THE TOWN OF GOSHEN

HAZARD MITIGATION PLAN UPDATE 2024

Adopted by the Goshen Select Board on _____

Prepared by:

The Goshen Hazard Mitigation Committee

and

Pioneer Valley Planning Commission

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Acknowledgements

The Goshen Board of Selectmen extends special thanks to the Goshen Hazard Mitigation Committee as follows:

Larry Holmberg, Emergency Management Director
Cameron Lacey - Fire Chief
Kristine Bissell - Select Board Member
Michael Rock - Service Director, Highland EMS
Tiffany Marcinek – Chair, Board of Health
Todd Dewkett, Highway Superintendent
William Bissell – Police Department
Julie Hooks – Planning Board Member
Fred Bezio – Police Chief
Kerry Normandin – Director, COA
Tom Cairns – Conservation Commission

The Goshen Select Board offers thanks to the Massachusetts Emergency Management Agency (MEMA) for developing the Massachusetts State Climate Adaptation and Hazard Mitigation Plan, which served as a resource for this plan and to staff for reviewing and commenting on the draft plan and to the Federal Emergency Management Agency (FEMA) for making the funds available and for the development of the Local Mitigation Planning Handbook, which provides a through overview of the Mitigation Planning process. In addition, special thanks are extended to the staff of the Pioneer Valley Planning Commission for professional services, process facilitation and preparation of this document.

Pioneer Valley Planning Commission

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1: PLANNING PROCESS

Introduction

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

Planning efforts, like the one undertaken by the Town of Goshen with technical assistance from the Pioneer Valley Planning Commission, make mitigation a proactive process. Pre-disaster planning emphasizes actions that can be taken before a natural disaster occurs. Future property damage and loss of life can be reduced or prevented by a mitigation program that addresses the unique geography, demography, economy, and land use of a community within the context of each of the specific potential natural hazards that may threaten a community.

Preparing a Local Natural Hazards Mitigation Plan before a disaster occurs can save the community money and will facilitate post-disaster funding. Costly repairs or replacement of buildings and infrastructure, as well as the high cost of providing emergency services and rescue/recovery operations, can be avoided or significantly lessened if a community implements the mitigation measures detailed in the Plan. FEMA requires that a community adopt a pre-disaster mitigation plan as a condition for mitigation funding, including for the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance Program (FMA), and the Building Resilient Infrastructure and Communities Program (BRIC).

Hazard Mitigation Planning Committee

In 2024, the Town of Goshen completed an update of their 2016 Hazard Mitigation Plan, with assistance provided by the Pioneer Valley Planning Commission. All portions of the plan were reviewed and updated as necessary. Planning for hazard mitigation in Goshen involved an 11-member workgroup led by the Town's Emergency Management Director, with participation from the Select Board, the Highway Superintendent, the Fire Chief, the Conservation Commission and the Planning Board. The members were as follows:

- Larry Holmberg, Emergency Management Director
- Cameron Lacey - Fire Chief
- Kristine Bissell - Select Board Member
- Michael Rock - Service Director, Highland EMS
- Tiffany Marcinek – Chair, Board of Health

- Todd Dewkett, Highway Superintendent
- William Bissell – Police Department
- Julie Hooks – Planning Board Member
- Fred Bezio – Police Chief
- Kerry Normandin – Director, COA
- Tom Cairns – Conservation Commission

The Hazard Mitigation planning process for the Town included the following tasks:

- Reviewing and incorporating existing plans and polices that regulate and affect the development of the community.
- Identifying the natural hazards that may impact the community.
- Conducting a Vulnerability/Risk Assessment to identify the infrastructure at the highest risk for being damaged by the identified natural hazards, particularly flooding.
- Identifying and assessing the policies, programs, and regulations the community is currently implementing to protect against future disaster damages.
- Identifying deficiencies in the current strategies and establishing goals for updating, revising or adopting new strategies to mitigate the long-term consequences of natural disasters to the people and infrastructure in the community.
- Adopting and implementing the final Hazard Mitigation Plan.

The key product of this process was the development of an Action Plan with a Prioritized Implementation Schedule.

Hazard Mitigation Committee Meetings

Meetings of the Hazard Mitigation Planning Committee, all of which took place at Goshen Town Offices, were held on the dates listed below. Agendas for each meeting are included in Appendix A.

May 11, 2023, Goshen Town Offices
The HMP Committee reviewed a PowerPoint presentation that provided an overview of the planning process, discussed the list of hazards to consider and revised the hazard index ratings based on previous occurrence, impacts and probability of future events. There was discussion of the impact of climate change on many of the hazards, which is resulting in both increasing frequency and magnitude of these hazards. The Committee updated the critical facility list from the 2016 plan. They also reviewed and approved the mitigation goal statement.

June 9, 2023, Goshen Town Offices
The HMP Committee updated the information about previous occurrences for all hazards and completed the mitigation capability assessment. They also discussed the status of previous

mitigation strategies and possible strategies to implement. They then chose a date for the first public meeting.

July 19, 2023, Goshen Town Offices
The HMP Committee finished reviewing progress on previous mitigation actions and completed the new mitigation actions table, including identifying the priority level, timeline, responsible parties, estimated cost, and possible funding sources for each action.

Agendas and sign-in sheets for each meeting can be found in Appendix A. While not all members of the Hazard Mitigation Committee were able to attend each meeting, all members collaborated on the plan and were updated on progress by fellow Committee members after meetings occurred as necessary.

Participation by Stakeholders

A variety of stakeholders were provided with an opportunity to be involved in the development of the Goshen Hazard Mitigation Plan. The different categories of stakeholders that were involved, and the engagement activities that occurred, are described below.

Local and regional agencies involved in hazard mitigation activities

The Pioneer Valley Planning Commission is a regional planning agency for 43 towns and cities in Massachusetts' Hampden and Hampshire Counties. PVPC regularly engages with the Town of Goshen as part of its regional planning efforts, which include the following:

- Developing "Our Next Future: An Action Plan for Building a Smart, Sustainable and Resilient Pioneer Valley," which includes chapters on sustainable land use throughout the region and consideration of the impact of flooding and other natural hazards on development, climate adaptation and mitigation, green infrastructure, and transportation.
- Developing the Pioneer Valley Climate Action and Clean Energy Plan, which assesses the impact that climate change will have on the region and recommends strategies for mitigation that can be implemented by local municipalities and businesses.
- Collaborating with state agencies, such as the Massachusetts Department of Transportation (MassDOT) and the Department of Conservation and Recreation (DCR), to maintain inventories of critical infrastructure throughout the region.
- Collaborating with the Town of Goshen on climate change mitigation, adaptation and resilience measures through the Green Communities program and the Municipal Vulnerability Preparedness program. This includes facilitating the Community Resilience Building Workshop for MVP 1.0 in 2020 and facilitating the MVP 2.0 process in 2024 to further build social resilience the impacts of climate change.

All of these PVPC initiatives considered the impact of natural hazards on the region and strategies for reducing their impact to people and property through hazard mitigation activities.

The facilitation of the Goshen Hazard Mitigation Plan by PVPC ensured that the information from these plans was incorporated into the Hazard Mitigation Planning process.

In addition, PVPC staff regularly present to their Executive Committee and Commission (representatives from the 43 cities and towns that comprise the Pioneer Valley), when new projects are launched and when funding opportunities are available. As result, all the communities in the region were informed of Goshen's Hazard Mitigation Plan update process and encouraged to comment. PVPC is working on hazard mitigation plans for surrounding communities of Williamsburg, Huntington, Chesterfield, and Westhampton.

The Town of Goshen is very active in the Hampshire Regional Emergency Planning Committee (REPC), and Goshen's EMD, Larry Holmberg made sure other REPC members were aware of Goshen's Hazard Mitigation planning process by speaking on the topic at a meeting of the committee. Mr. Holmberg also serves as the Emergency Management Director for the neighboring community of Chesterfield, so there is very close awareness and integration between these two neighboring communities.

Agencies that have the authority to regulate development

In Goshen, the Planning Board and the Zoning Board of Appeals are the primary entities that regulate development. Other Town commissions, boards, and committees that have the authority to regulate development include the Select Board, the Conservation Commission, and the Building Commissioner. Several of the Town staff and volunteers who participated in the Goshen Hazard Mitigation Committee serve on municipal committees and boards within Goshen that have the authority to regulate development. These include the Select Board, the Conservation Commission, and the Planning Board.

