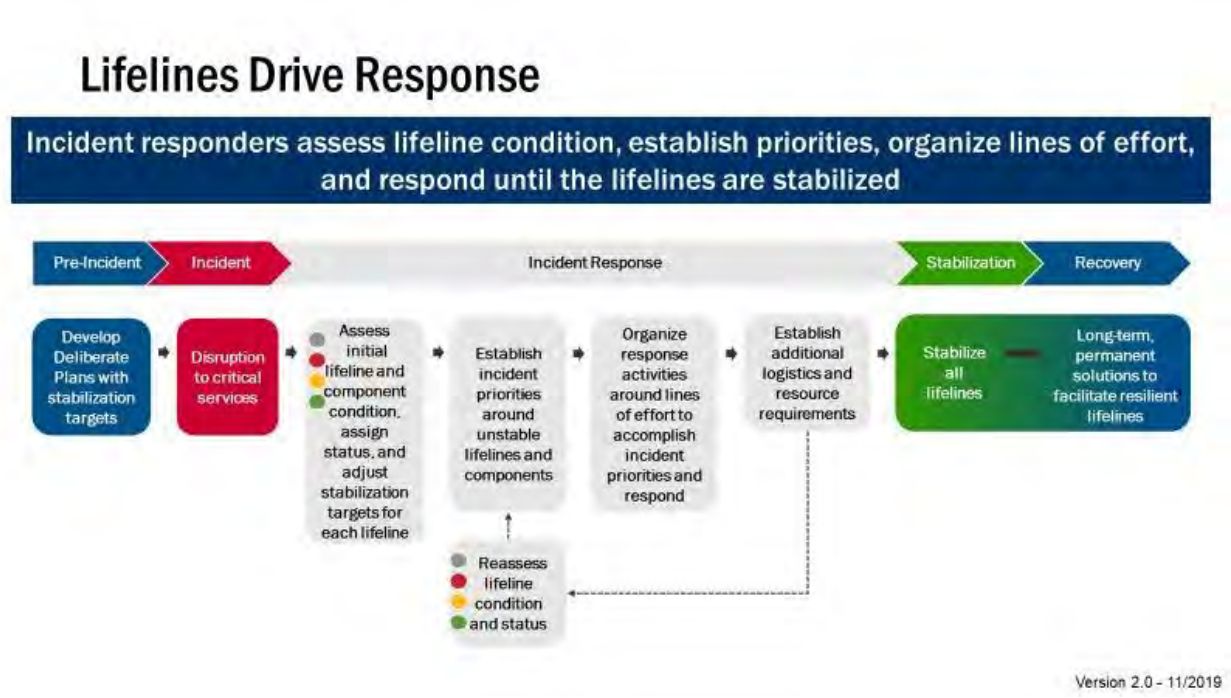
- State and Local Emergency Managers

- Interagency Partners
- Private and Non-Profit Stakeholders

Construct was validated during responses to Hurricanes Michael, Florence, and Dorian, Super Typhoon Yutu, Alaska Earthquake, and during Shaken Fury full-scale exercise.

Lessons learned from exercises, operations, and stakeholder feedback resulted in refinement and improvement to the construct.

National Response Framework (NRF) 4th Edition formalized lifelines in national response policy, and enhanced Lifelines guidance *(Lifelines Toolkit 2.0)* released to support NRF publication.



View the Community Lifelines Implementation Toolkit.

If you have any questions or feedback, please email them to:
Lifelines@fema.dhs.gov

Hazards Since (or Soon Before) Last Plan Update in 2018

Flooding

- 8/15/2015 – Flood: A weak cold front moving through southern New England brought showers and thunderstorms to the region. These storms produced hail and damaging winds as well as some poor drainage street flooding.
- 9/30/2015 – Flood: A cold front moved across southern New England bringing heavy rain, strong winds, and periods of coastal flooding along the south coast.
- 10/30/17 – Flood: The remnants of Tropical Storm Phillipe merged with a mid-latitude system approaching the U.S. East Coast. Tropical moisture flowing north ahead of the cold front contributed to heavy downpours with one to five inches of rain reported.
- 11/3/2018 – Flood: Heavy rain occurred in the early morning hours, with generally 1.50 to 2.50 inches in eastern sections of southern New England and up to 3.66 inches in the slopes of the Berkshires.
- 7/6/19 – Flood: A cold front advanced into a very moist, almost tropical air mass in place across southern New England. This produced a line of thunderstorms, some with torrential downpours that caused flooding.
- 7/9/21 – Flood: Tropical Storm Elsa made landfall in Rhode Island on Friday morning before moving into the Gulf of Maine. It interacted with a stalled frontal boundary and brought widespread heavy rainfall of 2 to 3.5 inches.
- 11/12/21 – Flood: Strong southerly wind flow out ahead of an advancing cold front produced strong to damaging wind gusts and some heavy rain that caused some street and basement flooding.
- 07/14/2023 – Flood: A cluster of thunderstorms moved northward into Connecticut during the morning ahead of a short-wave trough southwest of southern New England. The showers and thunderstorms spread northeastward into the early afternoon. One storm produced a lightning strike that started a house fire in northeast Massachusetts. Several roads were flooded in Worcester County. In Holden, Main St and several side streets were flooded in spots up to one ft.
- 09/11/2023 – Flash Flood: A deamplifying mid level shortwave with dewpoints in the 70s and decent instability brought scattered thunderstorms and widespread flash flooding to Massachusetts and Rhode Island. There were many streets closed, many cars stranded in flood waters, and several houses with flooded basements or first floors. In Leominster, flash flooding caused widespread damage to residences and municipal properties.

Sources:
Hopedale 2023 HMP
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Flash+Flood&eventType=%28Z%29+Flood&eventType=%28C%29+Heavy+Rain&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2000&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Severe Snowstorms / Ice Storms / Nor'easters

While the Fujita and Saffir-Simpson Scales characterize tornadoes and hurricanes respectively, there is no widely used scale to classify snowstorms. The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10 inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus NESIS gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact.

NESIS scores are a function of the area affected by the snowstorm, the amount of snow, and the number of people living in the path of the storm. The Storm events listed below occurred throughout the Northeast region.

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

Rank	Start	End	NESIS	Category	Description	Map
2	2022-12-21	2022-12-26	2.66	2	Significant	December 21-26, 2022Dec 21-26, 2022
4	2022-12-13	2022-12-20	8.52	4	Crippling	December 13-20, 2022Dec 13-20, 2022
67	2022-01-28	2022-01-30	1.73	1	Notable	January 28-30, 2022Jan 28-30, 2022
72	2022-01-04	2022-01-07	1.60	1	Notable	January 4-7, 2022Jan 4-7, 2022
88	2022-01-01	2022-01-03	1.06	1	Notable	January 1-3, 2022Jan 1-3, 2022
25	2021-01-30	2021-02-03	4.93	3	Major	January 30 - February 3, 2021Jan 30 - Feb 3, 2021
46	2020-12-14	2020-12-18	3.21	2	Significant	December 14-18, 2020Dec 14-18, 2020

83	2019-03-03	2019-03-04	1.29	1	Notable	March 3-4, 2019Mar 3-4, 2019

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

Previous Instances of Declared Winter Storm Disasters in Massachussetts

- Severe Winter Storm, Snowstorm, and Flooding /FEMA-4214-DR-MA, April 2015
- Severe Winter Storm and Snowstorm/FEMA-4379-DR, March 2018

Sources:

2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate-adaptation-plan-appendix-b/download.

https://www.ncei.noaa.gov/access/monitoring/rsi/nesis

https://www.ncei.noaa.gov/monitoring-content/snow-and-ice/rsi/docs/kocin-and-uccellini-2004.pdf

Hurricanes

Paxton's location in Central Massachusetts approximately 45 miles inland reduces the risk of extremely high winds that are associated with hurricanes, although it can still experience some high wind events.

Storm Name	Year	Saffir/Simpson Category (when reached MA)
Andrea	2013	Extratropical Storm
Florence	2018	Extratropical Storm
Elsa	2021	Tropical Storm
Fred	2021	Extratropical Storm
Henri	2021	Tropical Storm/Depression

Sources:
NOAA Historical Hurricane Tracks Map, https://coast.noaa.gov/hurricanes/#map=6.06/42.065/-71.688&search=eyJzZWFyY2hTdHJpbmciOiJNYXNzYWNodXNldHRzLCBVU0EiLCJzZWFyY2hUeXBlIjoiZ2VvY29kZWQiLCJvc21JRCI6IjYxMzE1IiwiY2F0ZWdvcmllcyI6WyJINSIsIkg0IiwiSDMiLCJIMiIsIkgxIiwiVFMiLCJURCIsIkVUIl0sInllYXJzIjpbXSwibW9udGhzIjpbXSwiZW5zbyI6W10sInByZXNzdXJlIjp7InJhbmdlIjpbMCwxMDMwXSwiaW5jbHVkZVVua25vd25QcmVzc3VyZSI6dHJ1ZX0sImJ1ZmZlciI6NjAsImJ1ZmZlclVuaXQiOlsiTmF1dGljYWwgTWlsZXMiXSwic29ydFNlbGVjdGlvbiI6eyJ2YWx1ZSI6InllYXJzX25ld2VzdCIsImxhYmVsIjoiWWVhciAoTmV3ZXN0KSJ9LCJhcHBseVRvQU9JIjp0cnVlLCJpc1N0b3JtTGFiZWxzVmlzaWJsZSI6dHJ1ZX0=.
Paxton Draft HMP Page 21

Tornadoes, Thunderstorms, and High Wind Events

- In 1953, an F4 tornado struck the City of Worcester, directly southeast of Paxton. The event resulted in at least

90 fatalities, and more than 1,200 injured. There was extensive property damage. On the same date, an F3 tornado began in the Town of Sutton, south-southeast of Worcester, 18 miles southeast of Paxton.

- In 1970, a category F3 tornado traveled from the Towns of Hardwick to Littleton, missing Paxton only by a few miles.
- In 1981 an F3 tornado struck, resulting in just 3 injuries and very little reported property damage.
- July 19, 2007 Tornado (New Braintree), EF-0, light damage, no fatalities, no injuries
- August 31, 2014 Tornado (Worcester), EF-0, light damage, no fatalities, no injuries
- July 26, 2018 Tornadoes (East Douglas, Uxbridge, Whitinsville and Upton), both EF-1, moderate damage, no fatalities, no injuries
- October 23, 2018 Tornado (Hardwick), EF-1, moderate damage, no fatalities, no injuries
- August 19, 2021 Tornado (Webster), EF-0, light damage, no fatalities, no injuries
- August 23, 2021 Tornado (Marlborough, Southborough), light damage, EF-0, no fatalities, no Injuries

Source: ArcGIS Tornado Tracks Data, data from Texas Parks & Wildlife, Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS,
https://www.arcgis.com/apps/View/index.html?appid=01672085b139432e8fe1296a743f67d7.
https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Hail&eventType=%28Z%29+High+Wind&eventType=%28Z%29+Strong+Wind&eventType=%28C%29+Thunderstorm+Wind&eventType=%28C%29+Tornado&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS
Paxton 2021 Draft HMP Plan

Wildfires / Bush Fires

Department	# of Incidents	# of Acres Burned (Fire Module)	# of Acres Burned (Wildland Module)	Total Acres Burned	Fire Service Injuries	Civilian Injuries	Fire Service Deaths	Civilian Deaths	Dollar Loss
PAXTON	12		1.7	1.7	0	0	0	0	$ -

Department	Total # of Brush Fires	2017	2018	2019	2020	2021	2022	2023
PAXTON	12	3	2		2		4	1

Source: Massachusetts Fire Incident Reporting System Natural Vegetation Fires Data, 2017-2023

Earthquakes

Events listed by Weston Observatory in Boston College were reviewed for all towns in Massachusetts. from 2015 to the present. Listed earthquakes above magnitude 2.0 include:

- 6/1/16 – 51 km ENE of Rockport, 2.4/2.7 [Mn*/Mc**]
- 9/6/17 – 2 km ESE of Athol, 1.5/2.0
- 8/18/18 – 83 km E of Nantucket, 2.5/2.9
- 12/21/18 – 3 km WSW of Gardner, 2.1/2.1
- 12/23/18 – 4 km SW of Gardner, 2.1/2.3
- 1/28/19 – 4 km WSW of Gardner, 1.0/2.0
- 4/27/19 – 24 km NE of Rockport, 1.8/2.1
- 8/21/19 – 2 km SSE of Wareham, 1.7/2.4
- 11/2/19 – 230 km ENE of Orleans, 2.2/2.9
- 12/3/19 – 4 km SSE of Plymouth, 1.6/2.2
- 7/24/20 – 20 km ESE of Woods Hole, 1.8/2.6
- 11/8/20 – 11 km SW of New Bedford, 3.8/3.4
- 11/22/20 – 12 km WSW of New Bedford, 1.7/2.6
- 7/25/21 – 5 km W of Peabody, 1.4/2.5
- 1/1/22 – 13 km N of Rockport, 2.3/3.0
- 3/4/22 – 5 km WSW of Orange, 2.2/2.7
- 3/19/22 – 36 km ENE of Rockport, 1.4/2.2
- 9/24/22 – 6 km S of Litleton, 1.9/2.5
- 11/10/22 – 12 km NW of Nantucket, 2.6/3
  *Mn is the Nutli Magnitude (see below)
  **Mc is the Coda Duration Magnitude (see below)

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

Source: Weston Observatory at Boston College New England Seismic Network (NESN) Recent Earthquakes Data, http://aki.bc.edu/cgi-bin/NESN/recent_events.pl

Dam Failure

According to the Massachusetts Office of Dam Safety, there are according to the Massachusetts Office of Dam Safety, there are 13 dams in Paxton, of which 1 is High Hazard, 2 are Significant Hazard, 1 is Low Hazard, and the other 9 are rated Not Applicable (N/A). In addition to the 13 dams in town, the Pine Hill Pond Dam (High Hazard, MA00623, largest dam owned and maintained by the City of Worcester) in the neighboring Town of Holden, lies roughly 0.1 miles north of the Paxton border, and 0.6 miles northeast from a somewhat populated section of Paxton.

National ID	Dam Name	Owner	Hazard Potential	Notes
MA0067	Eames Mill Pond Dam	DCR	Significant	Had work done recently.
MA0067	Kettle Brook Reservoir #4 Dam	City of Worcester	High	
MA0067	Streeter Pond Dam	Private	Low	Overflows regularly due to beaver activity.
MA0067	Asnebumskit Pond Dam	Town of Paxton	Significant	If this dam failed, it would take out roads, driveways, and any property that borders Streeter Pond.
MA0196	Small Pond Dam	Private	N/A	
MA0196	Kauppila Pond Dam	Private	N/A	
MA0196	Arrowhead Pond Dam	Private	N/A	
MA0196	Cournoyer's Dam	Private	N/A	
MA0196	Rasvall Pond Dam	Private	N/A	
MA0253	Eames Mill Pond Dam #1	DCR	N/A	Had work done recently.
MA0254	Eames Mill Pond Dam #2	DCR	N/A	Had work done recently.
MA0237	Illig's Pond Dam	Town of Paxton	N/A	This dam is in poor shape, but is more of a spillway.
MA0286	Turkey Hill Pond Dam	Private	N/A	

Inundation areas for these dams cover less than 10% of the town, or a "small" portion of its area.

The Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any dam failures having recently occurred in the CMRPC Region.

Sources:

Massachusetts State Hazard Mitigation and Climate Adaptation Plan

MassGIS Data: Dams

Paxton Draft HMP 2021

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences: https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Drought

Year	Maximum Severity
2018	D1 conditions in 36% of the state
2019	D0 conditions in 85% of the state
2020	D3 conditions in 36% of the state
2021	D2 conditions in 1% of the state
2022	D3 conditions in 70% of the state
2023 (to August)	D1 conditions in 0.2% of the state

Source: US Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln, https://droughtmonitor.unl.edu/DmData/DataDownload/StatisticsbyThreshold.aspx

Extreme Temperatures

- 02/15/2015: Low pressure off the Delmarva peninsula intensified rapidly as it moved northeastward. Its path just southeast of Nantucket brought heavy snow to all of southern New England and blizzard conditions and coastal flooding to coastal areas. Near blizzard conditions occurred across much of eastern Massachusetts. The large amount of snow, combined with wintry, frigid temperatures resulted in snow piling up on roofs and numerous (250) roof collapses were reported to emergency management and to the National Weather Service in the days after this snowstorm. Fortunately no injuries to humans were reported. However, a large amount of snow fell off a Boston-area ice rink roof, burying a man and knocking down four others. No one was seriously hurt, but two of the people were taken to the hospital for evaluation. In barn collapses in Stoughton and Andover, a total of 40 horses were trapped and rescued. In another barn collapse in Westford, two horses died. In another who would have guessed scenario, a falling icicle ruptured a gas line causing an explosion at the Duxbury House, an Alzheimer's care facility in Duxbury. No one was injured. There were several indirect fatalities related to the snow. These include: a 57 year old man who died shoveling snow, a 57 year old woman hit by a snow plow, and a 60 year old man hit by a snow plow. The Automated Surface Observing System at Fitchburg Municipal Airport (KFIT) recorded wind chills as low as 31 below zero.

- 02/20/2015: High pressure to the west and low pressure to the east funneled winds through southern New England overnight. Coupled with

strong cold advection into the region, this resulted in wind chills well below zero overnight. The Automated Surface Observing System at Fitchburg Municipal Airport recorded wind chills below 25 degrees below zero for six hours.

- 02/13/2016: Arctic high pressure brought strong northwest winds and extremely cold wind chills to southern New England. Many locations reported wind chills between 25 and 35 degrees below zero. Wind chills as low as 37 below zero were reported at Fitchburg Airport.

According to the SHMCAP43 warm weather events have occurred across Massachusetts between 1995 and 2018. **The NOAA Storm Events database does not have Record Warmth/Heat or Excessive Heat events listed in the last decade for Northern Worcester County.** However, it should be noted that, in 2012, Massachusetts temperatures broke 27 heat records. Most of these records were broken between June 20 and June 22, 2012, during the first major heat wave of the summer to hit Massachusetts and the East Coast. In July 2013, a long period of hot and humid weather occurred throughout New England. One fatality occurred on July 6, when a postal worker collapsed as the Heat Index reached 100°F (NOAA Storm Events Database)

Source: Hopedale 2023 HMP

https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Cold%2FWind+Chill&eventType=%28Z%29+Excessive+Heat&eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=2014&endDate_mm=11&endDate_dd=30&endDate_yyyy=2023&county=WORCESTER%3A27&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

- 1/7/2015 - Extreme Cold/Wind Chill
- 1/30- 2/2/2015 - Cold/Wind Chill
- 2/5/2015 - Cold/Wind Chill
- 2/13/2015 - Cold/Wind Chill
- 2/15- 2/16/2015 - Extreme Cold/Wind Chill
- 2/19-2/20/2015 - Extreme Cold/Wind Chill
- 2/23/2015 - Cold/Wind Chill
- 2/13-2/14/16 - Extreme Cold/Wind Chill
- 12/15/2016 - Cold/Wind Chill
- 3/11/2017 - Cold/Wind Chill

Source: 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard-mitigation-and-climate- adaptation-plan-appendix-b/download.