Feedback from the stakeholder agencies listed above was ensured through the participation of the Hazard Mitigation Committee members, who were able to attend the Hazard Mitigation Committee meetings representing their respective groups.

In addition, the Pioneer Valley Planning Commission, as a regional planning authority, works with all agencies that regulate development in Goshen, including the municipal entities listed above and state agencies, such as the Department of Environmental Protection, the Department of Conservation and Recreation (DCR) and MassDOT. This regular involvement ensured that during the update of the Goshen Hazard Mitigation Plan, the operational policies and any mitigation strategies or identified hazards from these entities were incorporated into the Hazard Mitigation Plan. PVPC is also regularly involved in land use, transportation, and environmental planning initiatives in Goshen and surrounding communities. Regular feedback received from these other initiatives were incorporated into the hazard mitigation planning process.

Neighboring Communities

Emails were sent to all neighboring communities before the public meetings, inviting them to attend and to provide input on the plan. Businesses and neighboring communities were also provided with an opportunity to provide feedback through the Pioneer Valley Planning Commission. PVPC is regularly involved in land use, transportation, and environmental planning initiatives in Goshen and the greater region including surrounding communities. Feedback received from these other initiatives was incorporated into the hazard mitigation planning process.

Representatives of businesses, academia, and private organizations

Administrators from New Hingham Elementary School, which serves students from both Goshen and Chesterfield, were invited to the public meetings and to review the draft plan. Representatives from Camp Holy Cross and Camp Howe, two privately – run summer camps located in Goshen, were also invited to the second public meeting and to review the draft plan.

Representatives of nonprofit organizations

The Director of Highland Ambulance, a nonprofit Class I Paramedic Ambulance company serving the towns of Goshen, Chesterfield, Ashfield, Williamsburg, Cummington, and Plainfield, was a member of the HMP Committee. In addition, representatives from Hilltown Community Development Corporation, a nonprofit organization that supports economic development, housing, and social services in the Massachusetts hilltown communities, were invited to attend the public meetings and to review the draft plan.

Public Involvement in the Plan

Two public meetings were held as part of the update to Goshen's Hazard Mitigation plan – on August 3, 2023 and December 10, 2024. Both meetings occurred after the Hazard Mitigation Committee had provided input on hazards and mitigation strategies relevant to the community. Notice of the public meetings was posted at Goshen Town Offices in compliance with the Commonwealth of Massachusetts' open meeting law. Public meeting agendas and notices can be found in Appendix A.

On July 24, 2023, the Pioneer Valley Planning Commission sent a press release to area media outlets to inform the public of the public meeting to be held on August 3. An announcement was printed in the Country Journal. The press release invited residents, businesses, members of surrounding communities, and all interested stakeholders to attend the meeting to learn about the planning process. A flyer announcing the public meeting was posted on the Town website and on the Town Facebook page, and also emailed to all relevant board and committee members. The meeting was also announced on the electronic bulletin boards located on the Town lines with Williamsburg and Ashfield on Route 9.

A second press release was sent on November 26, 2024, to inform residents, businesses members of surrounding communities, and all interested stakeholders about the second public

meeting to be held on December 10, 2024. It also shared that a draft of the Goshen Hazard Mitigation Plan was available for review on the Town website and provided a link to the plan. The press release also indicated that hard copies were available at Goshen Town Offices, and that all residents of Goshen were encouraged to comment on the plan by e-mailing or calling staff contacts at PVPC or the Town of Goshen. The media releases can be found in Appendix A, as well as a list of media organizations the press releases were sent to.

Strategies for Ongoing Public Involvement

The Goshen Local Emergency Planning Committee (LEPC), under the direction of the Emergency Management Director, will hold an annual review of Goshen's Hazard Mitigation Plan. This meeting will be held at the Goshen Town Offices and will focus on the LEPC's planning activities.

In addition to these annual meetings, the Town of Goshen website (https://www.goshen-ma.us/) will contain a tab for the Town's Hazard Mitigation Plan, where a copy of the Plan will be posted. During LEPC annual review meetings, the Emergency Management Directory will make attendees aware of the presence of the HMP plan on the town's website.

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:

- ***Goshen Zoning Ordinance and Sub-division Regulations*** - The Town's Zoning and Sub-Division Regulations 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.
- ***Goshen Comprehensive Emergency Management Plan*** (particularly the Critical Infrastructure Section) – the Critical Infrastructure section was used to identify those infrastructure components in Goshen that have been identified as crucial to the function of the town of Goshen;
- ***Municipal Vulnerability Preparedness CRB Workship – Northern Hilltowns Collaborative Summary of Findings, 2020-*** The MVP planning process and report was used to identify climate resilience and natural hazard mitigation vulnerabilities and strategies.
- ***Goshen Open Space and Recreation Plan, 2019*** **-** this Plan was used to identify the natural context within which the Goshen 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.
- ***Goshen Community Development Plan*** - This plan was assessed for any relevant strategies pertaining to mitigation.

- ***Massachusetts' State Hazard Mitigation Plan (2018 and 2023 plans)*** - The state plan was used to ensure consistency with state identification of mitigation strategies, critical infrastructure, natural hazards, and impacts of climate change.
- ***FEMA Flood Insurance Study for Hampshire County (1979)*** - This report was released in 1979 as the most updated Flood Insurance Study (FIS) for Hampshire County. The FIS revises and updates information on the existence and severity of flood hazards for Hampshire County, including for Goshen, however this report is quite outdated as the last update was 1979. The FIS and accompanying Flood Insurance Rate Maps (FIRMs) include data on flooding sources, FEMA flood zone designations, base flood elevations, and discharge rates of flooding sources. This data was reviewed and incorporated into the plan update process by informing the risk assessment for flooding.

Plan Adoption

In 2023, the Goshen Select Board agreed to begin the process of updating the Town's Hazard Mitigation Plan. After the plan was conditionally approved by FEMA, the Select Board voted to adopt the plan on _____, 2024.

2: LOCAL PROFILE

Community Setting

Covering about 17.7 square miles, the Town of Goshen is located in Hampshire County at the foothills of the Berkshire Mountains in western Massachusetts. Known as one of the "hilltowns," Goshen is situated in the uplands west of the Connecticut River Valley. It is bordered by the towns of Conway to the northeast, Williamsburg to the east, Chesterfield to the south and southwest, Cummington to the northwest, and Ashfield to the north.

Named after the Goshen of biblical accounts, Goshen was incorporated in 1781 as primarily an agricultural community. Several civic buildings, the meeting house, and the Congregational Church were built in the mid-1800s. Quarrying was an important industry at this time. One quarry produced what has been called Goshen Stone, and the mineral lithium aluminum silicate – the source of lithium metal – was found in Town as well.

During the turn of the 19th Century, Goshen became known as a summer resort community, and up until the 1950s, many seasonal homes were built. Hammond Pond was developed with waterfront cottages, and several camps were built throughout Town. The D. A. R. Forest, the first in the United States, was set aside in 1929, providing several outdoor recreation opportunities that still exist today, including a beach at the upper and lower Highland Lake.

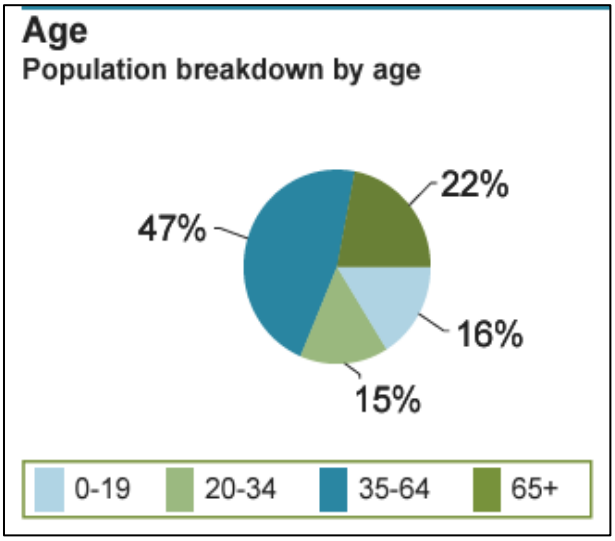
Goshen's lack of good roads and reliable water power prevented any major industrial development. Industry consisted of small mills and home-based businesses, which continue today. Because of its fairly remote location, it has been able to maintain a quiet, country character. Most development consists of single-family homes; the remainder of land in Goshen is hilly and forested, with some scattered open fields in farming. Goshen's location within 13 miles of the City of Northampton and 25 miles of the college town of Amherst, and within relatively easy access to Interstate 91, has contributed to its development as a "bedroom community" to these two larger towns, as well as the Town of Greenfield and the cities of Springfield, Chicopee, and Westfield along the I-91 corridor into Connecticut.

Today, the vast majority of Goshen's 17.7 square miles is undeveloped land, totaling more than 9,673 acres. Residential land is the second most prolific land use, at approximately 748 acres, followed by agricultural land at approximately 481 acres. Water comprises almost 237 acres of land in Goshen. There are 111 acres of outdoor recreation land in Town, and 34 acres characterized as urban open/public land. Land used for industrial uses constitutes approximately 42 acres, whereas the amount of commercial land is relatively small at just 17 acres.

Government

Goshen is governed by an Open Town Meeting form of government in which all registered voters may participate. Acting as the legislative branch, the Town Meeting enacts bylaws (both general and zoning), appropriates the operating budget, and makes other important decisions about the town's resources and services. An elected four-member Select Board act as the town's chief executive body, and a variety of elected or appointed volunteer committees and town officials are responsible for budget preparation, policy development, town bylaws, and state codes and regulations, among other advisory responsibilities.

Figure 1: Goshen Population by Age Category

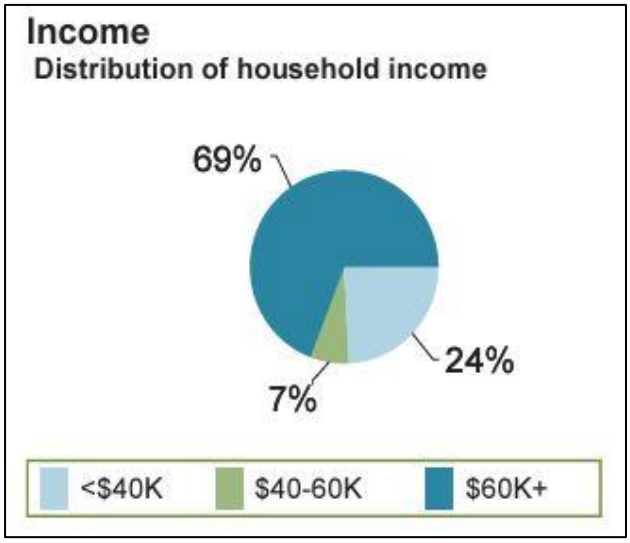


Population Characteristics

The Town's population according to the 2020 census was 960 people, resulting in a population density of about 54 people per square mile. This is a decline in population from 1,054 in the 2010 census. According to the Town website, the population increases substantially during the summer, when seasonal residents occupy the over 200 seasonal homes that are located around the Town's lakes and ponds. In addition, the two residential summer camps, Camp Howe and Camp Holy Cross, bring in an additional approximately 83,000 visitors annually.[1]

According to the 2021 American Community Survey five-year estimates, the Town's population resides in approximately 414 households. The median age is 52.7, with 22% of the population aged 65 or older. Figure 1 to the right shows the population breakdown by age in Goshen, and Figure 2 shows the distribution of household income. The median household income is $95,000, with 4% of households living below the poverty line (2021 American Community Survey Five-Year Estimates). There are no

Figure 2: Household Income Distribution in Goshen



[1] https://www.goshen-ma.us/about/

Environmental Justice communities in Goshen.

The median age in Goshen is 55.4, which is substantially older than the median age in Hampshire County of 36.8. 22% of the population in Goshen is aged 65 or older. Older adults are more vulnerable to health impacts from natural hazards and climate change impacts, especially extreme heat and cold. Older adults living alone and living in poverty are most vulnerable.

Development and Development Trends

Despite its rural character, Goshen has experienced significant population growth over the past 50 years. Goshen reached its lowest population in the 1920s, at 224 residents. The Town grew slowly through the mid-20th century, and then more quickly after 1970. The highest census population the Town has reached is 1,054 in 2010. As mentioned above, the population decreased over the next ten years to 960 residents in 2020. The lack of nearby employment is the main constraint on the Town's population growth. However, the increase in remote work, especially since the beginning of the Covid pandemic in 2020, may allow more people to settle in Goshen who otherwise would not have been able to, and result in increased population and housing development.

The Town of Goshen has limited economic resources and is primarily considered a bedroom community, since most residents travel outside of town boundaries for employment. However, the housing market has expanded in the Pioneer Valley and as housing pressures intensify in the valley, Goshen and other hilltowns are likely to see an increase in new home development over the next several years. Additionally, the impacts of climate change may drive in-migration to Goshen, as residents of coastal areas or the western or southern states move to inland towns such as Goshen that are less vulnerable to a number of climate impacts.

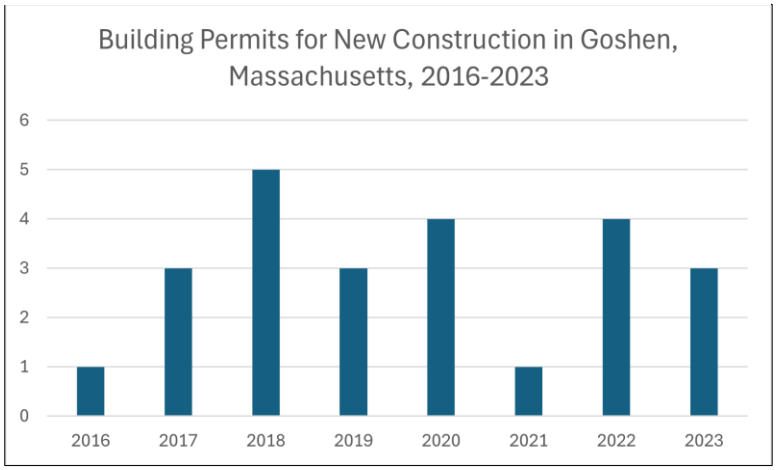
In addition to other factors, zoning and other land use regulations constitute Goshen's "blueprint" for its future. Land use patterns over time will continue to look more and more like the town's zoning map until the town is finally "built out"—that is, there is no more developable land left. Therefore, in looking forward over time, it is critical that the town focus not on the current use and physical build-out today, but on the potential future uses and build-out that are allowed under the town's zoning map and zoning bylaws. Zoning is the primary land use tool that the town may use to manage development and direct growth to suitable and desired areas while also protecting critical resources and ensuring that development is in keeping with the town's character.

The Goshen Zoning Bylaw establishes just one zone district, the Residential-Agricultural District. The Zoning Bylaw also establishes a Special Permit Approval procedure for specific uses and structures within Goshen. This review allows the Special Permit Granting Authority the ability to review development to ensure that the basic safety and welfare of the people of Goshen are protected, and includes several specific evaluation criteria that are relevant to natural hazards.

Currently, development in Goshen is directed by existing zoning and other land use regulations to areas where the environmental conditions and existing public utilities support such development. With just one zoning district, the Town relies heavily on special permitting and subdivision regulations in order to manage development.

There have not been any significant changes in development in Goshen since the previous HMP that have affected the Town's vulnerability to natural hazards. A very small number of new homes have been built since 2016, and no new subdivisions. There has not been any new major commercial development. **Error! Reference source not found.** to the right shows building permits issued for new construction in Goshen from 2016 – 2023. The highest number was 5 permits in 2018, followed by 4 in 2022. At this point, there does not appear to be a significant upward trend in home construction.

Figure 3: Building Permits for New Construction, 2016-2023



Infrastructure

Roads and Highways

Major roadways through Town are Route 9 tending northwest from Williamsburg through Goshen to Cummington, and Route 112 from the intersection of Route 9 at the north end of Goshen Center north to the Ashfield line in Franklin County.

Rail

There is no rail service in Goshen.

Public Transportation

The Pioneer Valley Transit Authority (PVTA) provides contracts through MV Transportation to offer paratransit in Goshen, a door-to-door demand responsive van service.

Public Drinking Water Supply

Goshen's water supply comes from groundwater sources through many private wells and eleven transient non-community wells and one non-transient non-community well.

Sewer Service

Goshen does not have a public sewer system or any publicly owned wastewater treatment plants. All residences and businesses are served by on-site septic systems.

Communications

The Town of Goshen is serviced by a broadband internet network, completed in 2022, that is owned by the Town and administered by the Broadband Goshen Municipal Light Plant (MLP). The MLP is an Enterprise Fund Accounting Entity, overseen by an MLP Board of five appointed members, an MLP Manager and an Associate Manager. The MLP partners with Whip City Fiber, a subsidiary of Westfield Gas + Electric, to operate the network and provide internet service and optional VOIP phone service.