Landslides

Though the Town has large hills, significant water bodies, and rivers, there are no documented previous occurrences of significant landslides in Paxton. This may be because most of its water bodies and rivers are dammed, which can minimize landslide risk. Most roadways are not built close to river channels, reducing undercutting risk from stormwater-induced bank erosion. The roadways that are built near rivers remain unaffected. The only area in Town that receives frequent flooding, despite increasing culvert sizes, is the Hill Street area, which is believed to be caused by beaver dams. High slope terrain (defined as 15 to 25% grade) cover 550 acres, or only 5.6% of the town; very high slopes (higher than 25% grade) cover only 75 acres, or less than 1% of the town's area. Little development is present in these areas.

The 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan does not report any landslides/mudslides having recently occurred in Worcester County.

Source:

Paxton Daft HMP 2021

Appendix B, Historical Disaster Occurrences, https://www.mass.gov/doc/2018-statewide-hazard- mitigation-and-climate-adaptation-plan-appendix-b/download.

Invasive Species

According to the MDAR Invasive Pest Dashboard Paxton hosts at least 1 invasive species: Emerald Ash Borer and Mile-A-Minute Vine. Beech Leaf Disease was also confirmed to have been found in Paxton in 2021 and Holden borders communities with Spotted Lanternfly. According to the Forest Ecosystem Monitoring Cooperative's Northeastern Forest Health Atlas Paxton has historically been host to Spongy Moth (commonly known as Gypsy Moth) in 1981 and again 2019 experiencing a mortality event covering 45 acres south of Pine Hill Reservoir.

Additionally, the Mitigation Team listed the Asian Longhorn Beetle, Pine Blight, and Emerald Ash Borer as invasive species/pests damaging and killing off trees.

As for water born invasives: in Eams Pond in Major Williard Moore Memorial Park, Pomoxis nigromaculatus, more commonly known as Black Crappie (a species of sport fish) was spotted in 2020. Whether stocked intentionally or not, Black Crappie prey on threatened and endangered juvenile salmon that spawn in rivers of the Northwest United States and may further contribute to salmon decline through habitat alteration, though the extent of those impacts are unknown.

Source:

MDAR Invasive Pest Dashboard (arcgis.com)

Forest Health Atlas (uvm.edu)

Microsoft Word - AIS_Plan_2010.doc (mass.gov)

Nonindigenous Aquatic Species (usgs.gov)

Black Crappie (Pomoxis nigromaculatus) - Species Profile (usgs.gov)

Other Hazards

In addition to the hazards identified in previous sections, the Hazard Mitigation Team reviewed the other hazards listed in the Massachusetts Hazard Mitigation and Climate Adaptation Plan: coastal hazards, atmospheric hazards, ice jams, coastal erosion, sea level rise, nor'easters, and tsunamis. It was determined that these hazards are either irrelevant to Paxton due to the town's location, or in the case of nor'easters, that the hazard is already included within another hazard described above (severe winter storms).

The Hazard Mitigation Team also mentioned concerns regarding cyber security breaches, especially with the Town's electric and water operations. There is a risk that a terrorist attack could contaminate the water supply or damage transmission lines.

Sources:
Paxton HMP Draft 2021

The Critical Facilities List for the Town of Paxton has been identified utilizing several sources, and the knowledge and expertise of the team:

- Paxton's Comprehensive Emergency Management Plan
- MassGIS data
- Critical infrastructure mapping undertaken by CMRPC under contract with the Central Region Homeland Security Advisory Council, which is charged by the Executive Office of Public Safety and Security to administer and coordinate the State Homeland Security Grant for central Massachusetts.

Paxton's Hazard Mitigation Team has broken up this list of facilities into four categories:

I. Emergency Response Facilities needed in the event of a disaster
II. Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Paxton
III. Dams
IV. Facilities/Populations that the Team wishes to protect in the event of a disaster

CATEGORY 1, EMERGENCY RESPONSE FACILITIES

The Town has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. **Emergency Operations(/Communications) Center/Police Station/Fire Station**

EOC/ECC/Paxton Police and Fire Department	576 Pleasant Street
EOC/Paxton Police Department Dispatch	Holden, MA

The Paxton EOC at 576 Pleasant Street has been affected by severe snowstorms and the snow load has been too much for the car port. Lightning strikes have hit the communication tower, and heavy rainfall lends to flooding concerns since the property has poor drainage. The EOC is also not fully equipped and is in need of more equipment, technology, and computers.

2. **Communications/Power Facilities**

Paxton Town Hall	697 Pleasant Street
Communications/Radio/Cell & Microwave Tower	Asnebumskit Road
Communications/Radio/Cell & Microwave Tower	Maple Street
Communications/Radio/Cell & Microwave Tower	Pleasant Street
Wentworth Power Station	Marshall Street
Fiber Connection from Holden	Route 31, Grove St, Maple
St, Pleasant St Southbound, and Richards Ave	

The Paxton Town Hall has been affected by high winds, hurricanes, and severe snowstorms; the roof has experienced wind damage. The Communication Tower on Asnebumskit Road is utilized for the water system. Trees do cause issues for the communication towers, and the tower on Maple Street has experienced lightning strikes.

3. **Department of Public Works/Highway Department**

DPW/Highway	107 Holden Road

The DPW and Highway Department facilities experience flooding and a heavy snow load on the roof.

4. **Municipal Light Department**

Light Department Headquarters	578 Pleasant Street

The Municipal Light Department also experiences snow load on the roof.

5. **Water Department**

Water Department	107 Holden Road
Maple Street Water Tank	Maple Street

The Maple Street Water Tank site stores supplies needed for water main repairs.

6. **Utilities**

Distribution Lines	(Runs SE-NW through Town)
Asnebumskit Hill Radio Towers	

7. **Primary Evacuation Routes**

Route 122
Route 56
Route 31

These evacuation routes are all two-lane roads, making evacuation in times of crisis more difficult and potentially congested. Additionally, there is a high water table along Route 31 near Spencer, MA.

8. **Shelters**

Paxton Center School - dispensing site	19 West Street
Anna Maria College - primary site	50 Sunset Lane
Congregational Church	1 Church Street
St. Columba Church	10 Richards Avenue

CATEGORY 2, NON-EMERGENCY RESPONSE FACILITIES

The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Paxton.

1. **Water Supply**

Maple Street Water Tank	Maple Street
Asnebumskit Pond	
Kettle Brook Reservoir #3	
Kettle Brook Reservoir #4	
Pine Hill Reservoir	
Asnebumskit Road Water Tank	

The Town of Paxton purchases 100% of their municipal water from the City of Worcester. There is concern that falling trees could damage these pre-fab buildings.

2. **Town Facilities**

Town Hall	697 Pleasant Street

The Paxton Town Hall has a backup generator; however, it is small and can likely only heat the building.

CATEGORY 3, DAMS

The third category is a listing of dams in Paxton.

National ID	Dam Name	Owner Type	Hazard Potential	Notes
MA00676	Eames Mill Pond Dam	Public	Significant	Had work done recently
MA00677	Kettle Brook Reservoir #4 Dam	Public	High	
MA00678	Streeter Pond Dam	Private	Low	Issues with spillway and beaver activity
MA00679	Asnebumskit Pond Dam	Public	Significant	Considered a High Hazard if let go
MA01962	Small Pond Dam	Private	N/A	
MA01963	Kauppila Pond Dam	Private	N/A	
MA01964	Arrowhead Pond Dam	Private	N/A	
MA01965	Cournoyer's Dam	Private	N/A	
MA01966	Rasvall Pond Dam	Private	N/A	
MA02539	Eames Mill Pond Dam #1	Public	N/A	Had work done recently
MA02540	Eames Mill Pond Dam #2	Public	N/A	Had work done recently
MA02375	Illig's Pond Dam	Public	N/A	Have had issues with beaver activity and cresting
MA02865	Turkey Hill Pond Dam	Private	N/A	Potentially a High Hazard dam

For additional information on dams and the dam failure hazard in Paxton, also see Section 4.

CATEGORY 4, FACILITIES/POPULATIONS TO PROTECT

1. Special Needs Population/Elderly Housing/Assisted Living

John Bauer Senior Center	17 West Street
Group Home	420 Pleasant Street
Group Home	54 Streeter Road
Group Home	270 Pleasant Street
Group Home	2 Pine Street
Group Home	157 Suomi Street
Group Home	132 Marshall Street
Group Home	60 Marshall Street
Group Home	33 Camp Street
50+ Community	260 Grove Street
Devereaux Group Home	461 Pleasant Street

These facilities experience issues with flooding as well as snow load on the roof.

2. Public Buildings/Areas

John Bauer Senior Center	17 West Street
Town Hall	697 Pleasant Street
Richards Memorial Library	44 Richards Avenue
Ten West Market	10 West Street

These facilities experience issues with flooding as well as snow load on the roof. Ten West Market has a generator, but it is not an adequate size to run all of the refrigerators.

3. Schools/Daycare

(Please note: The EMD has a list of current daycare facilities but these can change locations and addresses frequently, so this list should be revisited periodically.)

Paxton Center School	19 West Street
Anna Maria College	50 Sunset Lane
Creative Learning Center	170 Richards Avenue
Johansson, Leslie	22 Red Oak Street
Stepping Stones	66 Maple Street
Congregational Church	1 Church Street
Colorful Connections	140 West Street
Turn Back Time	250 Marshall Street

4. Historic Buildings/Sites

According to the Massachusetts Cultural Resources Information System (MACRIS) online database accessed in November 2021, there are 4 Areas, 98 Buildings, 2 Burial Grounds, 19 Objects, and 5

Structures listed for Paxton. The Hazard Mitigation Team noted that the Town Hall is a historic building as well as the Records building.

5. Employment Centers

Based on data obtained from the Massachusetts Executive Office of Labor and Workforce Development (EOLWD), the following table shows the largest employers in Paxton:

Largest Employers in Paxton - July 2016		
Company	**Location**	**No. of Employees**
Paxton Center School	West St	50-99
Town of Paxton	Pleasant St	50-99
Anna Maria College	Sunset Ln	20-49
Byram Healthcare	Saw Mill Rd	20-49
WSRS	Stereo Ln	20-49
WTAG	Stereo Ln	20-49
Amcat Fitness Center	Sunset Ln	10-19
Dunkin' Donuts	Pleasant St	10-19
Family Dental Group of Paxton	Pleasant St	10-19
NRC Sports	Pleasant St	10-19

6. Environmental Justice and Vulnerable Populations

The US Environmental Protection Agency defines Environmental Justice (EJ) as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Within the context of natural hazards and their mitigation, potential EJ concerns may arise from income-related factors, discrimination (overt or institutional), cultural isolation and barriers, language isolation, lack of transportation access, and disability (especially among the elderly).

In Massachusetts, a neighborhood is defined as an Environmental Justice population if one or more of the following criteria are true:

- The annual median household income is not more than 65 percent of the statewide annual median household income.
- Minorities comprise 40 percent or more of the population.
- 25 percent or more of households lack English language proficiency.
- Minorities comprise 25 percent or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150 percent of the statewide annual median household income.

According to 2020 US Census data, there are no EJ populations within Paxton. While there are no EJ populations within Paxton, future considerations should be given to these populations. The Hazard Mitigation Team noted that approximately 8.7% of the population is disabled, and approximately 15.2% of the population speaks a language other than English in the home. It was also noted that many of the residents at the group and assisted living homes do not have vehicles. In times of crisis, it could be more difficult to evacuate these properties.

Paxton Hazard Mitigation Plan

In October 2021, the Town of Paxton started the planning process to update its Hazard Mitigation Plan (HMP). An updated HMP will help the town identify strategies to reduce its vulnerability to hazards like flooding, winter storms, and drought. Climate change may shift the extent and severity of certain natural hazards, including those that already impact Paxton.

By participating in this survey, you will help the Town of Paxton understand the current and future natural hazards that residents are most concerned about. Survey responses will be accepted until _____, and may be extended as needed.

1. Check all that apply.

- [ ] I live in Paxton.
- [ ] I work in Paxton.
- [ ] I frequently visit Paxton.

2. Has your family or property, in Paxton, been impacted by any of the following natural hazards? Select all that apply:

- [ ] I have not been impacted by natural hazards in Paxton
- [ ] Winter Storms / Ice
- [ ] Thunderstorms, Microbursts, and/or Extreme Wind
- [ ] Tornadoes
- [ ] Flooding
- [ ] Extreme Heat / Extreme Cold
- [ ] Drought
- [ ] Wildfire / Brushfire
- [ ] Hurricanes
- [ ] Earthquakes
- [ ] Invasive Species
- [ ] Other (please specify)

3. Where have you observed natural hazard impacts in Paxton, and what were those impacts?

Examples: flooding on specific roads, drought/effects on water supply, trees down on roads, beaver dams affecting property and septic systems due to flooding from dams.

4. How much do you think the impacts of natural hazards and climate change will threaten your personal health, safety, or property?

- ◯ I think natural hazards and climate change will negatively impact my life.
- ◯ I'm not sure how natural hazards and climate change will impact my life.
- ◯ I don't think that I personally will be impacted by natural hazards and climate change.

5. If you are concerned about impacts to you or your community from natural hazards and/or climate change, what impacts are you most concerned about?

Examples: basement flooding, wells drying out / contamination of wells, ability to grow food, roads rendered impassable by flooding, extended power outages or loss of internet connectivity

6. How concerned are you about the impacts that natural hazards and climate change will have on the Town of Paxton (the local infrastructure, economy, environment, and/or town residents)?

- ◯ Very concerned
- ◯ Somewhat concerned
- ◯ Unsure
- ◯ Somewhat unconcerned
- ◯ Not concerned at all

7. What community assets are you most concerned about when you consider the potential impact of natural hazards and climate change on the Town of Paxton? Rank the responses below in order from most concerned (1) to least concerned (5).

- ≣ ☐ Local natural resources and public lands
- ≣ ☐ Resident health, safety, and property
- ≣ ☐ Local infrastructure
- ≣ ☐ Local business and the town economy
- ≣ ☐ Local government resources

8. Which of the following aspects of natural hazards and climate change would you like to learn more about? Select all that you are interested in.

- [ ] Impacts on water quantity / quality
- [ ] Future flood risks
- [ ] Impacts on infrastructure
- [ ] Sustainability initiatives
- [ ] Public health impacts like increased risks of vector-borne disease (ex. Lyme disease, West Nile Virus, EEE - Eastern equine encephalitis)
- [ ] Impacts on town budget and finances
- [ ] Impacts on wildlife
- [ ] Impacts on the health of local forests and public lands
- [ ] Impacts on future development
- [ ] Incursion by Invasive Species
- [ ] Other (please specify)

9. What actions should the Town of Paxton take to cultivate local resilience to natural hazards?

Examples: increase local capacity to apply for hazard mitigation grant funding and implement hazard mitigation projects; improve storm water management; provide more education and outreach about how climate change could impact my life; encourage planting climate-resilient tree species; encourage cutting/trimming dead trees beside/hanging over roads; etc.

10. If you would like to stay informed about other opportunities to participate in Boylston's Hazard Mitigation planning process, please enter your E-mail address below.

Paxton Hazard Mitigation Plan Update
Hazards and Infrastructure Update Meeting

Date/Time: April 25th , 2024 10:00AM – 12:30PM
Location: Public Safety Complex, 576 Pleasant St, Paxton, MA 01612

I. Introductions

II. Meeting #3 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

	Action Plan/Descriptions	Hazards Addressed	Who agencies involved	Potential Funding Sources	Priority Political and economic viability: High/Med/Low	Impact Mitigation impact: High/Med/Low	Estimate High/Me
	A. Structure & Infrastructure Strategies						
1	Raise Hill Street (3 feet high, 1,000-1,500 feet long) to eliminate flooding and allow emergency vehicles to pass.	FL, SS, ST, HU	DPW, Conservation	~~Local~~, Federal Grants (HMGP/PDM), State Grants (Various)	Medium	Medium	Hig $2.5-$5
2	Implement actions of Asnebumskit Pond Dam Phase 1 Inspection and Evaluation Report to prevent dam failure.	DF, FL, ST, HU	DPW, Water, Conservation	Local, State Grants (Dam & Seawall)	Medium	Medium	Hig
3	Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	FL, SS, ST, HU	DPW, Light	Local, State, Federal Grants	Medium	Medium	Med
4	Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.	FL, SS, ST, HU	National Grid, Town (DPW, Light), Private	Utility (National Grid), Local, Private (property owners)	High	High	Med
5	Replace emergency generator at ~~Asnebumskit hill~~ and relocate to most utilized emergency shelter (to provide power to building and food storage and preparation areas) in the case of power going out.	All	Local Emergency Management	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High	High	Med
	Install Fire protection System in Paxton Center School among other upgrades to the heating/cooling systems, to enhance the resiliency of the municipally owned facility to prevent damage in the event of catestophic fire or other hazard events.	WF	Tahanto School District, Fire Department, Town Administration	Local, Federal Grants (HMGP/PDM), State Grants (Various)			

	Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought	All	Town Administration, DPW, Water Department	Local, Federal Grants (HMGP/PDM), State Grants (Various)			
	Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarentine invasives.	IS, WF, HW	DPW, Conservation				

	B. Preparedness, Coordination & Response Action Strategies						
	Create a plan to ensure that shelters open immediately and completely within four hours of	FL, SS, ST, HU	DPW, Light, Local				

2	Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	High	High	Lo
3	Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	Low	Low	Lo
4	Road information coordination and planning for snow removal.	SS	DPW; MassDOT; Mass State Police; CMRPC	Local, Federal Grants (HMGP/PDM), State Grants (Various), Private Contracts	High	High	Lo
5	Evacuation Plan updates.	All	Local Emergency Management, DPW, CMRPC, MassDOT	Local, Federal Grants (Homeland Security via MEMA and CRHSAC)	High	High	Lo
6	Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR	WF	Fire Department, DPW, GWLT, DCR	Local	Medium	Medium	Lo

	C. Education & Awareness Strategies						
1	Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	FL, SS, ST, HU	DPW, Light Dept., Planning, Local Emergency Management	Local	Medium	Low	Lo
2	Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	DR, WF	DPW, Conservation, Water	Local, Private (water companies)	High	Medium	Lo
3	Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	All	Local Emergency Management	Local	Medium	Medium	Lo
4	Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.	WF	Fire Department	Local	Medium	Medium	Lo

	D. Local Plan & Regulation Strategies						
1	Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's needs.	DR	DPW, Water Department, Conservation	Local	Medium	Low	Lo
2	Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	All	All Town Departments	Local	Medium	High	Lo
3	Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply.	FL, DR	Conservation, Water, DPW	Local	Medium	Medium	Lo
4	Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	DF, FL, ST, EQ	DPW, Water, Conservation, Local Emergency Management	Local, State Grants (Various)	Medium	Medium	More infc required, k likely "Me "High" a dams remc significar and low rating, a other dan Not App (N /

5	Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve.	All	All Town Departments	Local	High	High	Lo
6	Implement Firewood Sourcing bylaw stipulating that firewood must be bought from within a specific geographic area to prevent the spread of invasives.	IS	Town Administration				

local norms and does not suggest a level of vulnerability that would impair household disaster preparations or response, no special action is recommended other than specifically targeting this area for emergency preparedness and response educational and outreach programs, which are listed in the Mitigation Strategies table on page 72. The location of this EJ area is shown in Map 1 in Appendix A.