Schools

There are no Public Schools in Goshen; however, regional schools that Goshen students attend include New Hingham Regional Elementary, and Hampshire Regional High School.

Natural Resources

Goshen's terrain and landscape has played a key role in dictating its development as a rural community. The Town's natural resources led to its development as an agricultural village, reliant on farming and its quarries, and then Goshen's natural beauty was realized by summer vacationers, and more recently, other outdoor recreation enthusiasts and campers.

Forests

The forest resources and woodlands in Goshen are abundant throughout the town. The town has large expanses of permanently and temporarily protected vegetated open space located within a North Central Hardwoods-Hemlock-White Pine zone. The extensive range of these forestlands encompasses approximately 9,307 acres, which comprises 82% of the total land area in the Town. These areas are habitat for several tree and plant species as well as wildlife.

Water Resources

There are several ponds and small lakes in Goshen. These include Lilly Pond, Sears Meadow Pond, Upper Highland Lake, Lower Highland Lake, Hammond Pond, and Damon Pond. Many other smaller bodies of water are scattered across the landscape of Goshen, primarily located along streams and in wooded areas. Most of the 227 acres of open water in Goshen are comprised of these small ponds and lakes. These water bodies offer valuable wildlife habitat, unique natural environments, and provide benefits to Goshen's human inhabitants in the form of prime recreational opportunities.

A small portion of northwestern Goshen lies within the Westfield River Watershed and is drained into that system via the Swift River. The remainder of Goshen lies within the Connecticut River Watershed Basin. There are 1,168 acres of riparian "natural land" in Goshen within the Westfield River basin and 832 acres of riparian "natural land" in Goshen's portion of the Connecticut River basin. These are areas within the riparian corridor that remain in a natural or undeveloped state, potentially functioning as a corridor for select species movement, as well as additional ecological purposes.

There are 596 acres of land within the 100-foot Rivers Protection Buffer Area – the inner riparian zone. Development activity in this area is limited by the Massachusetts Wetlands Protection Act (Rivers Protection Act). However, the outer riparian zone is susceptible to limited development in certain instances.

3: HAZARD IDENTIFICATION AND ANALYSIS

The following section includes a summary of disasters that have affected or could affect Goshen. Historical research, conversations with local officials and emergency management personnel, available hazard mapping and other weather-related databases were used to develop this list. Identified hazards are the following:

- Floods
- Severe snowstorms / ice storms
- Hurricanes
- Severe thunderstorms / wind / tornadoes
- Wildfires / brushfires
- Earthquakes
- Dam failure / levee breech
- Drought
- Extreme Temperatures

The 2018 and 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plans (SHMCAP); EEA and EOPSS) identified the natural hazards that can occur in the state along with the climate change interaction for each, and the representative climate change impacts. The one hazard without a climate change interaction is earthquakes. These are shown in Table 1 below from the SHMCAP.

Not all hazards included in the 2018 SHMCAP apply to the Town of Goshen. Given Goshen's inland location, coastal hazards and tsunamis would not affect the Town. The core team did not include landslides in their natural hazard inventory, as they have not previously occurred in the town. The plan also does not include invasive species as a natural hazard, although they are identified as a vulnerability. It is assumed that the entire Town of Goshen and its critical facilities are exposed to earthquakes, high wind events, hurricanes, winter storms, snow and ice, temperature extremes, and drought, to a similar extent. Flood risk from riverine flooding is elevated in the vicinity of flood zones.

Due to the impacts of climate change, Goshen is likely to experience more instances of extreme and sustained heat. Because warmer air holds more moisture, higher temperatures will also bring more severe storms, more frequent flooding, and generally wetter winters. The likelihood of more severe storms could mean increases in the number of severe thunderstorms, tornadoes or microbursts, hurricanes or tropical storms, and nor'easters affecting Goshen. Generally higher winter temperatures may result in less snow but more rain, sleet, and ice, as well as more alternating thawing and freezing that would affect roads.

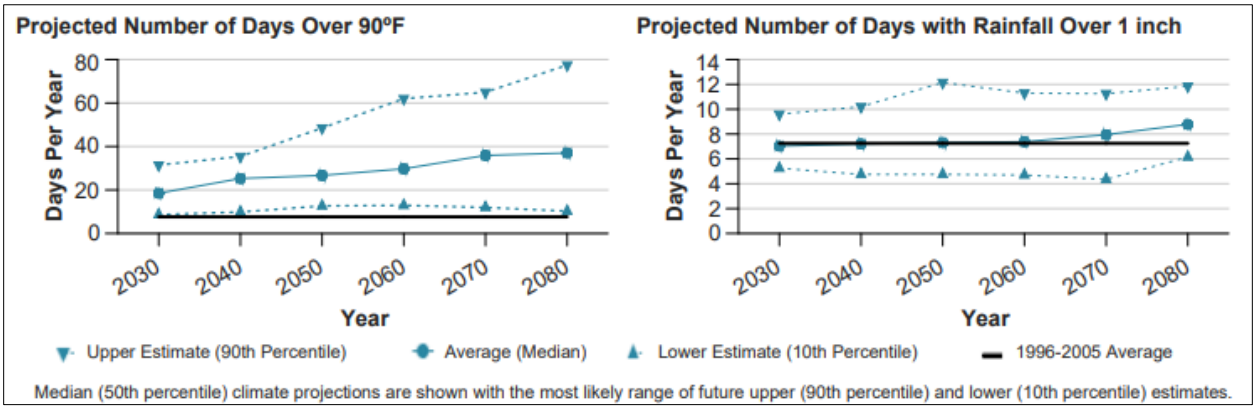
Table 1: Natural Hazards and Climate Change Interaction

Primary Climate Change Interaction	Natural Hazard	Other Climate Change Interactions	Representative Climate Change Impacts
 **Changes in Precipitation**	Inland Flooding	Extreme Weather	Flash flooding, urban flooding, drainage system impacts (natural and human-made), lack of groundwater recharge, impacts to drinking water supply, public health impacts from mold and worsened indoor air quality, vector-borne diseases from stagnant water, episodic drought, changes in snow-rain ratios, changes in extent and duration of snow cover, degradation of stream channels and wetland
	Drought	Rising Temperatures, Extreme Weather	
	Landslide	Rising Temperatures, Extreme Weather	
 **Sea Level Rise**	Coastal Flooding	Extreme Weather	Increase in tidal and coastal floods, storm surge, coastal erosion, marsh migration, inundation of coastal and marine ecosystems, loss and subsidence of wetlands
	Coastal Erosion	Changes in Precipitation, Extreme Precipitation	
	Tsunami	Rising Temperatures	
 **Rising Temperatures**	Average/Extreme Temperatures	N/A	Shifting in seasons (longer summer, early spring, including earlier timing of spring peak flow), increase in length of growing season, increase of invasive species, ecosystem stress, energy brownouts from higher energy demands, more intense heat waves, public health impacts from high heat exposure and poor outdoor air quality, drying of streams and wetlands, eutrophication of lakes and ponds
	Wildfires	Changes in Precipitation	
	Invasive Species	Changes in Precipitation, Extreme Weather	
 **Extreme Weather**	Hurricanes/Tropical Storms	Rising Temperatures, Changes in Precipitation	Increase in frequency and intensity of extreme weather events, resulting in greater damage to natural resources, property, and infrastructure, as well as increased potential for loss of life
	Severe Winter Storm / Nor'easter	Rising Temperatures, Changes in Precipitation	
	Tornadoes	Rising Temperatures, Changes in Precipitation	
	Other Severe Weather (Including Strong Wind and Extreme Precipitation)	Rising Temperatures, Changes in Precipitation	
Non-Climate-Influenced Hazards	Earthquake	Not Applicable	There is no established correlation between climate change and this hazard

The data shown below in Figure 4 gives the projections for the annual number of days over 90°F and the number of days with rainfall over 1 inch for Goshen. This data from resilient.mass.gov gives projections ranging from the lowest estimates (10th percentile) to the highest estimates (90th percentile) depending on emissions scenarios, as well as the average. By 2080, Goshen could experience up to 80 days per year above 90°F and up to 12 days per year with rainfall over 1 inch. While these changes in temperature and precipitation will directly impact flooding and extreme temperatures (particularly high temperatures), research indicates

that temperature increases will likely increase the frequency and intensity of strong storms such as hurricanes.