More information regarding the identification of Environmental Justice and Vulnerable populations in the Central Massachusetts region can be found online at www.cmrpc.org/mobility2040.

6.0 EXISTING PROTECTION

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process.

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands, stormwater management through the Central Mass Stormwater Coalition, tree maintenance coordinated by the Municipal Light Department and the recently hired Lewis Tree Company, etc.... Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, a Water Superintendent, a Conservation Agent, and a Municipal Light Department Manager who acts as a Tree Warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan, and it is working now to implement its Master Plan. Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted in to fire protection mutual aid agreements through MEMA. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief

description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

Element C: Mitigation Strategy Requirements

C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))

C2-a. The plan must describe participation in the NFIP for each participant, as applicable, in accordance with NFIP regulatory requirements. The following information must be provided for each participant.[14]

1. Adoption of NFIP minimum floodplain management criteria via local regulation.
2. Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable.
3. Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs.
4. Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP.
5. Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event.

Simply stating, "The community will continue to comply with the NFIP" is not sufficient to meet the requirement.

Jurisdictions not currently participating in the NFIP, where a Flood Hazard Boundary Map or FIRM has been issued, may meet this requirement by describing why the community does not participate in the NFIP.

For jurisdictions that voluntarily participate in the CRS, it is highly recommended that this description also include related activities and address any issues raised during community assistance and monitoring activities.

[14] For jurisdictions that voluntarily participate in the NFIP, note that floodplain management criteria for flood-prone areas is described in 44 CFR § 60.3.

6.1 Existing Protection Matrix

Table 29

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP) - Review NFIP Bylaw on town website	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code. Add NFIP Guidelines	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 100-year flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP.
Floodplain Zoning District bylaw in place	Requires all development to be in compliance with state building code requirements for construction in floodplains	Paxton has a Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw. This Chapter was last updated in May of 2014.	Very effective No changes recommended
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge.	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition.	Very effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Local Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee started to update this plan in 2013.	Somewhat effective Paxton should prepare its plan update per Mass. Division of Conservation Resources Requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve capacity and quality.	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

Existing Measure	Description	Action	Effectiveness & Recommendations
Drainage system maintenance and repair program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order	Paxton performs street sweeping from April to May, and catch basin cleaning year round.	Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices
Tree Trimming and tree wire installation	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. Lewis Tree Company was hired by the Paxton Light Department in August 2016 to trim trees. Tree wire is being installed to further reduce the effects of damaging storms.	Very Effective No changes recommended
Culvert Maintenance and Replacement	Maintain existing culverts through regular maintenance and (in some cases) beaver controls; replace/expand culverts where needed to allow for adequate stormwater flow.	The Town has historically maintained and replaced problem culverts when needed and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Somewhat effective Current efforts are limited by lack of resources and systematic approach. Paxton should develop a prioritized inventory of problem culverts for use in seeking external financial support. Planning must comply with 2014 Mass. Wetlands Protection Act update; culverts may not be replaced in-kind.

Existing Measure	Description	Action	Effectiveness & Recommendations
Dam Inspection and Evaluation Reporting	Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life.	In 2012, Paxton hired Lenart Consulting Service to inspect and evaluation Asnebumskit Dam, a Significant Hazard Dam. The Dam was found to be in "fair" condition, and the report listed 11 actions to be taken. Studies of this kind should be undertaken for the remaining Significant Hazard Dam in Town, as well as the High Hazard Dam in Town.	Somewhat effective. Plans are only as effective as their implementation. Town should continue to implement actions suggested by Lenart Consulting Service as mentioned in their report. Additional studies should be sought to address other noted hazardous dams in Town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association	These two fire and emergency response groups serve as organized systems for fire departments to work together across municipal boundaries.	Paxton joined these groups in recent years and have benefitted from doing so.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.
Continue to upgrade, improve, or secure secondary sources of power to eliminate outages as electrical feed from Worcester periodically goes down from hurricanes and severe snowstorms.	The Town relies on power coming from the City of Worcester. When this power supply is cut, the Town experiences not only power outages but also flooding, as many rely on sump pumps in their basements.	Work with National Grid to devise system for secondary sources of power to turn on as feed from Worcester goes out.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.

Existing Measure	Description	Action	Effectiveness & Recommendations
Relocate Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town's Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town..	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

Name	pdm_type	pdm_id	haz_type
Maple Street Water Tank	CI	1	<Null>
Richards Memorial Library	CI	2	<Null>
Anna Maria College	CI	3	<Null>
John Bauer Senior Center	CI	4	<Null>
First Congregational Church	CI	5	<Null>
St. Columba Church	CI	6	<Null>
Asnebumskit Communications Tower	CI	8	<Null>
Paxton Public Works Dept.	CI	11	<Null>
Pleasant St Pump Station	CI	7	<Null>
Maple St Communications Tower	CI	10	<Null>
Pleasant St Communications Tower	CI	9	<Null>
Richards Ave Electric Transformer	CI	12	<Null>
Worcester WTAG	CI	52	<Null>
Hill St Flooding	H	FL-1	FL
Hill St Flooding	H	FL-2	FL
Eames Mill Pond Dam	H	DF-1	DF
Turkey Hill Pond Dam	H	DF-2	DF
Kettle Brook Res. Dam	H	DF-3	DF
Asnebumskit Pond Dam	H	DF-4	DF
Small Pond Dam	H	DF-5	DF
Asnebumskit Hill snow clearing for radio tower	H	SS-1	SS

Batt

Follow up email

- Brie Grant
- Mitigation strategy – explain process in a 360
- look into NFIP by law for town
- Appendices of acronyms Cheat sheet
- Follow up on DLTA for engineering

Name	PDM_ID	PDM_Type
Flood Area	FL-4	H
Flood Area	FL-8	H
1953 Tornado	ST-1	H

Paxton Hazard Mitigation Plan Update
Mitigation Strategies and Existing Protection Measures Update Meeting

Date/Time: **June 13th , 2024 9:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #4 Recap

III. Community Lifelines

IV. Reference Documents

V. Mitigation Strategies Review

A. Structure and Infrastructure Strategies
B. Preparedness, Coordination, and Response Activities
C. Education and Awareness Strategies
D. Local Planning & Regulatory Strategies

VI. Review of Updates to Existing Protection Measures.

VII. Public Presentation

VIII. Next Meeting

- Date/Time/Location
- What to prepare

	Action Plan/Descriptions	Hazards Addressed	Who agencies involved	Potential Funding Sources	Priority Political and economic viability: High/Med/Low	Impact Mitigation impact: High/Med/Low	Estimated Cost High/Med/Low	Timeline
	A. Structure & Infrastructure Strategies							
1	~~Raise Hill Street (3 feet high, 1,000-1,500 feet long) to eliminate flooding and allow emergency vehicles to pass.~~ Beaver Mitigation Strategies instead: Beaver Decievers, Beaver Relocation, Town wide beaver mitigation plan (Response activites)	FL, SS, ST, HU	DPW, Conservation, Board of Health, Mass Conservation or Mass Wildlife land	Local (Town Meeting, Capital Fund, General Fund), Federal Grants (HMGP/PDM), State Grants (Various)	Medium	Medium/High	High/Low $2.5-$5 million	3-5 years
2	Perform H+H study of Asnebumskit Pond Dam as reccomended by the evaluation report. Continue maintinence of the dam and perform Dam Inspection every 5 years	DF, FL, ST, HU	DPW, Water, Conservation	Local (Town Meeting, Capital Fund, General Fund), Federal Grants, State Grants	Low	Low	Low	Ongoing
3	Obtain secondary source of power for when feed from Worcester goes down, mitigating flooding in houses and businesses with sump pumps.	FL, SS, ST, HU	DPW, Light	Local, State, Federal Grants	Medium	Medium	Medium	Implement-ation underway Fall 2016, ongoing
4	Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.	FL, SS, ST, HU	National Grid, Town (Light), Private	Utility (National Grid), Local (Light Company), Private (property owners)	High	High	Medium	Ongoing
5	Install Generators For SCADA System Asnebumskit Hill water Tank and Repeater Antennae at 105 Asnebumskit	All	DPW, Water	Local (Water Enterprise), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	Med/Low	<1 Year

	Paxton Center School Infrastructural Mitigations: Separate the White Building (COA) attached to the school by a minimum of 40 ft to mitigate secondary fire damages from hazard events.	All	Wauchusett Regional School District, Fire Department, Town Administration	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
	Paxton Center School Infrastructural Mitigations: Install Fire protection System in Paxton Center School to prevent catestropic Fire Damage within the school building caused by a hazard event.	All	Wauchusett Regional School District, Fire Department, Town Administration,	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
	Paxton Center School Infrastructural Mitigations: Install upgraded high efficiency Heating and cooling system to prevent damage from extreme temperatuires as well as open up the possibility of utilizing the school as a approved shelter location. Identify and improve shortcomings in energy efficiency for the school as a whole.	All, ET	Wauchusett Regional School District, Fire Department, Town Administration,	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
	Paxton Center School Infrastructural Mitigations: Identify Owner of drainage pipe that is believed to pass beneath the school and evaluate drainage pipe for structural integrity and feasibility to reroute the drainage pipe around the school facility.	All	Wauchusett Regional School District, Fire Department, Town Administration, Mass DOT	Local, Federal Grants (HMGP/PDM), State Grants (Various)	High/Medium	High	High	Variable
	Assess the feasibility of building a water treatment facility at Asnebumskit reservoir to provide clean drinking water to the town, addressing water supply concerns from 2016 drought, In conjunction with obtaining well access or installing new wells	All	Town Administration, DPW, Water Department	Local, Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	Low	High	High	5+ years

	Upgrade and maintain the pump equipment at Asnebumskit Reservoir for utilization in an emergency	All	DPW, Water, Conservation, MASS DEP, EPA,	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	High	1-3 Years
	Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarentine invasives.	IS, WF, HW	DPW, Conservation, Emergency Management, Planning Department	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various)	High	High	High	Ongoing
	Route 31 Culvert Replacements, 2 large cross culverts, [DLTA Project for engineering Follow up with Town admin and trish], [Send this spreadsheet as an office 365 doc to Planning team for them to fill out)	FL	DPW, MASS DOT, Conservation, DEP, EPA	Local (Enterprise Funds), Federal Grants (HMGP/BRIC/FMA), State Grants (Various, DLTA)				

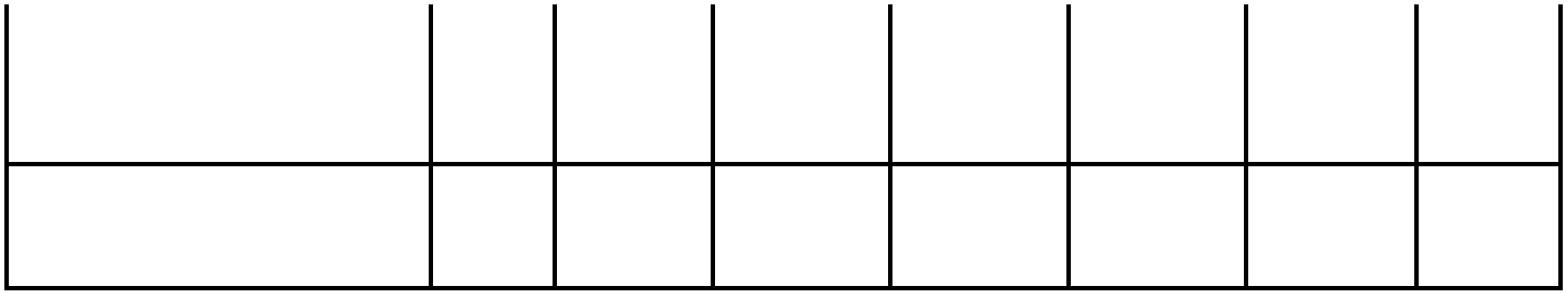
	B. Preparedness, Coordination & Response Action Strategies

1	Create a plan to ensure that shelters open immediately and completely within four hours of Town-wide power outages for the sake of Paxton's vulnerable populations (elderly and minors).	FL, SS, ST, HU, EQ	DPW, Light, Local Emergency Management	Local	Medium	Medium	Low	1-2 years
2	Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	High	High	Low	Ongoing
3	Investigate Community Rating System (CRS) benefits and requirements and decide whether to participate.	FL, SS, ST, HU	DPW, Local Emergency Management, Planning	Local	Low	Low	Low	1-2 Years
4	Road information coordination and planning for snow removal.	SS	DPW; MassDOT; Mass State Police; CMRPC	Local, Federal Grants (HMGP/PDM), State Grants (Various), Private Contracts	High	High	Low	Ongoing
5	Evacuation Plan updates.	All	Local Emergency Management, DPW, CMRPC, MassDOT	Local, Federal Grants (Homeland Security via MEMA and CRHSAC)	High	High	Low	1-2 Years (update every 5 Years)
6	Initiate Fire Road Access Management study to identify road closure risks and prioritize actions to eliminate identified risks. Especially useful for isolated areas. Coordinate fire road and access management with outside stakeholders such as the Greater Worcester Land Trust and DCR	WF	Fire Department, DPW, GWLT, DCR	Local	Medium	Medium	Low	1 year
	Establish a Contract							

	C. Education & Awareness Strategies							
1	Provide information to residents and businesses on backup generator usage to reduce basement flooding during power outages. Review FEMA and MEMA materials to form Town-specific brochures.	FL, SS, ST, HU	DPW, Light Dept., Planning, Local Emergency Management	Local	Medium	Low	Low	1-2 years
2	Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).	DR, WF	DPW, Conservation, Water	Local, Private (water companies)	High	Medium	Low	Ongoing
3	Provide list of shelters and other resources to residents and businesses in the case of tornadoes, earthquakes, and other severe weather or geological events.	All	Local Emergency Management	Local	Medium	Medium	Low	1 year
4	Provide homeowners and residents with information about wildfires and brushfire prevention, as well as information about shelters in the case of extreme fires. Make use of FEMA and/or National Fire Protection Agency (NFPA) materials.	WF	Fire Department	Local	Medium	Medium	Low	1 year

	D. Local Plan & Regulation Strategies							
1	Use MA Drought Management Plan as a template for Town's own drought plan, and integrate State's recommendations and actions according to Town's needs.	DR	DPW, Water Department, Conservation	Local	Medium	Low	Low	1-2 years
2	Review and update local plans and development review processes (planning, zoning, stormwater management, conservation, etc.) to ensure new construction will not be affected by hazards.	All	All Town Departments	Local	Medium	High	Low	Ongoing
3	Implement local, Town-wide Wetlands Protection Bylaw and regulations to further protect against flooding and ensure drinking water quality and supply.	FL, DR	Conservation, Water, DPW	Local	Medium	Medium	Low	1-2 years

4	Obtain Inspection and Evaluation Reports for remaining Significant Hazard and High Hazard dams in Town, similar to Asnebumskit Pond Dam Phase 1 Report.	DF, FL, ST, EQ	DPW, Water, Conservation, Local Emergency Management	Local, State Grants (Various)	Medium	Medium	More information required, but cost is likely "Medium" to "High" as three dams remain with a significant, high, and low hazard rating, and nine other dams rated Not Applicable (N/A)	2-4 years
5	Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve.	All	All Town Departments	Local	High	High	Low	Ongoing
6	Implement Firewood Sourcing bylaw stipulating that firewood must be bought from within a specific geographic area to prevent the spread of invasives.	IS	Town Administration					



Element C: Mitigation Strategy Requirements
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement 44 CFR § 201.6(c)(3)(ii))
C2-a. The plan must describe participation in the NFIP for each participant, as applicable, in accordance with NFIP regulatory requirements. The following information must be provided for each participant.[14] 1. Adoption of NFIP minimum floodplain management criteria via local regulation. 2. Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable. 3. Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs. 4. Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP. 5. Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event. Simply stating, "The community will continue to comply with the NFIP" is not sufficient to meet the requirement. Jurisdictions not currently participating in the NFIP, where a Flood Hazard Boundary Map or FIRM has been issued, may meet this requirement by describing why the community does not participate in the NFIP. *For jurisdictions that voluntarily participate in the CRS, it is highly recommended that this description also include related activities and address any issues raised during community assistance and monitoring activities.*

[14] For jurisdictions that voluntarily participate in the NFIP, note that floodplain management criteria for flood-prone areas is described in 44 CFR § 60.3.

local norms and does not suggest a level of vulnerability that would impair household disaster preparations or response, no special action is recommended other than specifically targeting this area for emergency preparedness and response educational and outreach programs, which are listed in the Mitigation Strategies table on page 72. The location of this EJ area is shown in Map 1 in Appendix A.

More information regarding the identification of Environmental Justice and Vulnerable populations in the Central Massachusetts region can be found online at www.cmrpc.org/mobility2040.

6.0 EXISTING PROTECTION

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process.

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands, stormwater management through the Central Mass Stormwater Coalition, tree maintenance coordinated by the Municipal Light Department and the recently hired Lewis Tree Company, etc…. Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, a Water Superintendent, a Conservation Agent, and a Municipal Light Department Manager who acts as a Tree Warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan, and it is working now to implement its Master Plan. Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted in to fire protection mutual aid agreements through MEMA. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief

description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

6.1 Existing Protection Matrix

Table 29

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP)	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding.	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code.	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 100-year flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP.
Floodplain Zoning District bylaw in place	Requires all development to be in compliance with state building code requirements for construction in floodplains	Paxton has a Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw. This Chapter was last updated in May of 2014.	Very effective No changes recommended
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge.	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition.	Very effective No changes recommended

Existing Measure	Description	Action	Effectiveness & Recommendations
Local Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee started to update this plan in 2013.	Somewhat effective Paxton should prepare its plan update per Mass. Division of Conservation Resources Requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve capacity and quality.	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

Existing Measure	Description	Action	Effectiveness & Recommendations
Drainage system maintenance and repair program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order	Paxton performs street sweeping from April to May, and catch basin cleaning year round.	Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices
Tree Trimming and tree wire installation	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. Lewis Tree Company was hired by the Paxton Light Department in August 2016 to trim trees. Tree wire is being installed to further reduce the effects of damaging storms.	Very Effective No changes recommended
Culvert Maintenance and Replacement	Maintain existing culverts through regular maintenance and (in some cases) beaver controls; replace/expand culverts where needed to allow for adequate stormwater flow.	The Town has historically maintained and replaced problem culverts when needed and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Somewhat effective Current efforts are limited by lack of resources and systematic approach. Paxton should develop a prioritized inventory of problem culverts for use in seeking external financial support. Planning must comply with 2014 Mass. Wetlands Protection Act update; culverts may not be replaced in-kind.