Figure 4: Climate Change Projections for Goshen



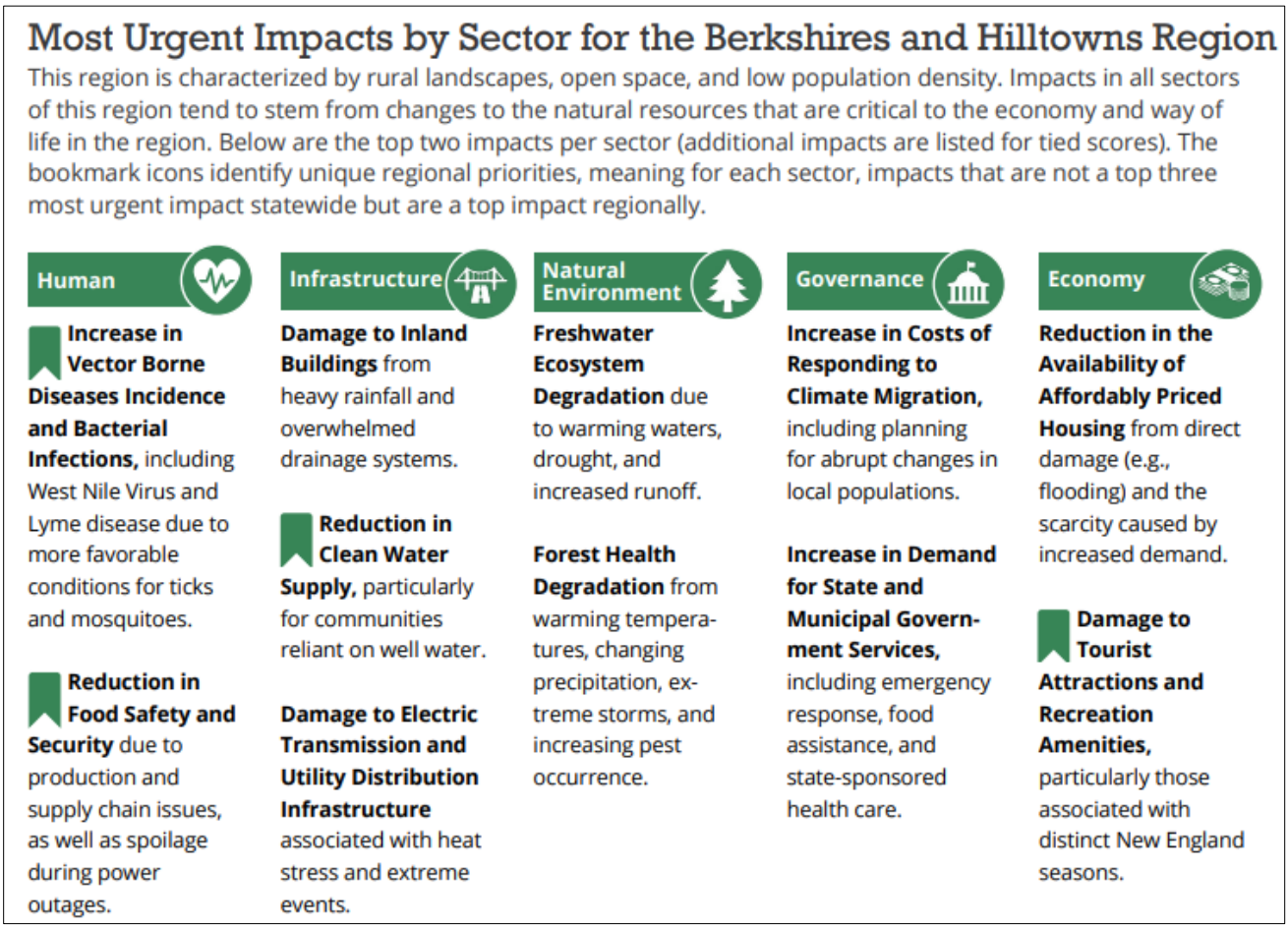
Source: resilient.mass.gov

Statewide and Regional Climate Change Impacts

The Massachusetts Climate Change Assessment report was issued in December 2022. This report provides region-specific data and analysis of climate change impacts for each of the seven regions of the Commonwealth. Goshen lies within the "Berkshires and Hilltowns" region. The report identifies the most urgent impacts to five sectors (Human, Infrastructure, Natural Environment, Governance, and Economy) for the Berkshires and Hilltowns region. Figure 5 below shows the top two or three most urgent impacts per sector. These include the following impacts that may be most likely to affect Goshen:

- Damage to Inland Buildings from heavy rainfall and overwhelmed drainage systems.
- Reduction in Clean Water Supply, particularly for communities reliant on well water.
- Increase in Vector Borne Diseases Incidence and Bacterial Infections, including West Nile Virus and Lyme disease due to more favorable conditions for ticks and mosquitoes.
- Increase in Costs of Responding to Climate Migration, including planning for abrupt changes in local populations.
- Increase in Demand for State and Municipal Government Services, including emergency response, food assistance, and state-sponsored health care.
- Damage to Tourist Attractions and Recreation Amenities, particularly those associated with distinct New England seasons.

Figure 5: Most Urgent Regional Climate Change Impacts



Source: Massachusetts Climate Change Assessment Report, 2022

The town of Goshen has been subject to a number of federal disaster declarations along with all of Hampden County. Some of these disaster declarations also correspond to emergency declarations in Massachusetts that applied to all or part of the state. The following table lists all of the Massachusetts emergency declarations since 2011 that have applied to Goshen, along with the corresponding federal disaster declarations that applied to Goshen.

Table 2: Massachusetts Emergency Declarations and Federal Disaster Declarations affecting Goshen

Massachusetts Emergency	Start	Termination	Corresponding Federal Disaster Declaration	FEMA Public Assistance	Application to Goshen
Hurricane Lee	9/15/2023	9/16/2023	NA	NA	Yes
Severe Weather and Flooding	9/12/2023	9/16/2023	NA	NA	Yes
Covid-19 Pandemic	3/13/2020	5/11/2023	DR-4496-MA	All counties	Yes
Severe Winter Storm, Snowstorm, and Flooding	2/8/2013	2/9/2013	DR-4110-MA	All counties	Yes
Severe Snow and Snowstorm	10/29/2011	10/30/2011	DR-4051-MA	Middlesex, Worcester, Hampden, Hampshire, Franklin, Berkshire	Yes
Tropical Storm Irene	8/27/2011	8/29/2011	DR-4028-MA	Barnstable, Dukes, Plymouth, Bristol, Norfolk, Hampden, Hampshire, Franklin, Berkshire	Yes
Severe Storms and Tornadoes	6/1/2011	6/1/2011	DR-1994-MA	Worcester, Hampden	No

Natural Hazard Analysis Methodology

The hazard profiles for Goshen were updated with information from the 2018 and 2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP; EEA and EOPSS, 2018, 2023), the Town's MVP community resilience building process and related report, and additional research and assessment conducted by the project team. The HMP Committee provided local accounts of each hazard. The hazard 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.

Hazard Description

The natural hazards identified for Goshen are: floods, severe snowstorms/ice storms, hurricanes, severe thunderstorms / wind / tornadoes, wildfire/brushfire, earthquakes, dam failure / levee breech, and drought. Many of these hazards result in similar impacts to a

community. For example, hurricanes, tornadoes and severe snowstorms may cause wind-related damage.

Location

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 wild fires. Classifications are based on the area that would potentially be affected by the hazard, on the following scale:

Table 3: Percentage of Town Impacted by Natural Hazard

Land Area Affected by Occurrence	Percentage of Town Likely to be 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

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.

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.

Probability of Future Events

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

Table 4: 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

Impact

Impact refers to the effect that a hazard may have on the built environment and on the people in the community, especially the most vulnerable populations. The magnitude of the impact is

based on the assessment of extent described above. Impacts are classified according to the following scale:

Table 5: Impacts, Magnitude of Multiple Impacts of Given Natural Hazard

Impacts	Potential magnitude of impacts to people	Potential magnitude of impacts to property
Catastrophic	Multiple injuries or deaths possible.	Up to 25 - 100% of property in affected area damaged or destroyed. Complete shutdown of facilities for 1 week or more.
Critical	Multiple injuries and health effects possible.	Up to 10 - 25% of property in affected area damaged or destroyed. Complete shutdown of facilities for 3 days or more.
Limited	Minor injuries and health effects, if any. People may be displaced or lose access to heat, cooling, or water.	Up to 5 - 10% of property in affected area damaged or destroyed. Complete shutdown of facilities for a day or more.
Minor	No injuries or health effects.	Only minor property damage and minimal disruption on quality of life. Possible temporary shutdown of facilities.