Existing Measure	Description	Action	Effectiveness & Recommendations
Dam Inspection and Evaluation Reporting	Inspect and evaluate existing dams, especially those that are considered a Significant or High threat, in order to identify causes of degradation and actions to prolong dam life.	In 2012, Paxton hired Lenart Consulting Service to inspect and evaluation Asnebumskit Dam, a Significant Hazard Dam. The Dam was found to be in "fair" condition, and the report listed 11 actions to be taken. Studies of this kind should be undertaken for the remaining Significant Hazard Dam in Town, as well as the High Hazard Dam in Town.	Somewhat effective. Plans are only as effective as their implementation. Town should continue to implement actions suggested by Lenart Consulting Service as mentioned in their report. Additional studies should be sought to address other noted hazardous dams in Town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association	These two fire and emergency response groups serve as organized systems for fire departments to work together across municipal boundaries.	Paxton joined these groups in recent years and have benefitted from doing so.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.
Continue to upgrade, improve, or secure secondary sources of power to eliminate outages as electrical feed from Worcester periodically goes down from hurricanes and severe snowstorms.	The Town relies on power coming from the City of Worcester. When this power supply is cut, the Town experiences not only power outages but also flooding, as many rely on sump pumps in their basements.	Work with National Grid to devise system for secondary sources of power to turn on as feed from Worcester goes out.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.

Existing Measure	Description	Action	Effectiveness & Recommendations
Relocate Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town‘s Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town..	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

Paxton Hazard Mitigation Plan Update
Community Survey review and Public Presentation Planning

Date/Time: **July 18th , 2024 10:00AM – 12:30PM**
Location: **Public Safety Complex, 576 Pleasant St, Paxton, MA 01612**

I. Introductions

II. Meeting #5 Recap

III. Community Lifelines Review

IV. Reference Documents

V. Community Survey Review

VI. Review of Updates to Existing Protection Measures.

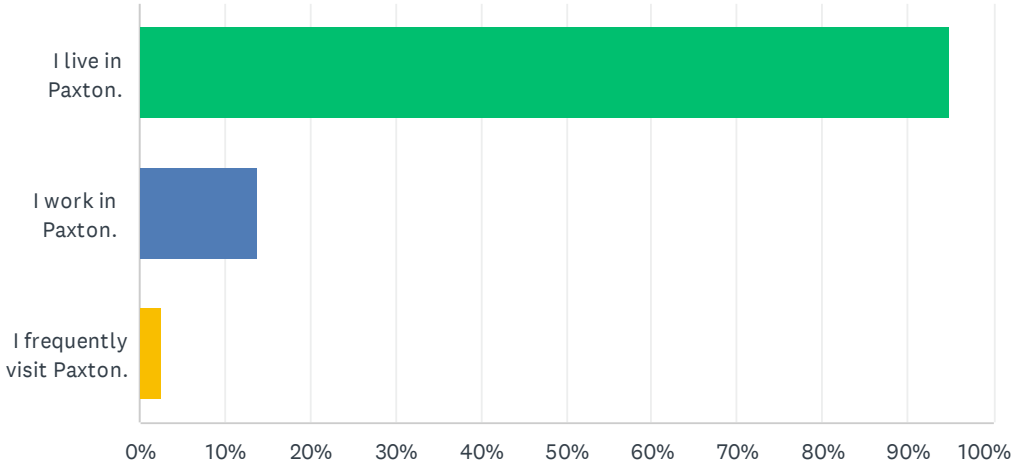
VII. Public Presentation Planning

VIII. Next Meeting

- Date/Time/Location
- What to prepare

Q1 Check all that apply.

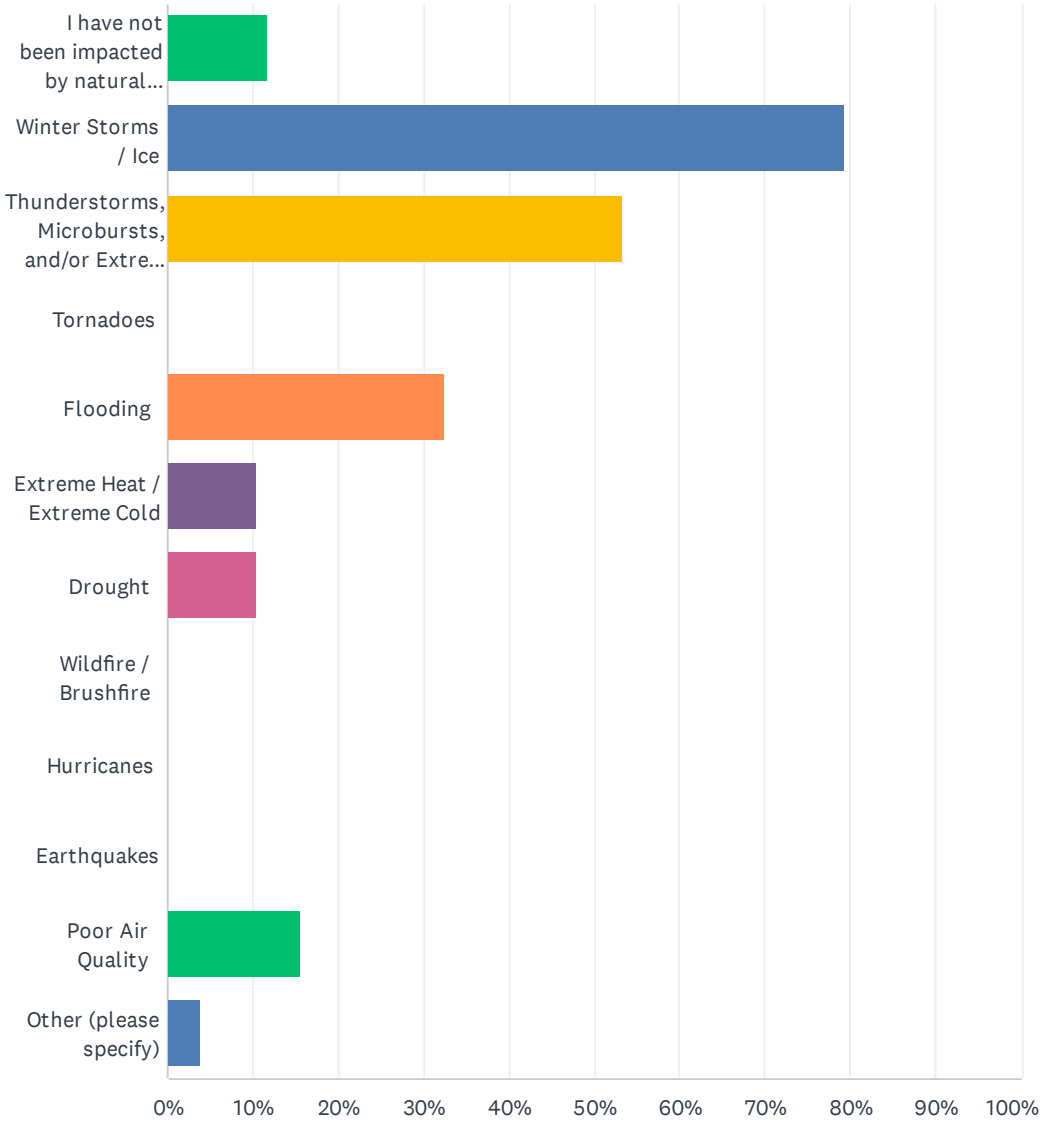
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
I live in Paxton.	94.94%	75
I work in Paxton.	13.92%	11
I frequently visit Paxton.	2.53%	2
Total Respondents: 79		

Q2 Has your family or property, in Paxton, been impacted by any of the following natural hazards? Select all that apply:

Answered: 77 Skipped: 2



ANSWER CHOICES	RESPONSES	
I have not been impacted by natural hazards in Paxton	11.69%	9
Winter Storms / Ice	79.22%	61
Thunderstorms, Microbursts, and/or Extreme Wind	53.25%	41
Tornadoes	0.00%	0
Flooding	32.47%	25
Extreme Heat / Extreme Cold	10.39%	8
Drought	10.39%	8
Wildfire / Brushfire	0.00%	0
Hurricanes	0.00%	0
Earthquakes	0.00%	0
Poor Air Quality	15.58%	12
Other (please specify)	3.90%	3
Total Respondents: 77		

#	OTHER (PLEASE SPECIFY)	DATE
1	spread of invasive plants especially Japanese Knot weed	3/30/2024 8:26 AM
2	Water Main breaks (Route 30)	3/29/2024 12:27 PM
3	Basement water	3/29/2024 10:04 AM

Q3 Where have you observed hazard impacts in Paxton, and what were those impacts?Examples: flooding on specific roads, drought/effects on water supply, extended power outages, trees down on roads, beaver dams affecting property and septic systems due to flooding from dams.

Answered: 60 Skipped: 19

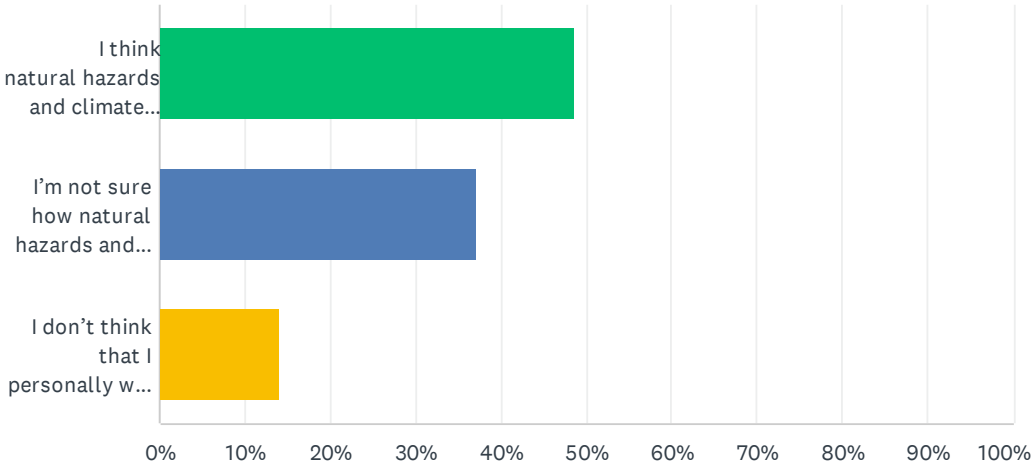
#	RESPONSES	DATE
1	Have not seen anything	4/22/2024 8:35 PM
2	Downed trees and power lines	4/14/2024 8:48 PM
3	flooded portions of road	4/9/2024 1:48 PM
4	Flooding	4/4/2024 9:22 PM
5	Trees down on the roads.	4/4/2024 9:00 AM
6	I have worked at PCS fro 25 years. School cancellations have occurred for cold, flooding, and snow, and we have had students in school during hazardous air quality conditions without the ventilation systems needed to provide acceptable indoor AQ. The schools eason is not impacted by heat on both ends without the air conditioning needed to make it an effective and at time reasonably comfortable environment. given this is expected to get worse(hotter), planning for building upgrades are needed.	4/1/2024 5:32 PM
7	Water daming flooding our property on Grove street.	4/1/2024 12:07 PM
8	Trees down on roads	4/1/2024 11:29 AM
9	Drainage flooding of my both front and back of my yard, heavily at the corner of Alrene and Berkshire (DPW has been out, but has not yet been able to fully stop the constant flow of water)	3/31/2024 10:07 PM
10	Trees down and large branches in roadway along upper mower street Poor drainage along walnut street	3/31/2024 10:06 PM
11	Winter/Ice storms used to have frequent power outages towards the Paxton-Spencer line, however since the substation was placed on Pleasantdale Rd, power and restore times have been greatly improved.	3/31/2024 8:57 PM
12	Crowningshield neighborhood. Thunderstorms/wind leading to trees down; suspected lightning strike leading to surge damaging electronics. Ice storms leading to trees down and ice dams/buildup around roof/gutters.	3/31/2024 8:46 PM
13	Haven't seen anything like that. Town does great job	3/31/2024 10:42 AM
14	Trees down from ice storm. Power outage.	3/31/2024 4:00 AM
15	The apron on my driveway along 122 was not done correctly by the state, so water comes pouring down my driveway on one side of the property and the other side gets flooded from the sidewalks pooling water in my yard and into my basement. I just had extensive foundation repair performed to start fixing this.	3/30/2024 9:58 PM
16	Flooding on Suomi street near our house 168- trees down on Suomi street from storms both rain, wind ice	3/30/2024 2:04 PM
17	Downed trees on Grove St several times have cut power and prevented our ability to return home on Pond St, once for many hours (we have disabled people in the household). It has been addressed quickly each time and we're grateful. The only option I can think of would be to create a continuation of Pond St for secondary access, and that seems unlikely.	3/30/2024 1:42 PM
18	Trees down in roads and beaver dams effecting property & septic systems due to flooding	3/30/2024 12:57 PM

19	Fallen trees/branches. Strong winds impacting power and internet access which impacts my work from home time	3/30/2024 9:28 AM
20	The spread of invasive plants such as Japanese knot weed should be considered a hazard for the town of Paxton. It displaces native plants contributing to erosion, overgrows roadsides limiting visibility. Its roots can cause property damage to roadways, sidewalks, house foundations, etc.	3/30/2024 8:26 AM
21	Roads are a disaster.	3/30/2024 8:26 AM
22	Down trees, poor air quality during the Canada Wildfires	3/30/2024 7:49 AM
23	We've had many big branches knocked down by recent windstorms.	3/29/2024 10:48 PM
24	trees and branches down on Mower St, Pleasant Street and environs. This is usually due to high winds and/or ice storms	3/29/2024 10:46 PM
25	The runoff and dispersal of water during storms from the top of Glen Ellen Street has impacted much of the even numbered homes on orchard drive. Even after the repavement it's an issue	3/29/2024 5:11 PM
26	Trees in rough shape throughout town due to the ice storm years ago.	3/29/2024 5:07 PM
27	Flooding in Hill St	3/29/2024 4:47 PM
28	Trees down on Pleasant Street and Davis Hill Rd, lightening strike on our personal property affected internet access and communications for our home	3/29/2024 2:22 PM
29	Lots of dead trees near my house	3/29/2024 2:22 PM
30	Davis Hill Rd- trees down	3/29/2024 2:18 PM
31	Trees falling, water main breaks (due to sinking roads) Roads flooding and causing sink holes.	3/29/2024 2:10 PM
32	Trees down on Pleasant Street in Davis Hill Rd area	3/29/2024 2:06 PM
33	Extended power outage and tree damage to property on Pierce circle during snow and ice storms	3/29/2024 1:45 PM
34	Eames Pond water level. Rainfall causing significant puddles and wet areas in hay fields and garden.	3/29/2024 1:29 PM
35	Power outages, downed trees	3/29/2024 1:10 PM
36	Downed trees and limbs, along with power loss.	3/29/2024 1:08 PM
37	Trees down on Marshall Street and Suomi street, flooding at the reservoir area of Marshall Street, ice/wind damage to trees,	3/29/2024 12:59 PM
38	Flooding in yard, reservoir area of Marshall, ice/wind damage to trees, water bans (most recent 2 yrs ago)	3/29/2024 12:59 PM
39	West st	3/29/2024 12:55 PM
40	Power outages due to winter storms	3/29/2024 12:43 PM
41	Power outages, downed trees/limbs causing significant property damage and impassable roads during ice storms - 2008, 2015, 2017, 2021, 2023 and 2024.	3/29/2024 12:42 PM
42	Short power outages due to trees down on Grove St; draught effect on available groundwater	3/29/2024 12:22 PM
43	Flooding on corner of property due to storm drain passing under the road being beyond capacity at 46 Brooks Rd. Lots of tree branches on roads throughout the town	3/29/2024 11:44 AM
44	There is some sort of drain system near the street on either side of our property. Sometimes that gets blocked by natural debris. Our yard can become saturated with water sometimes and then the basement floods. I've also seen cars sliding down our street from ice. This winter, the whole street was backed up with vehicles from a flash ice storm. We had to get several trees cut down this year because we were afraid the harsh winds would blow them down onto our home. A wind storm destroyed a temporary shed we had as well.	3/29/2024 10:57 AM
45	Limbs hitting powerlines on Nanigian Rd, erosion in Nanigian rd, causing large cracks, holes and issue in the asphalt.	3/29/2024 10:52 AM

46	Trees down on Richards Ave, Pleasant St, large limbs down on most streets. Flooding on Richards Ave near drains.	3/29/2024 10:39 AM
47	Flooding in the Forestdale/Glen Ellen neighborhood	3/29/2024 10:38 AM
48	trees down in roads, lots of pooling of water in yards on certain streets	3/29/2024 10:31 AM
49	Ice damage to trees, wind damage to trees	3/29/2024 10:16 AM
50	downed tress due to ice storms, thunderstorms, and high winds	3/29/2024 10:09 AM
51	During the ice storm in 2008, we lost power for 9 days and were unable to get out for several days due to downed trees and power lines along Laurel Street. Additionally there is nearly constant pooling of water on Laurel Street near Terrace Place.	3/29/2024 10:08 AM
52	Drought and water supply and garden production	3/29/2024 10:04 AM
53	We have a lot of fallen trees on our road and on our property due to the ice storms, the house has been struck by lighting a few times so we needed to put in a grounder.	3/29/2024 10:00 AM
54	Tree limbs down when there is an ice storm	3/29/2024 9:58 AM
55	Paxton has no natural problems.	3/29/2024 9:57 AM
56	Holbrook Ln	3/29/2024 9:56 AM
57	Fields surrounding PCS frequently flooded, downed (non active) power lines on the ground in the parking lot for months, water in the building low quality.	3/29/2024 9:54 AM
58	Flooding and high winds on Burtenmar Circle.	3/29/2024 9:53 AM
59	Freezing rain leading to branches down and icy roads/ slippery conditions.	3/29/2024 9:51 AM
60	Flooded streets, beaver dams, down trees and limbs as well as overflowing streams	3/29/2024 9:47 AM

Q4 How much do you think the impacts of natural hazards and climate change will threaten your personal health, safety, or property?

Answered: 78 Skipped: 1



ANSWER CHOICES	RESPONSES	
I think natural hazards and climate change will negatively impact my life.	48.72%	38
I'm not sure how natural hazards and climate change will impact my life.	37.18%	29
I don't think that I personally will be impacted by natural hazards and climate change.	14.10%	11
TOTAL		78

Q5 If you are concerned about impacts to your life from natural hazards and/or climate change, what impacts are you most concerned about? Examples: basement flooding, wells drying out / contamination of wells, ability to grow food

Answered: 57 Skipped: 22

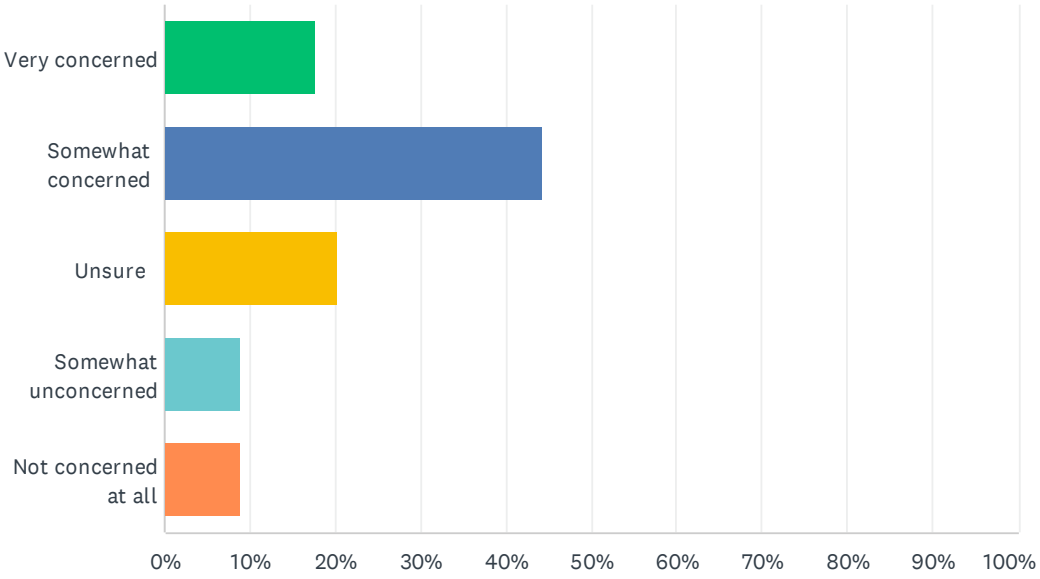
#	RESPONSES	DATE
1	The government messing with nature	4/22/2024 8:35 PM
2	basement flooding contamination	4/9/2024 1:48 PM
3	Basement flooding	4/4/2024 9:22 PM
4	Well drying out, access to clean food	4/4/2024 9:00 AM
5	Excess heat. Ice storms feel like they may be more frequent but I have not seen data substantiate this. Extreme precipitation is predicted to increase and data has suggested this is indeed happening. I am still amazed we lost one day this year to flooding), albeit a district issue not centered in Paxton).	4/1/2024 5:32 PM
6	Yard and basement flooding. Well being contaminated.	4/1/2024 12:07 PM
7	Basement flooding	4/1/2024 12:03 PM
8	Trees falling	4/1/2024 11:29 AM
9	Flooding with the Paxton clay soil, impact to house foundation	3/31/2024 10:07 PM
10	Death! Falling trees and limbs causing property damage or injury. Severe storms knocking out power.	3/31/2024 10:06 PM
11	Heavy windstorm	3/31/2024 5:30 AM
12	Basement flooding and a compromised foundation to my house.	3/30/2024 9:58 PM
13	Contamination to wells , ability to grow food	3/30/2024 2:04 PM
14	1. Contamination of well water; biggest concerns are high arsenic, pesticide runoff, and PFAS (need less expensive access to annual well water testing and consideration of banning the most dangerous pesticides and plastics) 2. With climate change, New England will experience tornadic storms of greater frequency and intensity sooner than anyone expects. A warning system including tornado sirens can be installed and can also act as civil defense warnings (different tones). Perhaps a system can be planned with the first siren installed downtown and annually add an additional siren based on higher density population areas. I've lived in Oklahoma and Tennessee, where we've had outbreaks of more than 100 tornadoes in one day, including EF 4s and 5s, and where people have been killed outdoors because Nashville was slow to place sirens. In Paxton, we already have a great system for text, call, and email emergency and routine notifications. But we need sirens to alert persons who are outdoors to check their phones. 3. Light pollution is much worse than it should be this far from Worcester. Municipal lighting should be replaced (by attrition, as needed) with dark-sky friendly downlighting and encouragement (and perhaps incentives) for business and residential residents to do the same. 4. Flooding hasn't impacted us personally. Yet. But should be addressed.	3/30/2024 1:42 PM
15	Contaminated wells and/or wells drying out.	3/30/2024 12:57 PM
16	Flooding since my property borders a creek and has a pond and wet areas surrounding	3/30/2024 11:04 AM
17	Flooding	3/30/2024 9:37 AM
18	Basement flooding Tree damage	3/30/2024 9:28 AM

19	Loss of native plant species.	3/30/2024 8:26 AM
20	Ability to grow food	3/30/2024 7:49 AM
21	Flooding	3/29/2024 10:48 PM
22	I'm concerned about trees and large branches taking out power lines and/or falling on our home. And although we haven't seen fires, we live across from Boynton Park, which is full of ready fuel if a fire comes.	3/29/2024 10:46 PM
23	Flooding is the only real issue. Worried about power loss as well, but only in how it will effect dunno pumps etc...	3/29/2024 5:11 PM
24	I think as a community, we should be more mindful of water consumption.	3/29/2024 5:07 PM
25	Water contamination and air quality	3/29/2024 3:15 PM
26	Water supplies with either drought or flooding, tree hazards are a big one right now	3/29/2024 2:22 PM
27	Trees down, poison ivy, ticks, mosquitoes	3/29/2024 2:18 PM
28	Basement flooding, yard flooding Sinking yards	3/29/2024 2:10 PM
29	Increased severity of storms with wind/water damage, higher temps leading to greater need/costs for cooling	3/29/2024 2:06 PM
30	natural hazards are part of life on this earth and will affect all of us at one time or another in our lifetimes.	3/29/2024 2:01 PM
31	I am not concerned	3/29/2024 1:48 PM
32	Contamination of wells from flooding. Loss of the last of the local farmers. Damage caused by Downed trees from increased rainfall and high wind events.	3/29/2024 1:29 PM
33	Downed trees hitting house, basement water	3/29/2024 1:10 PM
34	Basement flooding, loss of land, and long term power outages	3/29/2024 1:08 PM
35	Ability to grow food, maintain a a comfortable climate in my home, domestic/farm animal safety	3/29/2024 12:59 PM
36	Falling trees, water contamination, ability to grow food, domestic/farm animal safety	3/29/2024 12:59 PM
37	Damage to homes	3/29/2024 12:55 PM
38	Wells drying out	3/29/2024 12:43 PM
39	Contamination, crop damage, stormwater causing water main breaks and impact on the local economy	3/29/2024 12:42 PM
40	Groundwater levels and contamination (ability to drink and grow food)	3/29/2024 12:22 PM
41	Basement flooding	3/29/2024 11:44 AM
42	Basement flooding, well water contamination (we had to put in a whole house filtration system for our well water)	3/29/2024 10:57 AM
43	Well drying out, septic system inundated with run off water, erosion of property and driveway, basement flooding, oil usage in extreme weather.	3/29/2024 10:52 AM
44	Damage to property from downed trees, flooding	3/29/2024 10:39 AM
45	Basement flooding	3/29/2024 10:38 AM
46	basement flooding, water damage to earth causing houses to sink/tilt, road pavement cracking.	3/29/2024 10:31 AM
47	basement flooding	3/29/2024 10:14 AM
48	I anticipate flooding becoming a bigger and bigger issue because of climate change - both damage to property and to roadways.	3/29/2024 10:09 AM
49	Lack of snow pack leading to lower water levels, well drying out, excessive heat, loss of ecosystem for native plants and animals.	3/29/2024 10:08 AM

50	Growing food, food for helpful insects and ground bacteria, wildlife diseases, Street flooding and contamination in runoff coming onto our property	3/29/2024 10:04 AM
51	The air quality last year was concerning.	3/29/2024 10:00 AM
52	trees/limbs falling on my house/ property.	3/29/2024 9:58 AM
53	Leave us alone, Mother Nature will take care of its self.	3/29/2024 9:57 AM
54	Mold, Basement Flooding.	3/29/2024 9:56 AM
55	Drainage in the parking lot not taken care of.	3/29/2024 9:54 AM
56	Basement flooding	3/29/2024 9:53 AM
57	Water contamination, property damage	3/29/2024 9:47 AM

Q6 How concerned are you about the impacts that natural hazards and climate change will have on the Town of Paxton (the local infrastructure, economy, environment, and/or town residents)?

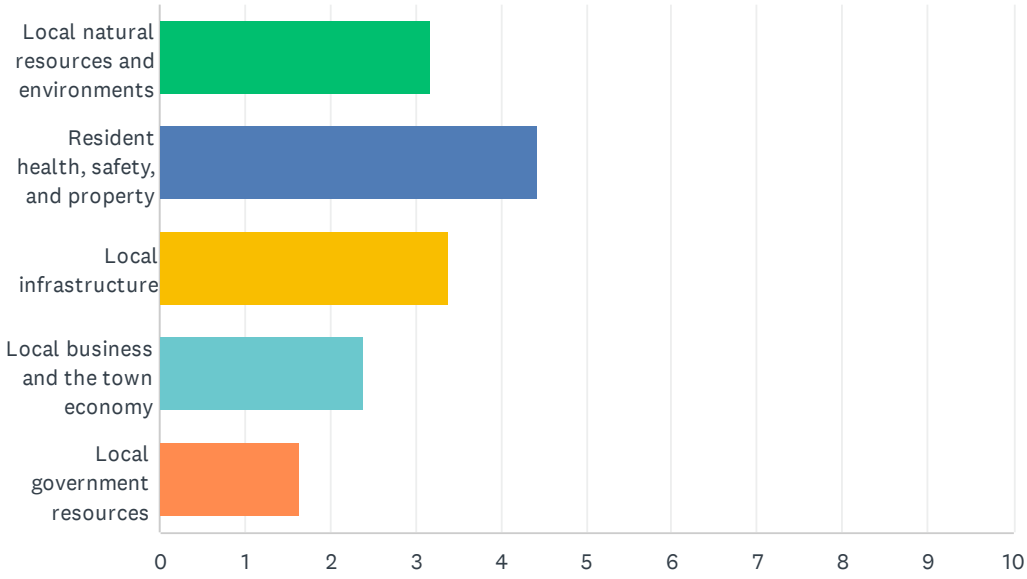
Answered: 79 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very concerned	17.72%	14
Somewhat concerned	44.30%	35
Unsure	20.25%	16
Somewhat unconcerned	8.86%	7
Not concerned at all	8.86%	7
TOTAL		79

Q7 What community assets are you most concerned about when you consider the potential impact of natural hazards and climate change on the Town of Paxton? Rank the responses below in order from most concerned (1) to least concerned (5).

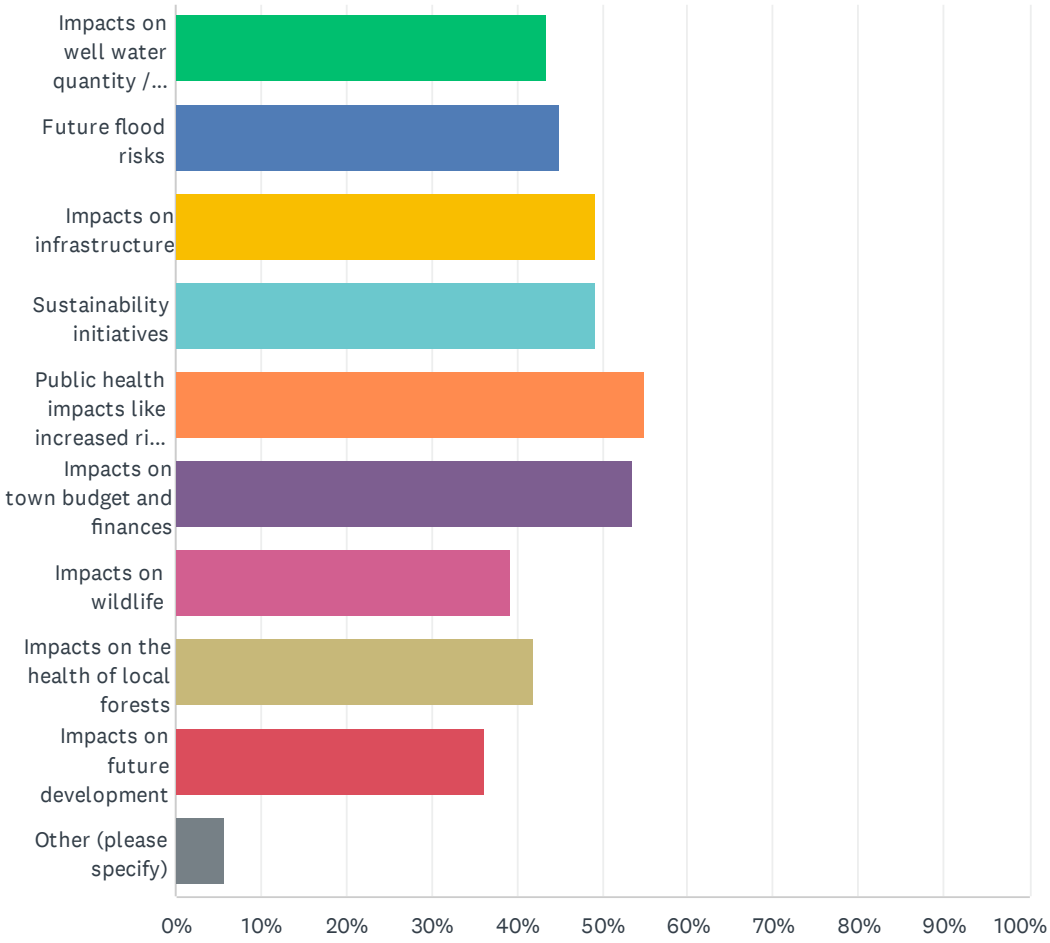
Answered: 72 Skipped: 7



	1	2	3	4	5	TOTAL	SCORE
Local natural resources and environments	18.06% 13	25.00% 18	29.17% 21	12.50% 9	15.28% 11	72	3.18
Resident health, safety, and property	59.72% 43	27.78% 20	9.72% 7	1.39% 1	1.39% 1	72	4.43
Local infrastructure	16.67% 12	30.56% 22	31.94% 23	15.28% 11	5.56% 4	72	3.38
Local business and the town economy	2.78% 2	11.11% 8	22.22% 16	48.61% 35	15.28% 11	72	2.38
Local government resources	2.78% 2	5.56% 4	6.94% 5	22.22% 16	62.50% 45	72	1.64

Q8 Which of the following aspects of natural hazards and climate change would you like to learn more about? Select all that you are interested in.

Answered: 69 Skipped: 10



ANSWER CHOICES	RESPONSES	
Impacts on well water quantity / quality	43.48%	30
Future flood risks	44.93%	31
Impacts on infrastructure	49.28%	34
Sustainability initiatives	49.28%	34
Public health impacts like increased risks of vector-borne disease (ex. Lyme disease, West Nile Virus, EEE - Eastern equine encephalitis)	55.07%	38
Impacts on town budget and finances	53.62%	37
Impacts on wildlife	39.13%	27
Impacts on the health of local forests	42.03%	29
Impacts on future development	36.23%	25
Other (please specify)	5.80%	4
Total Respondents: 69		

#	OTHER (PLEASE SPECIFY)	DATE
1	Climate change is a myth	3/30/2024 8:26 AM
2	None	3/29/2024 1:48 PM
3	I	3/29/2024 1:08 PM
4	This is not a concern	3/29/2024 10:24 AM

Q9 What actions should the Town of Paxton take to cultivate local resilience to natural hazards?Examples: increase local capacity to apply for hazard mitigation grant funding and implement hazard mitigation projects; improve storm water management; provide more education and outreach about how climate change could impact my life; encourage planting climate-resilient tree species; encourage cutting/trimming dead trees beside/hanging over roads; etc.