Vulnerability

This describes the overall potential risk factor for the community. 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.

Vulnerability Assessment Methodology

In order to determine estimated losses due to natural hazards in Goshen, each hazard area was analyzed with results shown below. The data below was calculated using the methodology outlined in FEMA's mitigation planning guide, *Understanding Your Risks: Identifying Hazards and Estimating Losses (FEMA 386-2),* August 2001.

Total value of all structures in Goshen (Assessor's data, FY 2023): $130,147,400

Median value of an owner-occupied home in Goshen - American Community Survey (ACS) 2022 5-year estimates: $285,900

Average household size: 2.15persons (across roughly 414 households, ACS 2022 5-year estimates)

Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. The damage calculations are rough estimates, and likely reflect worst-case scenarios. Computing more detailed damage assessment based on assessor's records is a labor-intensive task and beyond the scope of this project.

Table 6: Hazard Identification and Analysis for Goshen

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Hazard Risk Index Rating
Flooding	Medium	High	Limited, but increasing	2 - High risk
Severe Snowstorms/Ice Storms	Large	Very High	Critical	1 – Highest Risk
Severe Thunderstorms and Winds / Tornadoes	Medium	Severe Thunderstorms and Winds: Moderate Tornadoes: Very low	Limited	Severe thunderstorms and Winds: 2 – High Risk Tornadoes: 4 – Low Risk
Hurricanes/Tropical Storm	Large	Very low	Limited	4 - Low Risk
Wildfire / Brushfire	Small	High	Minor	3 – Medium Risk
Earthquakes	Large	Very low	Critical	4 - Low Risk
Dam Failure / Levee Breech	Medium	Very low	Limited	3 – Medium Risk
Drought	Small	Low	Minor	4 - Low Risk
Extreme Temperature	Large	Moderate	Minor	4 - Low Risk

Flooding

Hazard Description

There are three major types of storms that can generate flooding in Goshen:

- Continental storms are typically low-pressure systems that can be either slow or fast moving. These storms originate from the west and occur throughout the year.
- Coastal storms, also known as nor'easters, usually occur in late summer or early fall and originate from the south. The most severe coastal storms, hurricanes, occasionally reach Massachusetts and generate very large amounts of rainfall.
- Thunderstorms form on warm, humid summer days and cause locally significant rainfall, usually over the course of several hours. These storms can form quickly and are more difficult to predict than continental and coastal storms.

A floodplain is the relatively flat, lowland area adjacent to a river, lake or stream. Floodplains serve an important function, acting like large "sponges" to absorb and slowly release floodwaters back to surface waters and groundwater. Over time, sediments that are deposited in floodplains develop into fertile, productive farmland like that found in the Connecticut River valley. In the past, floodplain areas were also often seen as prime locations for development. Industries were located on the banks of rivers for access to hydropower. Residential and commercial development occurred in floodplains because of their scenic qualities and proximity to the water. Although periodic flooding of a floodplain area is a natural occurrence, past and current development and alteration of these areas will result in flooding that is a costly and frequent hazard.

Floods can be classified as one of two types: flash floods and general floods.

- **Flash floods** are the product of heavy, localized precipitation in a short time period over a given location. Flash flooding events typically occur within minutes or hours after a period of heavy precipitation, after a dam or levee failure, or from a sudden release of water from an ice jam. Most often, flash flooding is the result of a slow-moving thunderstorm or the heavy rains from a hurricane. In rural areas, flash flooding often occurs when small streams spill over their banks. However, in urbanized areas, flash flooding is often the result of clogged storm drains (leaves and other debris) and the higher amount of impervious surface area (roadways, parking lots, roof tops).
- **General floods** may last for several days or weeks and are caused by precipitation over a longer time period in a particular river basin. Excessive precipitation within a watershed of a stream or river can result in flooding particularly when development in the floodplain has obstructed the natural flow of the water and/or decreased the natural ability of the groundcover to absorb and retain surface water runoff (e.g., the loss of wetlands and the higher amounts of impervious surface area in urban areas).

Action Stage - the stage which, when reached by a rising stream, represents the level where the NWS or a partner/user needs to take some type of mitigation action in preparation for possible significant hydrologic activity. The type of action taken varies for each gage location. Gage data should be closely monitored by any affected people if the stage is above action stage.

Minor Flooding is defined to have minimal or no property damage, but possibly some public threat. A Flood Advisory product is issued to advise the public of flood events that are expected not to exceed the minor flood category. Examples of conditions that would be considered minor flooding include:

- water over banks and in yards
- no building flooded, but some water may be under buildings built on stilts (elevated)
- personal property in low lying areas needs to be moved or it will get wet
- water overtopping roads, but not very deep or fast flowing
- water in campgrounds or on bike paths
- inconvenience or nuisance flooding
- small part of the airstrip flooded, and aircraft can still land
- one or two homes in the lowest parts of town may be cut off or get a little water in the crawl spaces or homes themselves if they are not elevated

Moderate Flooding is defined to have some inundation of structures and roads near the stream. Some evacuations of people and/or transfer of property to higher elevations may be necessary. A Flood Warning is issued if moderate flooding is expected during the event. Examples of conditions that would be considered moderate flooding include:

- several buildings flooded with minor or moderate damage
- various types of infrastructure rendered temporarily useless (i.e. fuel tanks cannot be reached due to high water, roads flooded that have no alternates, generator station flooded)
- elders and those living in the lowest parts of the village are evacuated to higher ground
- access to the airstrip is cut off or requires a boat
- water over the road is deep enough to make driving unsafe
- gravel roads likely eroded due to current moving over them
- widespread flooding, but not deep enough to float ice chunks through town
- water deep enough to make life difficult, normal life is disrupted and some hardship is endured
- airstrip closed
- travel is most likely restricted to boats

Major Flooding is defined to have extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations are necessary. A Flood

Warning is issued if major flooding is expected during the event. Examples of conditions that would be considered major flooding include:

- many buildings flooded, some with substantial damage or destruction
- infrastructure destroyed or rendered useless for an extended period of time
- multiple homes are flooded or moved off foundations
- everyone in threatened area is asked to evacuate
- National Guard units assist in evacuation efforts
- erosion problems are extreme
- the airstrip, fuel tanks, and the generator station are likely flooded
- loss of transportation access, communication, power and/or fuel spills are likely
- fuel tanks may float and spill and possibly float downstream
- ice chunks floating through town that could cause structural damage
- high damage estimates and high degree of danger to residents

Location

The location of occurrence for 100-year and localized flooding is “medium,” with 10 – 50% of the Town potentially affected. However, there are no locations in Goshen that have been susceptible to 100-year floods in the past. There has been limited localized flooding at locations along Route 9, as well as areas with undersized culverts on Hyde Hill Road, Sears Road, and Fuller Road.

Extent

The average annual precipitation for Goshen and surrounding areas in western Massachusetts is approximately 50 – 55 inches per year, although that is likely increasing to the effects of climate change.

Water levels in Goshen’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). 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.

The worst flooding recorded in the Goshen region's recent history occurred following Hurricane Diane in August 1955. While Goshen does not have records of the precise water levels in the Town, the region recorded levels of nearly 20 inches of rain in the greater Springfield area, according to the US Geological survey Report "Floods of August 1955 in the Northeastern States". More recently, Goshen experienced significant flooding from Hurricane Irene.

Previous Occurrences

In addition to the floodplains mapped by FEMA for the 100-year and 500-year flood, Goshen often experiences minor flooding at isolated locations due to drainage problems, or problem culverts.

There are four remaining problem culverts in Goshen. The previous problem culverts at Loomis Road and Fuller Road have been upgraded, thanks in part to funding from the HMGP program. The remaining four problem culverts are mapped on the Past and Potential Hazards/Critical Facilities Map (Appendix D). Most of the flood hazard areas listed here were identified due to known past occurrences in the respective area. There are many areas with no record of previous flood incidents that could be affected in the future by heavy rain and runoff.