Answered: 41 Skipped: 38

#	RESPONSES	DATE
1	Encourage planting native species. Keep up with dead trees. No spraying.	4/22/2024 8:35 PM
2	Encourage cutting/trimming dead trees beside/hanging over roads. I think having a central market area would be a good idea. Could bring together local farmers, crafts, merchants, and maybe entertainment?	4/4/2024 9:00 AM
3	I would like to see the roof and grass bank behind the Middle school developed with a town solar field along with grid scale battery to support an emergency center in the school for the town. The battery could be cycled to reduce the town's cost for peak electricity with positive payback for the town MLP and provide electrical support for the school to be used as an emergency center. Technology and costs are now making this practical.	4/1/2024 5:32 PM
4	Increase visibility of grant funding or other resources that might be available to residents on these topics	4/1/2024 12:07 PM
5	Encourage cutting/trimming dead trees hanging over roads as well as power lines	4/1/2024 12:03 PM
6	All of above.	4/1/2024 11:29 AM
7	Hardening of town infrastructure e.g., electricity and drainage (that Paxton clay soil!)	3/31/2024 10:07 PM
8	Tree maintenance Road drainage Water management	3/31/2024 10:06 PM
9	Continue cutting/trimming dead trees, especially near power lines	3/31/2024 10:42 AM
10	The tree trimming mentioned in the prompt would be nice. Developing our business property tax base would be nice to help enhance the town budget and help reduce the tax load on residents.	3/30/2024 9:58 PM
11	Wrote all suggestions in answer to question #5 above	3/30/2024 1:42 PM
12	Storm water management, improve parks, removal dead trees, road overhang	3/30/2024 11:04 AM
13	Provide additional educational resources	3/30/2024 9:37 AM
14	Taking care of trees and finding methods to incentivize community. Financial aid in addressing the issue due to economic impact on individuals trying to maintain their properties though encountering flooding, ongoing concerns about water quality, and safety risks associated with deteriorating trees and strong winds.	3/30/2024 9:28 AM
15	Educate town residents and public works how to properly treat Japanese knot weed and prevent its spread. The town yard waste drop off site is particularly at risk and a potential source of spread. Knot weed is already surrounding the town cemetery and only getting worse	3/30/2024 8:26 AM
16	Cut down dead trees, but not at the exorbitant cost Tree Warden Robert’s did it for.	3/30/2024 8:26 AM
17	Educate and encourage residents about what is within our control today to be proactive about hazards; cutting dead trees, better water utilization	3/30/2024 7:49 AM

18	Information about how to prevent flooding	3/29/2024 10:48 PM
19	Tree and forest management is getting urgent; putting power lines underground so that we don't have the kinds of electricity-sparked fires that have occurred in other states;	3/29/2024 10:46 PM
20	Actually listen to the residents who have complained about the flooding issue for years in the above affected areas	3/29/2024 5:11 PM
21	Plant new trees, take out dead ones	3/29/2024 2:22 PM
22	Trimming trees, alternate power sources (ex solar, wind)	3/29/2024 2:18 PM
23	Cleaning up roads Water trenches (culverts)	3/29/2024 2:10 PM
24	Increased hazard mitigation grant applications, trimming dead trees, long-term resilience strategies	3/29/2024 2:06 PM
25	Provided as much information as possible to its residents	3/29/2024 1:45 PM
26	Better staffing of essential services, dpw, fire, and police departments.	3/29/2024 1:08 PM
27	Trimming damaged trees, encourage planting climate resistant trees, improve watersheds,	3/29/2024 12:59 PM
28	Encourage planting climate resistant tree species, cutting and trimming dead and damaged trees near roads and hanging over roads	3/29/2024 12:59 PM
29	all of the above. Also this information should be available and accessible to all on the town website	3/29/2024 12:42 PM
30	Ensuring eligibility for state and federal aid when needs arise.	3/29/2024 12:22 PM
31	Increase money to towns to take care of the infrastructure	3/29/2024 11:44 AM
32	Cutting dead trees, possible moving power lines underground, increase drainage abilities in the roads, road maintenance, town wide leaf cleanup and sweeping of roads, to keep organic matter dams from building up.	3/29/2024 10:52 AM
33	Education on climate resilient trees, trimming where necessary, inspecting drains regularly	3/29/2024 10:39 AM
34	funding to proactively identify issues. cutting/trimming dead trees	3/29/2024 10:31 AM
35	Improve storm water management, increase reserve water supply, inprove town service response to hazards ie.. police, fire, highway dept	3/29/2024 10:16 AM
36	increase capacity to apply for grant funding, proactively cutting down trees that might pose a hazard in storms, building up local infrastructure such as water guards/drainage around major roads, etc.	3/29/2024 10:09 AM
37	PLD already does a god job of trimming branches back from power lines. I noticed the town abandoned their project of removing sick/dying trees. That should get funded.	3/29/2024 10:09 AM
38	Encourage cutting /trimming dead trees, water management, free local utilities (pine power like Princeton or more solar power)	3/29/2024 10:00 AM
39	The town needs to apply for more grants; work on cutting/trimming more dead trees/limbs hanging over roads and power lines - especially to people's houses.	3/29/2024 9:58 AM
40	Continue high quality road management and prevention against tree damage that could cause road or electrical issues (safety).	3/29/2024 9:51 AM
41	Increased capability and mitigation by removing dead / dying trees, overhanging limbs and adding culverts on Marshall St properties	3/29/2024 9:47 AM

SECTION 6: EXISTING PROTECTION

The Town of Paxton currently makes use of most available locally-controlled tools to mitigate the consequences of natural hazards: zoning regulations, planning, and physical improvements. The Town does not participate in any federal programs such as StormReady certification or Firewise community certification, but they do use CodeRed for emergency notifications. Paxton also plans to research the utility of public awareness and education programs as a result of this planning process.

Paxton has most of the no-cost or low-cost hazard mitigation capabilities in place. Land use zoning, subdivision regulations and an array of specific policies and regulations that include hazard mitigation best practices, such as limitations on development in wetlands and stormwater management through the Central Mass Stormwater Coalition are in place. Paxton also has appropriate staff dedicated to hazard mitigation-related work for a community of its size, including a Town Administrator, an Emergency Management Director, a professionally run Department of Public Works, Department of Public Works Director, a Conservation Agent, and a Municipal Light Department Manager, and an elected tree warden. Paxton has several relevant plans in place, including a Comprehensive Emergency Management Plan, and it is working now to implement its Master Plan. Not only does Paxton have these capabilities in place, but they are also deployed for hazard mitigation, as appropriate. The Town also has very committed and dedicated volunteers who serve on Boards, Commissions and Committees and in other volunteer positions. The Town collaborates closely with surrounding communities through the Central Mass Stormwater Coalition, and has opted into fire protection mutual aid agreements through MEMA. The Town's Water Department participates in MassWarn mutual aid for water departments. The Town also participates in the Northeast Public Power Association (NEPPA) mutual aid with area municipal light departments. Paxton is also an active member community of the Central Massachusetts Regional Planning Commission (CMRPC) and can take advantage of no-cost local technical assistance as needed provided by the professional planning staff at CMRPC.

The table below describes existing mitigation protections in Paxton. It includes a brief description of each activity as well as a subjective evaluation of its effectiveness and of any need for modifications.

DRAFT

EXISTING PROTECTION MATRIX

Existing Measure	Description	Action	Effectiveness & Recommendations
Participation in National Flood Insurance Program (NFIP)	Provides flood insurance for structures located in flood-prone areas. Also, communities participating in the NFIP have adopted and enforce ordinances, bylaws and regulations that meet or exceed FEMA requirements to reduce the risk of flooding. Paxton has a Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw that Requires all development to be in compliance with state building code requirements for construction in floodplains. This	Paxton monitors building activity within the flood plain to ensure compliance with provisions of state building code. The Town's Administrator is the appointed designee who implements the addressed commitments and requirements of the NFIP in town and the Town has adopted the Flood Insurance Rate Map (FIRM) dated from July 16th, 2014; this information is noted in the Flood Plain District Boundaries (Chapter 7.2.2) in its Zoning Bylaw. The Town's Floodplain Overlay District, described in this same section of the Zoning Bylaw, includes all special flood hazard areas (SFHAs) designated as Zone A,	Effective There are no repetitive loss properties in Paxton. Paxton should seek to further limit development in the 1% flood zones. It should work to score in the Community Rating System (CRS) under NFIP to enable its residents to obtain lower flood insurance rates. Paxton should educate its residents about NFIP.

DRAFT

	Chapter was last updated in May of 2014. This Zoning Bylaw is as of writing being updated to reflect updates to the latest FIRMs.	AE, AH, or AO in town and regulates and permits development within these areas. In addition, this same section of the Zoning Bylaw also regulates the ability of development within floodways in Zones A, A1-30, and AE to be substantially improved to ensure that these improvements do not lead to an increase in damage when floods occur.	
Stormwater Management policy and regulations in place	Planning Boards or Conservation Commissions review projects for consistency with MA DEP standards. This helps ensure adequate on site retention and recharge. The Town enforces MS4 Permitting Compliance	Paxton enacted a Storm Water Regulations document in March 2012, in order to administer the Paxton Storm Water Bylaw, accepted May 2006 and revised May 2012, and most recently updated in May 2019. The Town also issues Storm Water Management Permits to make exceptions to the altering of land in Town. Paxton also participates in the Central Mass Stormwater Coalition.	Very effective There will be additional updates to this policy in the near future.

DRAFT

Local Planning Efforts: Open Space and Recreation Plan	Local plan identifying significant natural resources and identifying mechanisms to ensure their protection. Following Mass. Department of Conservation and Recreation guidance for development of OSRPs, this document does not focus on specific hazards. Open Space Plans can provide many tools. Towns must commit to making the land acquisitions and regulatory changes, giving increased attention to preserving undeveloped flood-prone areas and associated lands	Paxton's Open Space and Recreation Plan was issued in June 2003. Paxton's Open Space and Recreation Committee updated this plan in 2013. This Plan is currently under the process of review and update as of writing of this HMP.	Somewhat effective Paxton should prepare its plan update per MA Division of Conservation Services requirements and Workbook guides. Where allowable, Paxton should use the update to integrate hazard mitigation activities and recommendations.

DRAFT

Local Planning Efforts: Municipal Vulnerability Preparedness Plan	This plan is a guide for climate resiliency implementation projects in town. It includes a vulnerability assessment and an action-oriented resiliency plan. This plan makes the town eligible for MVP Action Grant funding.	The Paxton Municipal Vulnerability Preparedness Plan was adopted in 2019	Somewhat effective The Town should incorporate its MVP Plan recommendations into its broader planning goals and objectives.

DRAFT

Local Planning Efforts: Paxton Master Plan	The Master Plan serves as a policy guide as well as the Town's future vision of itself. It compiles a comprehensive analysis of all aspects of community development and is designed to be a resource for the Town over the next 10-20 year time period.	Paxton's Master Plan was adopted in 2008. Paxton has been implementing the goals and objectives from this plan.	Somewhat Effective The Town should consider reviewing and updating their master plan.
Local Watershed Protection District in place	Local zoning district builds upon the State's Wetlands Protection Act and Regulations. These add regulatory oversight provisions for development within the jurisdictional buffer zone, adding increased attention to alteration of watershed and wetlands, and the opportunity to preserve	Paxton has implemented a Watershed Protection District to regulate development around the water bodies and reservoirs in Town that are used for potable water. The Paxton Watershed Protection District Map is included as Appendix E3.	Very effective Paxton should examine the enhanced development controls of implementing a local town-wide wetlands protection bylaw to further control development around natural resources and sustain natural barriers to flooding and protect potable water supply.

DRAFT

	capacity and quality.		
Drainage system Maintenance, Repair, and Improvement program	Plan to keep municipal drainage facilities (storm drains, culverts, etc.) in good order Maintain existing culverts through regular maintenance and (in some cases) beaver controls; replace/expand culverts where needed to allow for adequate stormwater flow.	Paxton performs street sweeping in spring and fall, and catch basin cleaning year round. The Town has historically maintained and replaced problem culverts when needed and as funding allows. For instance, in 2014, Paxton received a grant from MassWorks to replace their culvert on Davis Hill Road, and in 2016 for the relining of two culverts on Route 56.	Somewhat Effective Paxton should examine a public education program for residents on storm drain clearance and other best practices . They should send out quarterly education flyers on this topic. It is part of the Stormwater Management Plan to develop a prioritized inventory of problem culverts. Culvert replacements should prioritize nature-based solutions whenever possible.

DRAFT

Tree Trimming and tree wire installation to protect power lines	Plan to ensure routine maintenance of trees to reduce likelihood of vegetative debris and damage to power lines in response to storm events.	Paxton conducts roadside mowing from April-November to remove juvenile trees. Tree trimming (take-downs and clearing dead branches) takes place as needed. The Municipal Light Department performs routine maintenance of vegetation and tree branches on its power lines. Tree wire is being installed to further reduce the effects of damaging storms. In 2022 Paxton received ARPA Funding to remove trees.	Effective Current efforts are focused on power lines. It is recommended to establish a tree trimming program for all trees throughout town.
Participation in Northern Worcester County Fire District (Mutual Aid District 8) as well as the Mid-State Mutual Aid Association and the Northeast Public Power Mutual Aid	These fire, emergency response, and electrical/power groups serve as organized systems for fire departments and municipal light departments to work together across municipal boundaries.	Paxton has been a member since 1955.	Very effective. Paxton is now more resilient towards wildfires and emergency management needs.

DRAFT

Town of Paxton Municipal Light Department	The Town has had its own substation since the 1970s and has relied on this as its main source of power. It has the ability to receive power from the City of Worcester or the Town of Rutland in the event that the Town's substation goes down. The Town relies on power coming from the City of Worcester and the National Grid transmission line as a secondary source of power.	The Town no longer relies on National Grid or the City of Worcester as its main source of power. The Town is planning on building backup energy storage to increase resiliency.	Very effective. Reducing the occurrence of power outages in multiple ways prevents flooding and other problems associated with power outages.
Relocated Public Safety transmitter and backup generator away from Asnebumskit hill, which becomes impassable during large snowstorms.	The Town's Public Safety radio transmitter was relocated and strategically placed in three separate locations throughout Town.	Secure and maintain new Public Safety radio transmitter locations so as to ensure their continued operation throughout severe weather events.	Very effective. The Town now experiences more reliable radio transmissions during severe weather events.

DRAFT

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton HMP Continuation **Community:** Paxton

Location: Paxton Public Safety Building **Date:** 2/21/24 **Meeting Time:** 12 pm

Participant Name	Organization	Title	E-Mail
Jeffrey Olson	Paxton Fire / EMD	Lt / Assistant EMD	Jolson@townofpaxton.net
Trish Settles	CMRPC		
Marc Granato	CMRPC		
Michael Pingitore	Paxton Fire	Chief / EMD	MPingitore@townofpaxton.net

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton Hmp mit. strategies **Community:** Paxton

Location: Paxton Public Safety **Date:** 04/25/24 **Meeting Time:** 10:00 am - 12:30 pm

Participant Name	Organization	Title	E-Mail
Jeffrey Olson	Paxton FD/EMD	Lt/Assistant EMD	Jolson.@townofpaxton.net
Travis Thibault	Paxton DPW	Director	tthibault@townofpaxton.net
Forrest Thorpe	Paxton PD	Sgt.	fthorpe@townofpaxton.net
Mark Wilde	WRSD	Fac. Direct.	mark_wilde@WRSD.net
Heather Munroe	Paxton TA	Town Admin	hmunroe@townofpaxton.net
Marc Gratto	CMRPC	emergency planning	mgratto@cmrpc.org

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton Hmp mit. stakeh's **Community:** Paxton

Location: Paxton Public Safety **Date:** 04/25/24 **Meeting Time:** 10:00 am - 12:30 pm

Participant Name	Organization	Title	E-Mail
Jeffrey Olson	Paxton FD/EMD	Lt/Assistant EMD	Jolson@townofpaxton.net
Travis Thibault	Paxton DPW	Director	tthibault@townofpaxton.net
Forrest Thorpe	Paxton PD	Sgt.	fthorpe@townofpaxton.net
Mark Wilde	WRSD	Fac. Direct.	mark_wilde@WRSD.net
Heather Munroe	Paxton TA	Town Admin	hmunroe@townofpaxton.net
Marc Gratto	CMRPC	Emergency Planning	mgratto@cmrpc.org

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton HMP meeting 5 **Community:** Paxton

Location: Paxton Public Safety **Date:** 06/13/24 **Meeting Time:** 9:00

Participant Name	Organization	Title	E-Mail
Marc Comeau	CMRPC	Emergency Planner	mycomeau@cmrpc.org
Heather Munroe	Paxton	Town Admin	hmunroe@townofpaxton.net
Jeff Olson	Paxton Fire	Lt / Assistant EMD	JOlson@townofpaxton.net
Michael Pingitore	Paxton Fire	Chief / EMD	mpingitore@townofpaxton.net
Travis Thibault	Paxton DPW	Director	tthibault@townofpaxton.net

CMRPC
Central Massachusetts Regional Planning Commission

Meeting Name: Paxton HMP meeting: Comm. Survey Review **Community:** Paxton

Location: Paxton Public Safety Building **Date:** 7/18/24 **Meeting Time:** 10:00AM

Participant Name	Organization	Title	E-Mail
Mark Granato	CMRPC	Emergency Preparedness Planner	mgranato@cmrpc.org
Forrest Thorpe	Paxton PD	Sergeant	fthorpe@townofpaxton.net
Heather Munroe	Paxton TA	TA	hmunroe@townofpaxton.net
Jeffrey Olson	Paxton FD	Assistant EMD	Jolson@townofpaxton.net
Travis Thibault	Paxton DPW	Director	tthibault@townofpaxton.net
Michael Pingitore	Paxton FD	Chief	mpingitore@townofpaxton.net

APPENDIX D:

Board of Selectmen Meeting Public Presentation - Materials

Appendix D helps meet the following FEMA local mitigation plan requirements:

A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?" (Requirement 44 CFR § 201.6(c)(1))

A2. "Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process?" (Requirement 44 CFR § 201.6(b)(2)); and

A3. "Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval?" (Requirement 44 CFR § 201.6(b)(1))

Town of Paxton, Natural Hazard Mitigation Plan
Public Presentation: June 23, 2025

What is hazard mitigation? What is a mitigation plan?

- Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of natural disasters.
- Mitigation is not disaster response; its goal is to reduce hazard impacts before a disaster occurs.
- A mitigation plan identifies natural hazards and the risks they pose to residents, infrastructure, property, and natural resources. It prioritizes projects, policies, education, and procedures for reducing these risks, now and in the future.
- Mitigation helps break the cycle of disaster damage, reconstruction, and repeated damage.

Why should Paxton complete and adopt this kind of plan?

- Natural hazard mitigation planning establishes a road map for achievable actions that can substantially reduce risks.
- The Federal Emergency Management Agency (FEMA) requires that cities and towns adopt and update a natural Hazard Mitigation Plan to be eligible for various FEMA pre-disaster and post-fire hazard mitigation grants.
- This plan is primarily funded by a grant from FEMA through MEMA (with a local in-kind match), as well as through additional DLTA Funding
- FEMA and Paxton's Board of Selectmen adopted the Town's last natural hazard mitigation plan in December 2016, and this plan expired in December 2021.

What natural hazards pose the greatest risks to Paxton?

- Largest risks: Severe snowstorms, severe thunderstorms / wind, invasive species, extreme temperatures
- Moderate risks: flooding, wildfires,
- Lower risks: hurricanes, drought, tornadoes, dam failure, earthquakes

Local partners

Local knowledge is essential to the mitigation planning process. Partners in Paxton to date include: Carol Riches, Select Board Member; Heather Munroe, Town Administration, Town Administrator; Travis Thibault, Department of Public Works Superintendent; Michael Pingitore, Fire Chief; Jeff Olsen, Fire Lieutenant; Forrest Thorpe, Paxton Police Sergeant; Mark Wilde, Wachusett Regional School District, Facilities Director; Tara Rondeau, Paxton Light Department, Manager; and Timothy White, Paxton Light Department, Manager

Planning timeline

- Information gathering via mapping, research, and local input — August 2021 to the present
- Draft plan development — July 2024 – November 2024
    - Public comments/questions are requested within two weeks of the draft plan being posted on the town website following this presentation.
- Public presentation — June 23, 2025
- MEMA review — Anticipated Spring/Summer 2025
- FEMA approval and local adoption — Anticipated Fall 2025
- 5-year update — 2030

Recent/ongoing mitigation activities include:

- Street sweeping and catch basin cleaning
- Maintaining and replacing problem culverts and maintaining and repairing problem roadways when needed and as funding allows
- Participation in the National Flood Insurance Program (NFIP)
- Compliance with the state building code
- Dam monitoring
- Tree trimming program
- Snow removal
- Hazard warning systems and notifications
- Education and outreach
- Plans, regulations, and studies

Recommended high priority mitigation strategies in the DRAFT plan

Structure and Infrastructure Strategies

- Continue installing tree wire, and continue tree trimming program with newly hired Lewis Tree Company, in order to reduce power outages, flooding, and other problems associated with power losses. Include Tree Trimming around Communications Infrastructure.
- Install Generators For SCADA System Asnebumskit Hill water tank and Repeater Antennae at 105 Asnebumskit
- Paxton Center School Infrastructural Mitigations: Relocate the White Building attached to the school by a minimum of 40 ft to mitigate secondary fire damages from hazard events.
- Paxton Center School Infrastructural Mitigations: Install Fire protection System in Paxton Center School to prevent catastrophic Fire Damage within the school building caused by a hazard event.
- Paxton Center School Infrastructural Mitigations: Install upgraded high efficiency Heating and cooling system to prevent damage from extreme temperatures as well as open up the possibility of utilizing the school as a approved shelter location. Identify and improve shortcomings in energy efficiency for the school as a whole.
- Paxton Center School Infrastructural Mitigations: Identify Owner of drainage pipe that is believed to pass beneath the school and evaluate drainage pipe for structural integrity and feasibility to reroute the drainage pipe around the school facility.
- Upgrade and maintain the pump equipment at Asnebumskit Reservoir for utilization in an emergency
- Implement a robust forestry program to remove hazardous trees before storm events as well as to identify and quarantine invasives.
- Perform Route 31 Culvert Replacements upgrading drainage infrastructure on that road.
- Water Infrastructure Replacement on West Street, water infrastructure there is aging and supplies water to west side of the town. Begin a broader study of the Town's Water system to create a replacement plan for aging infrastructure
- Install bat boxes and Dragonfly gardens on public property in town to reduce the threat from mosquito borne illnesses.
- Address drainage concerns at critical town facilities such as the Department of Public Works and the Paxton Public Safety building.
- Address snow load concerns on town owned facilities with retrofits.

Preparedness, Coordination, and Response Strategies

- Continue to participate in National Flood Insurance Program (NFIP) (or other) training offered by the State and/or FEMA that addresses flood hazard planning and management.
- Draft a Snowstorm Plan for road information coordination and planning for snow removal.
- Participate in Evacuation Plan updates.
- Establish a Contract with Leicester for Backup Water Interconnection.
- GIS Water Infrastructure mapping to provide accurate water infrastructure data to fix mains and reduce loss of service to community.
- Obtain Stormready Certification

Education and Awareness Strategies

- Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).

Local Plan and Regulation Strategies

- Monitor implementation of Hazard Mitigation Plan, To include annual review of the Hazard Mitigation Strategies/ Existing Protection Measures to update and improve. Incorporate High Hazard Potential Dam information in future updates.
- Develop a Road Grading Plan to improve Paxton's infrastructure and maintenance of evacuation corridors as well as other highways and byways of the town.
- Establish Tree Management and Stabilization Fund to address hazardous tree concerns in town.

The draft plan with the full list of mitigation strategies will be available shortly on Paxton's town website.

Comments and questions should be directed to Marc Granato (mgranato@cmrpc.org) at CMRPC within two weeks of the draft plan being posted on the town website.

This natural hazard mitigation planning activity is funded by an FY23 Hazard Mitigation grant from the Federal Emergency Management Agency through the Massachusetts Emergency Management Agency

TOWN OF PAXTON HAZARD MITIGATION PLAN

Paxton Board of Selectmen

June 23rd , 2025

Marc Granato, Emergency Preparedness Planner

Will Talbot, Assistant Planner

Central Massachusetts Regional Planning Commission

WHY IS PAXTON COMPLETING THIS PLAN?

- The Federal Emergency Management Agency (FEMA) requires that cities and towns adopt and update a natural Hazard Mitigation Plan to be eligible for various FEMA pre-disaster and post-fire hazard mitigation grants.

- This plan will meet FEMA's requirements and help the town make good use of its resources.
- Paxton's last HMP update was approved in 2016 and expired in 2021.



PLAN FOR MITIGATING DAMAGES FROM NATURAL HAZARDS

- Flooding
- Severe Snowstorms / Ice Storms / Nor'easters
- Hurricanes
- Severe Thunderstorms / Wind / Tornadoes
- Wildfires / Brush Fires
- Earthquakes
- Dam Failure
- Drought
- Extreme Temperatures
- Invasive Species
- Other Hazards (Landslides, Groundwater Intrusion)

Not an Emergency Response Plan

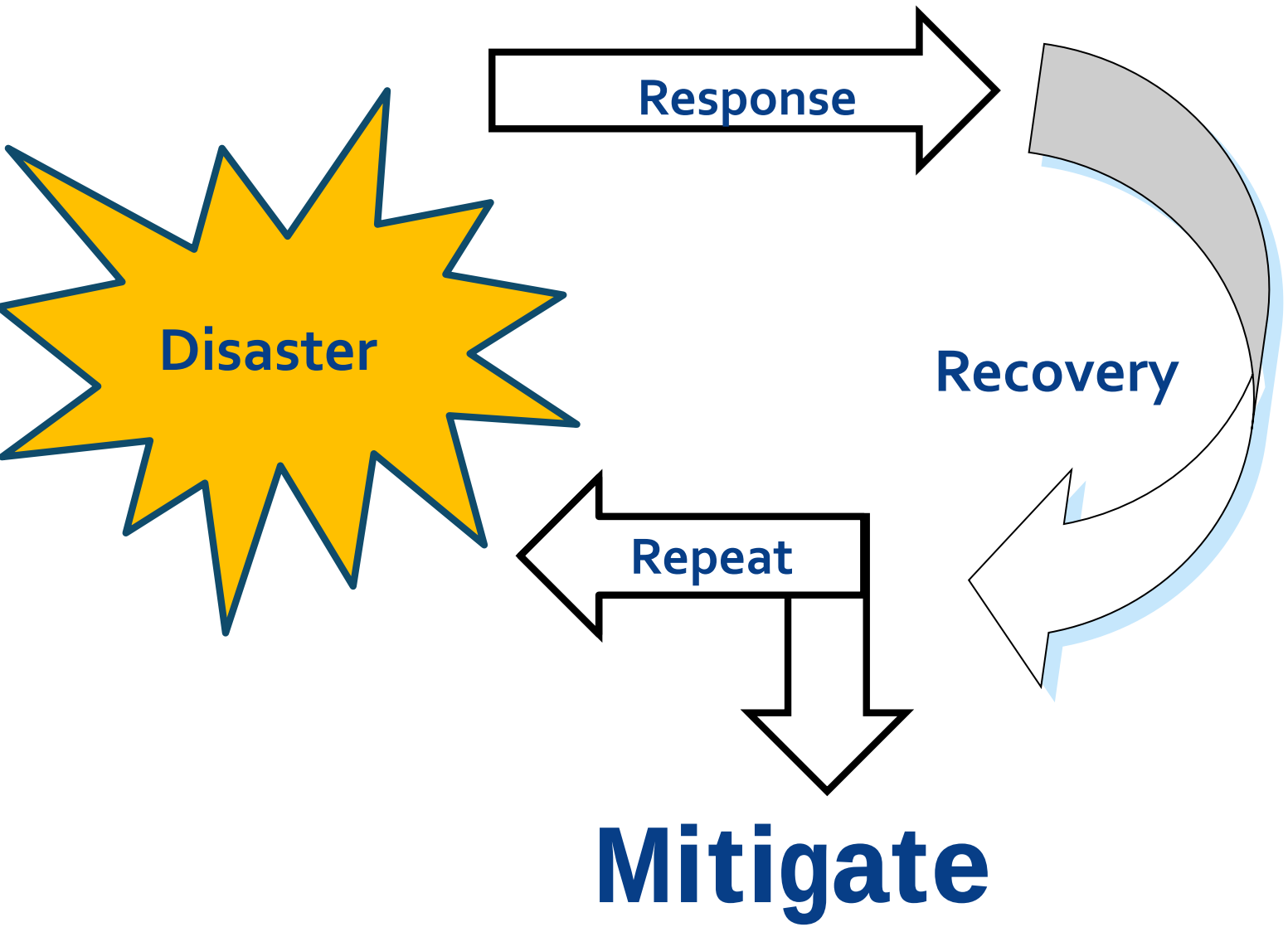
WHAT IS HAZARD MITIGATION?

- *To permanently reduce or prevent losses of life, injuries and property damage by using long-term strategies*
- *What preventive actions are being taken NOW to reduce future risks and damages?*
- *What additional actions can be taken in the FUTURE?*
- *According to the National Institute of Building Sciences Natural Hazard Mitigation Saves: 2019 Report, on average between 4 to 6 dollars is saved for every dollar spent on hazard mitigation*

THE BENEFITS OF MITIGATION

National Benefit-Cost Ratio (BCR) Per Peril *BCR numbers in this study have been rounded	Beyond Code Requirements	Federally Funded
Overall Hazard Benefit-Cost Ratio	**$4:1**	**$6:1**
Riverine Flood	$5:1	$7:1
Hurricane Surge	$7:1	Too few grants
Wind	$5:1	$5:1
Earthquake	$4:1	$3:1
Wildland-Urban Interface Fire	$4:1	$3:1

Breaking the Cycle of Risk



Four Tools & Techniques for Hazard Mitigation

1. Structure & Infrastructure Projects
2. Preparedness, Coordination & Response Actions
3. Education & Awareness Programs
4. Local Plans & Regulations

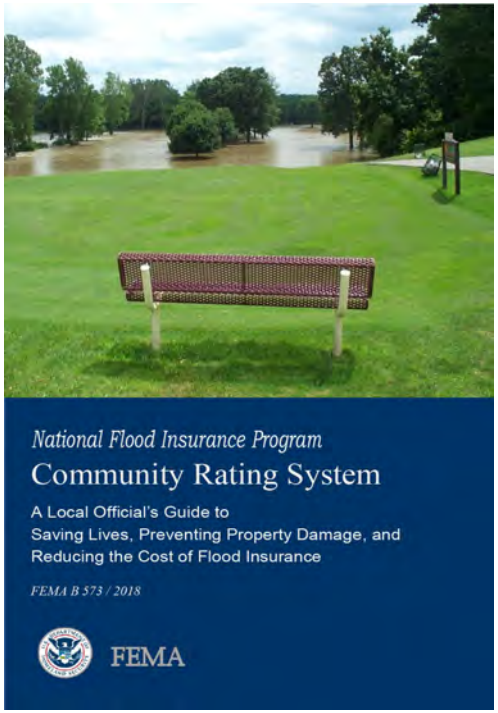
STRUCTURE AND INFRASTRUCTURE PROJECTS

- Prevent floodwaters from reaching properties
- Man-made structures to control water flows
- Culverts, dams, storm drainage facilities, pumping facilities



PREPAREDNESS AND RESPONSE

- National Flood Insurance Program
- Evacuation Planning
- Community Rating System
- Facilitate and coordinate the administration, enforcement and collaboration



EDUCATION AND AWARENESS

- Natural hazard awareness websites
- Hazard information at libraries, schools, and public buildings
- Information brochures mailed to residents (e.g., safe operation of home generators)
- Public outreach at community events



LOCAL PLANS & REGULATIONS

- Planning & Zoning
- Subdivision and Site Plans
- Floodplain regulations
- Wetlands bylaws
- Storm water regulations
- Building Code
- Master Plans
- MVP Plans



PLANNING PROCESS

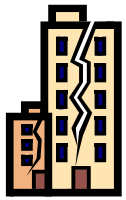
- CMRPC provides technical assistance to the Town for plan development
- The Town coordinates through its Local Hazard Mitigation Team
- Public Survey
- Public presentation (tonight), during plan development and review of the draft plan
- Submittal of Draft Plan to MEMA and FEMA for review, revision, and approval
- Plan adoption by the Board of Selectmen

DEVELOPMENT OF THE PLAN

CMRPC assisted the Paxton Local Hazard Mitigation Planning Team to:

- Identify & Map Critical Facilities
- Identify & Map Locally Identified Hazard Areas
- Identify & Review Existing Mitigation Measures
- Identify and Prioritize New Mitigation Strategies
- Gather Feedback & Input from the Public



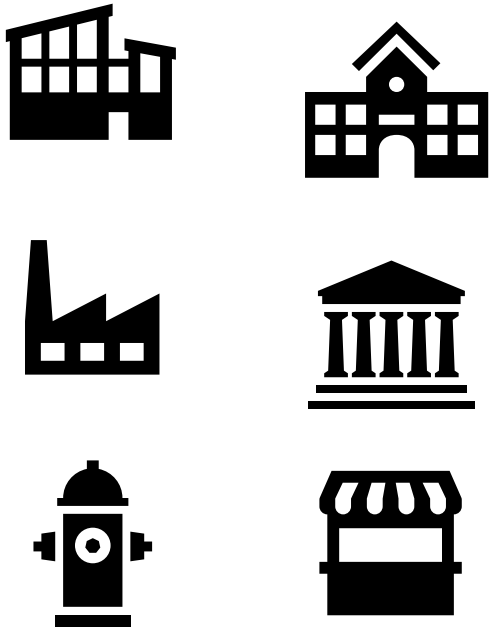



IDENTIFY CRITICAL FACILITIES

Database & GIS maps of critical facilities, infrastructure

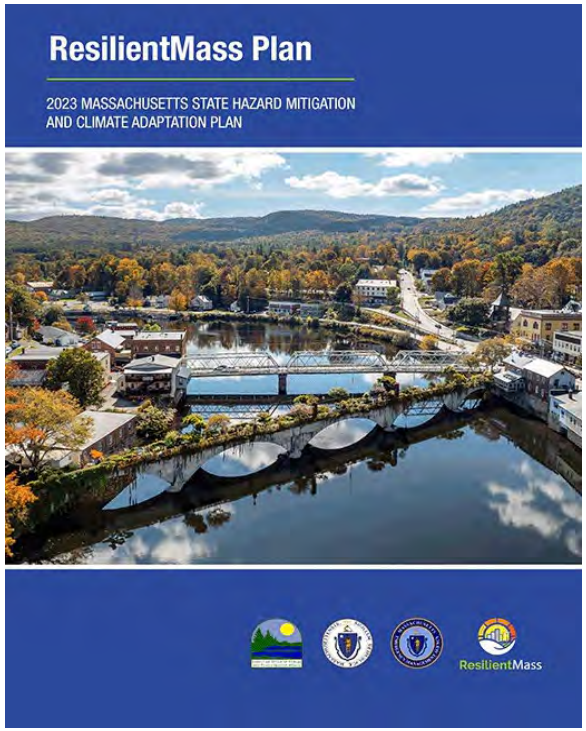
Sites identified include:

- Emergency Response Facilities
- Water Supply and Sewer Facilities, Town Facilities, and Utilities
- Dams
- Facilities and populations to protect



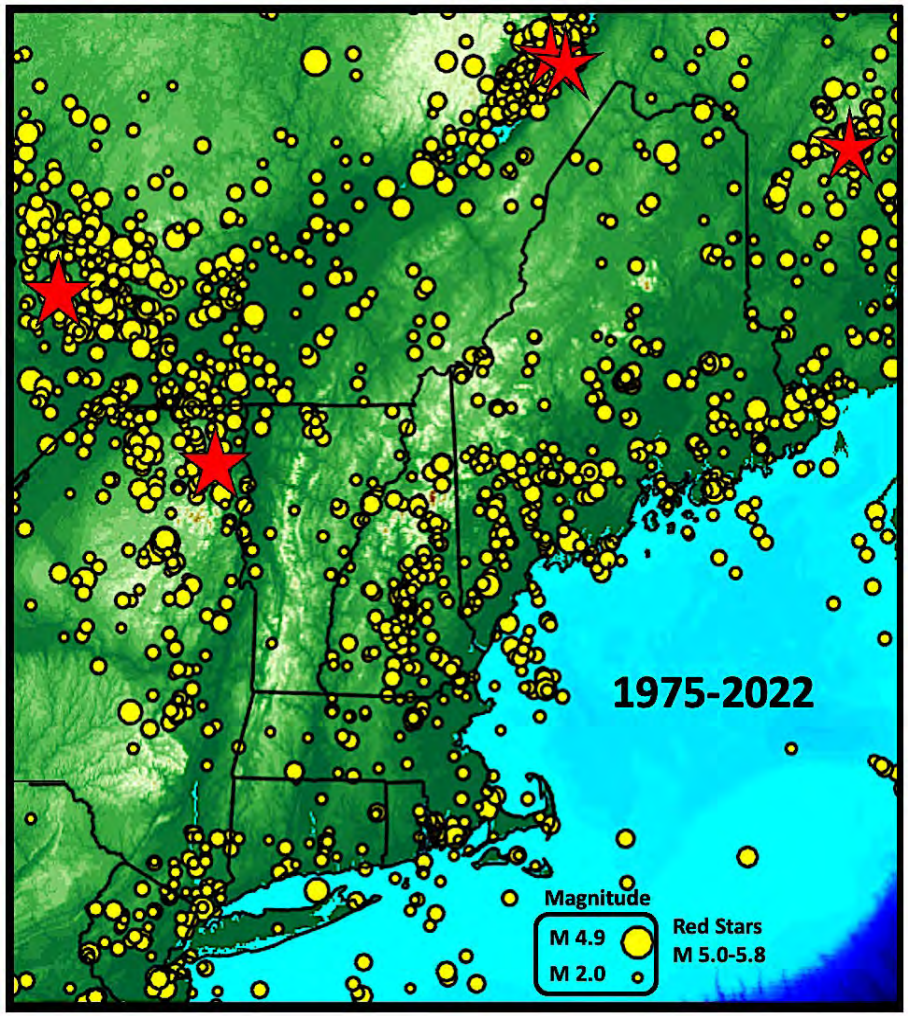
HAZARD IDENTIFICATION & MAPPING

- State & Federal data on floodplains, snowfall, wind speeds, hurricanes, earthquake risk, etc.
- Review Mass. State Hazard Mitigation Plan
- Coordinate with Local Team to get local information on hazard areas and potential future developments



OTHER HAZARDS – GEOLOGIC, WIND, & SNOW

Earthquakes from 1975 to 2022 2+ Magnitude



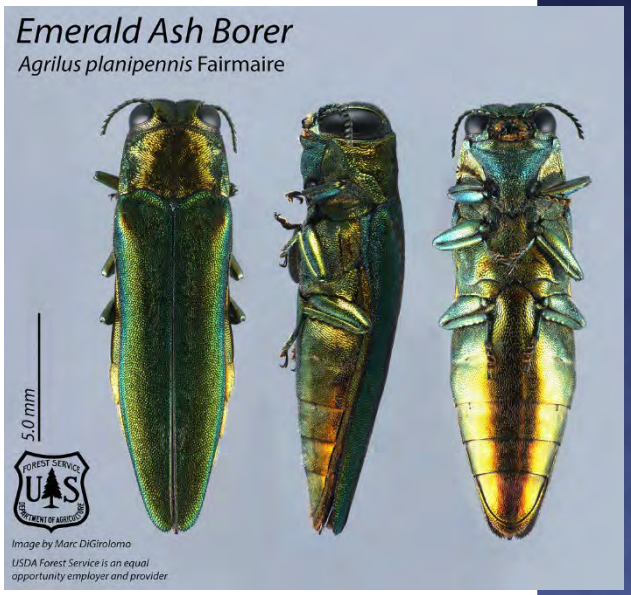
Recent Declared Hurricanes & Snow Disasters