In 2011 (8/27/2011) Hurricane Irene, which had become Tropical Storm Irene by the time it affected Goshen, brought rains that caused an estimated $100,000 in damage. The majority of the damage was to roads that washed out due to plugged culverts, but in addition the Town Hall was damaged by flooding and gravestones in a cemetery were damaged.

Probability of Future Events

Based upon previous data, there is a "very high" chance (between 70 percent and 100 percent in the next year) of localized flooding occurring in Goshen in the next year, however these floods are small and generally cause little damage.

Flooding frequencies for the various floodplains in Goshen are defined by FEMA as the following:

- 10-year floodplain – 10 percent chance of flooding in any given year
- 25-year floodplain – 2.5 percent chance of flooding in any given year
- 100-year floodplain – 1 percent chance of flooding in any given year
- 500-year floodplain – 0.2 percent chance of flooding in any given year

In actuality, flooding occurs more frequently than this because the current FEMA-defined flood zones are based on historical patterns of rainfall intensity and frequency, and do not take into account the impacts that climate change will have on Goshen. In future years, it is likely that the currently designated 10-year, 25-year, 100-year and 500-year floodplains will flood more frequently due to climate change.

Vulnerability Assessment

Impact to the Built Environment

According to the HMP Committee, the Town faces a "limited" impact from flooding, with possibly more than 10% of property in the affected area damaged or destroyed. There would likely be minimal disruption of the quality of life of residents, although a shutdown of some facilities for a day or more would be possible. There are no critical facilities are at risk within Goshen's floodplain.

There are approximately 479 acres of land within the FEMA mapped 100-year floodplain (the Special Flood Hazard Area or SFHA) and 278 acres of land within the 500-year floodplain in the Town of Goshen. The total value of all structures within the SFHA in 2023 was $12,716,900. Damage from flooding could result in a range of losses, from 1 percent for a limited amount of flooding to upward of 50 percent. Thus, dollar estimates for losses could range from $127,169 to $6,358,450 or more. In addition, the cost of repairing or replacing roads, bridges, utilities, and contents of structures is significant but cannot be estimated with sufficient accuracy for this plan.

Population Impacts

The most vulnerable groups in Goshen may be more seriously impacted by flooding – this includes seniors, low-income individuals, and disabled residents. These individuals may be unable to physically or financially prepare for or respond to hazard events and require additional assistance. The Town will need to ensure that the vulnerable individuals in Goshen have information about flooding, can adequately prepare, and can be reached after a flooding event in the event that evacuation is necessary.

Based on recent trends, the population of the Town is not likely to increase significantly over the next 5-10 years. Over time, there is the possibility of climate migrants from coastal areas and other highly vulnerable areas of the country settling in Goshen and surrounding towns, and that is a scenario that the Town should prepare for. In the near term, however, this is not a population change that is likely to significantly impact hazards in Goshen.

Changes in Land Use/Development

There has been very little development since the previous HMP, other than a small number of new individual homes being built. There has been a negligible amount of commercial development. Thus, there have not been any significant land use or development changes that have impacted the Towns' vulnerability to natural hazards and climate change impacts. In the coming 5-10 years there will likely be continued moderate residential growth. It will be important to ensure that there is very limited development in the floodplains. In 2023, the Town added a Floodplain District to the Zoning Bylaws as an overlay district. The new district will provide for increased oversight and regulation of development in floodplains.

Vulnerability

Based on the above analysis, Goshen has a hazard index rating of "2 – high risk" for flooding.

Severe Snowstorms / Ice Storms

Hazard Description

Severe winter storms can pose a significant risk to property and human life. Severe snowstorms and ice storms can involve rain, freezing rain, ice, snow, cold temperatures and wind.

Location

The entire Town of Goshen is susceptible to severe snowstorms, which means the location of occurrence is "large." Because these storms occur regionally, they would impact the entire city.

Extent

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin of The Weather Channel 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.

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 7: Northeast Snowfall Impact Scale Categories

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

Source: http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis

Previous Occurrences

New England generally experiences at least one or two severe winter storms each year with varying degrees of severity. Severe winter storms typically occur during January and February; however, they can occur from early October through late April. Large snowstorms, blizzards and ice storms in Massachusetts can range from an inconvenience to extreme events that cause

significant impacts and require a large-scale, coordinated response. A list of winter weather federal disaster declarations since 2000 affecting Hampshire County is shown in Table 8 below.

Table 8: Winter Weather Federal Disaster Declarations in Hampshire County

Disaster Name and Date of Event	Disaster Number	Type of Assistance	Counties Under Declaration
Snowstorm December 6-7, 2003	EM-3191	FEMA Public Assistance	Middlesex, Essex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable, Berkshire, **Hampshire,** Hampden, Franklin, Berkshire
Snowstorm January 22 - 23, 2005	EM-3201	FEMA Public Assistance	**All** 14 Massachusetts Counties
Severe Winter Storm and Flooding December 11-18, 2008	DR-1813	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	**All** 14 Massachusetts Counties
Severe Winter Storm December 11-18, 2008	EM-3296	None	Middlesex, Essex, Suffolk, Bristol, Berkshire, **Hampshire,** Hampden, Franklin, Berkshire
Severe Winter Storm and Snowstorm January 11-12, 2011	DR-1959	FEMA Public Assistance Grant	Middlesex, Essex, Suffolk, Norfolk, **Hampshire**, Hampden, Berkshire
Snowstorm October 29-30, 2011	DR-4051	FEMA Public Assistance	Middlesex, Worcester, **Hampshire**, Hampden, Franklin, Berkshire
Severe Winter Storm, Snowstorm, and Flooding February 8-9, 2013	DR-4110	FEMA Public Assistance	**All** 14 Massachusetts Counties

Based on data available from the National Oceanic and Atmospheric Administration, there are 14 winter storms in the Pioneer Valley between 2010 and 2022 that have registered on the NESIS scale and resulted in snowfalls of at least 10 inches. These storms are listed in Table 9 below in order of their NESIS severity.

Table 9: Winter Storms Producing Over 10 inches of Snow in the Pioneer Valley, 2010 -2022

Date	NESIS Value	NASIS Category	NESIS Classification
12/13/2022	8.52	4	Crippling
2/23/2010	5.46	3	Major
1/29/2015	5.42	3	Major
1/9/2011	5.31	3	Major
2/11/2014	5.28	3	Major
3/12/2017	5.03	3	Major
1/31/2021	4.93	3	Major
2/7/2013	4.35	3	Major
3/5/2018	3.45	2	Significant
2/14/2020	3.21	2	Significant
3/11/2018	3.16	2	Significant
3/4/2013	3.05	2	Significant
1/25/2015	2.62	2	Significant
10/29/2011	1.75	1	Notable
1/3/2018	1.65	1	Notable
2/8/2015	1.32	1	Notable

Source: http://www.ncdc.noaa.gov/snow-and-ice/rsi/nesis

Goshen was significantly affected by the ice storm in December 2008 that caused tree damage, power outages and impassable roads. The Town received almost 30 inches of snowfall in the October 2011 snowstorm, however there were no power outages or significant damage to structures. Most recently, the heavy snowstorms in December 2022 and March 2023 caused tree damage and short-term power outages. Overall, the Town has been experiencing more heavy and wet snow as well as ice than it did in the past, due to warmer average winter temperatures.

Probability of Future Events

Based upon the availability of records for Hampshire County, the likelihood that a severe snow or ice storm will affect Goshen is “high” (between 40 and 70 percent in any given year). Research on climate change indicates that there is greater potential for stronger, more frequent storms as the global temperature increases. While there may be lower annual snowfall amounts as more precipitation falls as rain, the snowstorms that do occur may be more severe. There is also likely that the occurrence of sleet and ice storms will increase.

Vulnerability Assessment

Impact to the Built Environment

The Town faces a “minor” impact or less than 10 percent of total property damaged, from snow or ice storms. 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. Tree limbs can fall and cause damage to utility lines and power outages, as well as possibly damage buildings and vehicles.

Using an estimated value of $146,224,000 for all property in the town and an estimated 5 percent of damage to 10 percent of residential structures, approximately $ 731,120 worth of damage could occur from a severe snowstorm. This is a rough estimate and likely reflects a worst-case scenario. Computing more detailed damage assessments based on assessor's records is a labor-intensive task and beyond the scope of this project. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Population Impacts

Other impacts from snowstorms and ice storms that may affect Goshen residents include power outages, blocked and unsafe roadways, and risks of traffic accidents. Power outages can result in loss of heat, drinking water, and phone and internet service. All Goshen residents have private wells for drinking water, which rely on electricity. As with all hazards, the most vulnerable populations in Goshen are more likely to be impacted by severe winter storms. These individuals may be physically or financially less able to both prepare for and respond to hazard impacts such as power outages, lack of heat and/or drinking water, heavy snow or ice loads damaging buildings, an inability to clear snow, poor roads, and extreme cold, among others. It is important for Emergency Management, the Council on Aging, the Highway Department, and other Town departments to have strategies in place to provide assistance to vulnerable individuals impacted by severe snow and ice storms.