Disaster	Declaration Date	Incident Period	FEMA ID
Hurricane Lee	09/15/23	09/15/23 - 09/17/23	EM-3599-MA
Mashpee Wampanoag Tribe Tropical Storm Henri	08/22/21	8/20/21 -	3566-EM-Mashpee Wampanoag Tribe

Disaster	Declaration Date	Incident Period	FEMA ID
Massachusetts Severe Winter Storm and Snowstorm	04/18/22	01/28/22 - 01/29/22	DR-4651-MA
Massachusetts Severe Winter Storm and Snowstorm	07/19/18	03/13/18 - 03/14/18	DR-4379-MA

SELECT LOCALLY-IDENTIFIED HAZARD AREAS

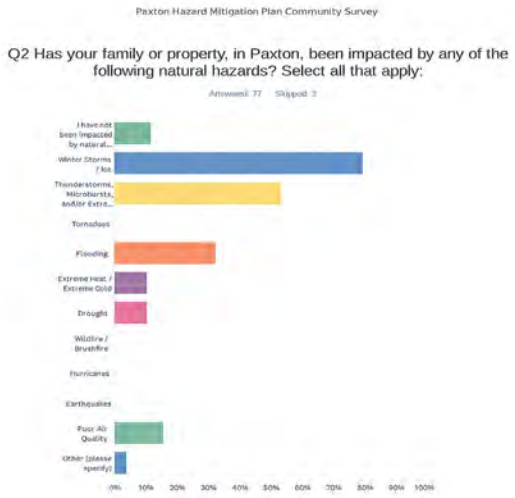
- Flooding
  - Indian Hill Road, Rasvall Pond Dam, Nanigan Road, Thompson's Pond, Black Hill Road, Streeter Pond and Asnebumskit Dam, and Route 31
- Severe Storms (wind and snow)
  - August 10th, 1979 Treasure Valley Tornado
  - December 5th 2020 Snowstorm
- Extreme Temperatures
  - Water Main Breaks in colder temperatures
- Invasive Species
  - Japanese Knotweed
  - Emerald Ash Borer
  - Beech Leaf Disease
  - Spongey Moth



This Photo by Unknown Author is licensed under CC BY-SA-NC

PUBLIC SURVEY – Summer / Fall 2024

- 79 total responses
- Hazards of greatest concern: winter storms / ice, thunderstorms / microbursts / extreme wind, invasive species, and loss of water quality
- The survey was promoted through town social media and a geographically targeted Facebook ad buy.
  - Survey flyers and paper copies were also posted at several high traffic locations in town.
- A paper flyer was also distributed through the Wachusett regional School district and was highly successful in garnering responses.





EXISTING MITIGATION MEASURES

MULITIHAZARD

- Comprehensive Emergency Management Plan (CEMP)
- Compliance with the state building code
- Education and outreach
- Hazard warning systems and notifications
- Plans, regulations, and studies

FLOOD RELATED HAZARDS

- National Flood Insurance Program
- Street sweeping
- Catch basin cleaning
- Drainage preventive practices to reduce clogging
- Subdivision Rules and Regulations
- Zoning Regulations

DAM FAILURES

- Dam inspection and evaluation reporting

WIND-RELATED HAZARDS

- Tree trimming program

WINTER-RELATED HAZARDS

- Salting and sanding of roads and plowing for snow removal

WILDFIRE HAZARDS

- Existing Mutual Aid Agreements

PAXTON MITIGATION STRATEGIES

- Where are the GAPS?
- What actions will further reduce vulnerability?
- Where are the PRIORITIES?

DRAFT PLAN SELECT HIGH-PRIORITY MITIGATION MEASURES

- Install Generators For SCADA System Asnebumskit Hill water tank and Repeater Antennae at 105 Asnebumskit
- Draft a Snowstorm Plan for road information coordination and planning for snow removal
- GIS Water Infrastructure mapping to provide accurate water infrastructure data to fix mains and reduce loss of service to community
- Provide information to residents and businesses on water conservation through low-impact landscaping and other measures (to conserve water for firefighting in areas that do not have hydrants).
- Establish Tree Management and Stabilization Fund to address hazardous tree concerns in town.

PLAN APPROVAL AND ADOPTION

- The Draft plan will be reviewed by MEMA.
- FEMA will review the plan and is the agency that issues conditional approval.
- A Board of Selectmen resolution to adopt the plan can occur after FEMA conditional approval.
- FEMA issues final plan approval.
- The plan will be in effect for 5 years.



IMPLEMENTING THE PLAN
WHAT HAPPENS AFTER THE PLAN IS APPROVED?

- Establish a local implementation group.
- Prepare a timeline for implementation.
- Integrate the plan's recommendations with other local plans and policies.
- Seek FEMA and other funding sources and other resolutions for plan mitigation measures.
- Meet at least yearly to review progress of plan implementation.
- Update the plan every 5 years.

DRAFT PLAN

The full draft plan will be available on the Paxton town website.

Please send any comments on or questions about the plan to mgranato@cmrpc.org within two weeks of the draft plan being posted on the town website.

CENTRAL MASSACHUSETTS
Regional Planning Commission

Town of Paxton
Hazard Mitigation Plan: Plan Presentation
June 23, 2025
Sign-In Sheet

Name	Address (or Organization if non-resident)
Trish Settles	CMRPC
Jeff Olson	Paxton Fire
Neil Boyle	Paxton Planning
Mark Lodi	Paxton, Finance Committee
Chuck Putney	2 Ledyard Rd.
Kendy Rose	COA
Al Stoll	16 old Lantern Circle
Michael Ryan	15 Strawberry Rd
Select Board Members	
Carol Riches	
Peter Bogren	
Julia Pingitore	
Kirk Hoehls (Remote)	
Christopher Curtis	
Additional Participants	
Remote including	Heather Monroe TA

TOWN OF PAXTON

SELECT BOARD MEETING
Monday, June 23, 2025 – 7:00pm
Training Room of the Public Safety Complex
576 Pleasant Street, Paxton MA 01612

Join Zoom Meeting
https://us06web.zoom.us/j/86710028342?pwd=Rqpyw7RIh0JboNvm2vTv3aBoLrunDC.1

Meeting ID: 867 1002 8342
Passcode: 474411

This agenda lists all matters anticipated for discussion, some items may be passed over, and other items not listed may be brought up for discussion to the extent permitted by law. Select Board meetings are recorded by the Local Cable Access Channel. Any member of the public planning to record the meeting must first notify the Chair. The Chair will strive to honor timed items as best as possible, however, the estimated timing may occasionally be different.

CALL TO ORDER

1.	**OPEN MEETING**
2.	**PUBLIC HEARING**
7:00 PM	Hazard Mitigation Plan Public Hearing – Presentation by CMRPC
3.	**CONSENT ITEMS**
7:20 PM	1. Approve the meeting minutes from the Regular Meeting held on June 9, 2025.
	2. Approve the meeting minutes from the Regular Meeting held on June 16, 2025.
	3. Sign the Road stabilization letter for FY26 to approve the amount of $124,887.
	4. Accept the resignation of Paul Robinson from the Zoning Board of Appeals effective 6/7/25.
	5. Dissolve the Town Hall Renovation Committee effective 7/1/2025.
	6. Dissolve the Town Building Needs Study Committee effective 7/1/2025.
	7. Approve Annual Appointments for FY26.
	8. Accept the resignation of Brooke Maliff effective June 27, 2025.
4.	**UPDATES FROM TOWN DEPARTMENTS/COMMITTEES/BOARDS**
7:25 PM	1. Discuss FY26 COA Building Hours for FY26 with Cindy Love, COA Director.
	2. Black Hill Road Bridge Project Update with Travis Thibault, Director of Public Works.
5.	**NEW BUSINESS**
7:50 PM	1. Discuss Results of Annual Town Meeting A. Possible Call for Special Town Election - Override i. Possible Date – Monday, August 4, 2025 ii. Override Amount iii. Approval of question language and submittal to Town Clerk
	2. Approve year-end transfers round IV.
	3. Liaison assignments for FY26
	4.Discuss next steps for the Permitting & Community Development Coordinators position.
6.	**OLD BUSINESS**
8:15 PM	1. Interim Town Administrator Position - Update
7.	**SELECTBOARD CORRESPONDENCE**
8.	**TOWN ADMINISTRATOR'S REPORT**
9.	**CITIZENS SPEAK (Public Comment)**
10.	**ADJOURN**

- **Times may be adjusted during the meeting.**
- **The documents that support this meeting can be located on the Town's website (townofpaxton.net) on the Select Board page under meeting materials.**

The meeting room is handicapped accessible. With advance notice the Select Board can arrange for reasonable accommodation for persons with other disabilities. To request assistance please contact the Town Administrators Office at 508-799-7347
2nd revision posted 6/18/25 at 3:50pm Town Hall & Website LB

APPENDIX E:

Public Comment Period and Community Lifeline Comment Period Materials

Appendix E helps meet the following FEMA local mitigation plan requirements:

- *A1. "Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction?" (Requirement 44 CFR § 201.6(c)(1))*
- *A2. "Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process?" (Requirement 44 CFR § 201.6(b)(2)); and*
- *A3. "Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval?" (Requirement 44 CFR § 201.6(b)(1))*

There were no public comments received.

From:	Marc Granato	CMRPC
To:	Jeff Olson; Mike Pingitore; "msavasta@paxtonma.gov"; "j_krol@wrsd.net"; "clove@paxtonma.gov"; "wecare@bigy.com"; "wfp@wachusettfoodpantry.org"; "nia.rennix@redcross.org"; "jmcmurray@secondharvest.org"; "adam_darnobid@tenenthealth.com"; "nsoucie@ummhc.org"; "trondeau@paxtonlight.com"; "nathan.audette@eversource.com"; "deborah.blanch@nationalgrid.com"; "b.irwin@verizon.com"; "john.starck@verizon.com"; Autoreply System; "wpaxtv@paxtonma.gov"; "blorion@dot.state.ma.us"; "dtrabucco@therta.com"; "patc@aatransportation.com"; "corporatecommunications@gwrr.com"; "IAviation@massport.com"; David Pederzani; "MaryJude.Pigsley@mass.gov"; "timothy.gallagher@mass.gov"; "tthibault@paxtonma.gov"; "nfo@ubcleanwater.org"
Subject:	Paxton Hazard Mitigation Plan Community Lifelines - Hazard Mitigation Plan Review Update
Date:	Friday, October 31, 2025 2:57:00 PM
Attachments:	image001.png image002.png

Good Afternoon,

If you are receiving this message it is because you have been identified as a community lifeline for the Town of Paxton. A community lifeline "...enables the continuous operation of critical government and business functions and is essential to human health and safety or economic security."

Subsequently, we would appreciate if you would review the initial draft of the Hazard Mitigation Plan and provide comments to us for improving it based on your experiences:

2024 HMP Paxton Draft 1.5.pdf

Please send any comments to my email address provided below.

Respectfully,
Marc Granato

CENTRAL MASSACHUSETTS
Regional Planning Commission

Marc Granato
Resiliency Planner
(He/Him)
Central Massachusetts Regional Planning Commission
P: (508) 459-3374
mgranato@cmrpc.org
www.cmrpc.org

APPENDIX F:

Glossary of Terms

APPENDIX F

GLOSSARY OF TERMS

As used in the plan, these terms are defined as follows:

Blizzard – Issued for sustained or frequent gusts to 35 mph or more for an hour or greater and considerable falling and/or blowing snow. These conditions frequently occur alongside reduced to or below one-quarter mile. These conditions must be the predominant condition over a 3-hour period.

Blizzard warning - Sustained winds or frequent gusts of 35 mph or higher, occurring in combination with considerable falling and/or blowing snow. When proclaimed, these conditions are expected to prevail for a period of at least three (3) hours. Visibilities will frequently be reduced to less than one-quarter mile.

Blowing snow - Wind driven snow that reduces visibility to six (6) miles or less causing significant drifting. Blowing snow may be snow that is falling and/or loose snow on the ground picked up by the wind.

Community Lifelines – The most fundamental services in the community that, when stabilized, enable all other aspects of society to function. (Definition from FEMA).

Conflagration - A large destructive fire which attains such intensity that it creates and sustains its own wind system. It is most commonly a natural phenomenon, created during some of the largest bushfires, forest fires, and wildfires.

Drifting snow - Uneven distribution of snowfall caused by strong surface winds. Drifting snow is usually associated with blowing snow.

Flurries – Intermittent light snow with no measurable accumulation; a light dusting is all that is expected.

Exposure - The people, property, systems, or functions that could be lost to a hazard. Generally, exposure includes what lies in the area that the hazard could affect.

Freeze - Occurs when the surface air temperature is 32 degrees Fahrenheit or below over a widespread area for a climatologically significant period of time. The term “freeze” is usually restrictive to advective situations or occasions when wind or other conditions prevent frost.

Freezing rain or drizzle – Rain that falls as a liquid but freezes into an icy glaze when it hits the ground or other surfaces such as trees, cars, and roads.

Frost - The formation of thin ice crystals on the ground or other surfaces in the form of scales, needles, feathers, or fans. Frost develops when the temperature of the earth's surface falls below 32 degrees Fahrenheit, but because frost is primarily an event that occurs due to radiation cooling, it frequently occurs with air temperatures in the middle 30s.

Graupel - Small pellets of ice created when super-cooled water droplets coat or rime, a snowflake. The pellets are cloudy or white, not clear like sleet, and are often mistaken for hail. Same as snow pellets or small hail.

Gustnado - A whirlwind of dust or debris at or near the ground with no condensation funnel. Typically forms as an eddy in thunderstorm outflows.

Hail - A form of showery precipitation in the form of irregular pellets or balls of thin ice that occur when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice.

Heavy snow - This definition depends on the region of the USA. In Massachusetts, heavy snow means that six (6) or more inches of snow have fallen in 12 hours, or eight (8) inches in 24 hours. Heavy snow is also observed when snow is falling at a rate of one (1) inch per hour.

Heavy Snow Warning - Snow accumulations are expected to approach or exceed six (6) inches in 12 hours or eight (8) inches or more in 24 hours but will not be accompanied by significant wind. During a heavy snow warning, freezing rain and sleet are not expected.
Hurricane - An intense tropical cyclone in the Atlantic, Caribbean Sea, Gulf of Mexico, or eastern Pacific, which the maximum 1-minute sustained surface wind is 74 mph or greater.

Ice Storm - An ice storm is used to describe occasions when damaging accumulation of ice are expected during freezing rain situations. Significant accumulations of ice are recognized to pull down trees and utility lines, resulting in power loss; they are defined as one-quarter inch or greater.

Ice Storm Warning – Predicted significant coating of freezing rain; one-quarter inch or more is expected to accumulate in an area.

Invasive Species - A species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (definition from the Invasive Species Advisory Committee of the U.S. Department of the Interior).

Mitigation - The process of reducing the severity of the impact of natural hazards through planning. Each hazard requires a specific type of mitigation. In some cases, we can use engineering solutions (such as an earthquake-resistant building) to at least temporarily reduce the impact of a natural hazard. In other cases, the only form of mitigation that is guaranteed to be successful is to limit or not allow human activities where the hazard occurs (such as in floodplains).

Natural Disaster - A hazard event caused by nature or the natural process of the earth, such as a flood or tornado. Natural disasters result in widespread destruction or death to the lives of individuals, damaging their property, causing economic loss and/or the inability for a population to rebuild.

Natural Hazard - An act or phenomenon that has the potential to produce harm or other undesirable consequences to a person or thing.

Risk - Depends on all three factors: hazard, vulnerability, and exposure. Risk is the estimated impact that a hazard would have on people, services, facilities, and structures in a community. It refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage.

Sleet – Pellets of ice composed of frozen or mostly frozen rain drops or refrozen partially melted snowflakes. Sleet usually bounces when hitting the surface and does not stick to objects. However, it can accumulate like snow and cause a hazard to motorists. Heavy sleet occurs when a half of an inch of sleet accumulates.

Snow Showers - Snow falling at varying intensities for brief periods of time. Some accumulation is possible.

Snow Squalls - Intense, but of limited duration, periods of moderate to heavy snowfall, accompanied by strong, gusty surface winds and possible lightning.

Storm Surge – An abnormal rise in sea level, accompanying a hurricane or other intense storm, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone. Storm surge is usually estimated by subtracting the normal or astronomic tide from the observed storm tide. Storm surges can reach 25' high and 50-100 miles wide. This can cause severe erosion, major flooding and extensive damage to coastal areas.

Sustained Wind - Two-minute average wind measured at about 33' above the surface. BB.
Technological Disaster - A disaster that results from a technological or man-made hazard event.

Technological Hazard - A hazard that originates in accidental or intentional human activity (oil spill, chemical spill, building fires, terrorism, etc.)
Tropical Depression - A tropical cyclone in which the maximum 1-minute sustained surface wind is 38 mph or less.

Tropical Storm - A tropical cyclone in which the maximum 1-minute sustained surface wind ranges from 39-73 mph.

Vulnerability - Susceptibility to physical injury, harm, damage, or economic loss. It depends on an asset's construction, contents, and economic value of its functions. Vulnerability assessment provides the extent of injury and damages that may result from a hazard event of a given intensity in a given area.

Wind Chill Warning - Life-threatening wind chills reaching minus 50 degrees Fahrenheit or lower. Criterion varies state-by-state.

Watch (Storm) - A watch is used when the risk of hazardous weather events has increased significantly, but the occurrence, location and timing are still uncertain.

Warning/Advisory (Storm) - These products are issued when a hazardous weather event is occurring, is imminent, or has a very high probability of occurrence. A warning is used for conditions posing a threat to life or property. Advisories are for less serious conditions

that causes significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life and property.

Whiteout - A condition caused by falling and/or blowing snow that reduces visibility to nothing or zero miles; typically, only a few feet. Whiteouts can rapidly occur, blinding motorists and creating chain-reaction crashes involving multiple vehicles. Whiteouts are most frequent during blizzards.

Wind Chill - The wind chill is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. This temperature is the reading the body "feels" given the combination of wind and air temperature. At wind speeds of four (4) mph or less, the wind chill temperature is the same as the actual air temperature. The threshold for potentially dangerous wind chill conditions is about negative 20 degrees Fahrenheit.