Changes in Land Use/Development

The limited amount of new residential and commercial development in Goshen since the last plan is not likely to impact the Town's vulnerability to severe snow and ice storms.

Vulnerability

Based on the above assessment, Goshen has a hazard index rating of "1 — high risk" from snowstorms and ice storms. Based on the expertise and experience of the local Hazard Mitigation Committee, ice storms are much more of an anticipated risk of substantive damage than are snow storms.

Hurricanes

Hazard Description

Hurricanes are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. The primary damaging forces associated with these storms are high-level sustained winds and heavy precipitation. Hurricanes are violent rainstorms with strong winds that can reach speeds of up to 200 miles per hour and which generate large amounts of precipitation. Hurricanes generally occur between June and November and can result in flooding and wind damage to structures and above-ground utilities.

Location

Because of the hazard's regional nature, all of Goshen 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. A description of the damages that could occur due to a hurricane is described by the Saffir-Simpson scale, as shown below in Table 10.

Table 10: Saffir-Simpson Scale: Hurricane Damage Classifications

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 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.	96-110
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+

Source: National Hurricane Center, 2023

Previous Occurrences

Hurricanes that have affected the region which includes Goshen are shown in Table 11 below. According to the local Hazard Mitigation Committee and affirmed by the NOAA Historical Hurricane tracks, no hurricanes have tracked directly through Goshen.

Table 11: Major Hurricanes and Tropical Storms affecting the Pioneer Valley

Hurricane/Storm Name	Year	Saffir/Simpson Category (when reached MA)
Great Hurricane of 1938	1938	3
Great Atlantic Hurricane	1944	1
Carol	1954	3
Edna	1954	1
Diane	1955	Tropical Storm
Donna	1960	Unclear, 1 or 2
Groundhog Day Gale	1976	Not Applicable
Gloria	1985	1
Bob	1991	2
Floyd	1999	Tropical Storm
Irene	2011	Tropical Storm
Sandy	2012	Super Storm
Isaias	2020	Tropical Storm
Henri	2021	Tropical Storm

While Superstorm Sandy in late October of 2012 had severe impacts on much of the Northeastern United States, there was minimal damage that occurred in Goshen due to the storm. No roads were flooded or washed out, and no residents encountered displacement due to the storm's impacts. In nearby areas of western Massachusetts, there were modest impacts, with localized flooding and downed power lines. Overall, western Massachusetts was able to send emergency response resources to other states where the storm had a larger impact. [2] Hurricane Irene resulted in downed trees and limbs as half a million people across Massachusetts were left without power. In addition, localized flooding caused damage throughout western Massachusetts, but did not cause significant damage in Goshen. Tropical storms Isaias and Henri caused minor flooding and power outages in nearby communities, but the impacts in Goshen were minor.

Probability of Future Events

Goshen's location in western Massachusetts reduces the risk of extremely high winds that are associated with hurricanes, although it does experience some high wind events. Based upon past occurrences, it is reasonable to say that there is a "low" probability (1 percent to 10

[2] "Western Massachusetts escapes Hurricane Sandy's wrath, but impact elsewhere still being felt." http://www.masslive.com/news/index.ssf/2012/10/western_massachusetts_escapes.html. October 30, 2012. Accessed March 6, 2015.

percent in any given year) of hurricanes in Goshen. 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.

Vulnerability Assessment

Impact to the Built Environment

The Town faces a "limited" impact from hurricanes, with 10 percent or less of Goshen affected. Using a total value of all structures in Goshen of $146,224,000 and an estimated 10 percent of damage to 5 percent of all structures, the estimated amount of wind damage from a hurricane is $731,120. Estimating that flooding would create 10 percent of damage to 20 percent of structures, the resulting damage would be $2,924,480. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Population Impacts

Damage to homes and property and power outages are impacts from high wind events that could affect all Goshen residents. As mentioned earlier, power outages can cause lack of heating or cooling, and also access to drinking water, especially during an extended outage. Flooding from excessive rainfall with hurricanes would impact Goshen residents as well. As with all hazards, underserved and vulnerable populations in Goshen are more likely to be impacted by damages from wind and flooding. These individuals may be physically or financially less able to both prepare for and respond to this hazard. It is important for Emergency Management, the Highway Department, the Council on Aging, and other Town departments to have strategies in place to provide assistance to vulnerable individuals. This may involve ensuring that they are aware of cooling and warming centers, providing transportation to cooling and warming centers, providing drinking water, or other types of assistance.

Changes in Land Use/Development

The limited amount of new residential and commercial development is not likely to impact the Town's vulnerability to hurricanes and tropical storms.

Vulnerability

Based on the above analysis, Goshen has a hazard index rating of "4 – low risk" from hurricanes.

Severe Thunderstorms / Wind / Tornadoes

Hazard Description

A thunderstorm is a storm with lightning and thunder produced by a cumulonimbus cloud, usually producing gusty winds, heavy rain, and sometimes 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 (NWS, 2013).

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 Worcester County and in communities west of Worcester, including towns in both western and eastern Hampshire County. 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 (cars, etc.).

Location

As per the SMHCAP, the entire Town is at risk of high winds, severe thunderstorms, and tornadoes. The plan also identifies Goshen and the surrounding communities as having a high frequency of tornado occurrence within Massachusetts. However, the actual area affected by thunderstorms, wind, or tornadoes is "minor," with less than 10 percent of the Town 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, and flooding. Table 12 below gives the extent of hail sizes, from .5 on an inch to 4.5 inches.

Table 12: Extent Scale for Hail

Hail Size in inches	Object Analog
.50	Marble, moth ball
.75	Penny
.88	Nickel
1.00	Quarter
1.25	Half dollar
1.50	Walnut, ping pong
1.75	Golf ball
2.00	Hen egg
2.50	Tennis ball
2.75	Baseball
3.00	Tea cup
4.00	Grapefruit
4.50	Softball

Source: http://www.spc.noaa.gov/misc/tables/hailsize.htm

Microbursts and tornadoes are not uncommon in the region. There are typically 1 to 3 tornadoes somewhere in southern New England per year, and according to the SHMCAP, Massachusetts experiences an average of 1.7 tornadoes per year. However, tornadoes may be occurring more frequently due to the impacts of climate change. Just in the summer of 2023, eight tornadoes touched down in New England. On August 18, 2023, five tornadoes touched down in southern New England – three in Massachusetts, one in Connecticut and one in Rhode Island. Additionally, two other tornadoes touched down in Massachusetts in 2023 – one in July and one in early August.

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

Table 13: Enhanced Fujita Scale for Tornadoes and Descriptions of Damage

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.

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.

Since the 1950s, there have been nine tornadoes recorded in Hampshire County, although only one has touched down in Goshen. In February 2017, an EF2 tornado touched down in Goshen at the Route 9 and 112 intersection, and took out a number of electrical poles. This resulted in the closure of Route 9 for 24 hours.

Probability of Future Events

One measure of tornado activity is the tornado index value. It is calculated based on historical tornado events data using USA.com algorithms. It is an indicator of the tornado level in a region. A higher tornado index value means a higher chance of tornado events. Data was used for Hampshire County to determine the Tornado Index Value as shown in the table below.

Table 14: Tornado Index

Geography	Index Value
Hampshire County	125.73
Massachusetts	87.60
United States	136.45

Source: http://www.usa.com/hampshire-county-ma-natural-disasters-extremes.htm

Based upon the available historical record, as well as Goshen's location in a high-density cluster of state-wide tornado activity, there is a "very low" probability (less than 1 percent chance in any given year) of a tornado affecting the Town.

As per the Massachusetts Hazard Mitigation Plan, there are approximately 10 to 30 days of thunderstorm activity in the state each year. Thus, there is a "moderate" probability (10 percent to 40 percent chance in any given year) of a severe thunderstorm or winds affecting the Town.

Vulnerability Assessment

Impact to the Built Environment

Overall, Goshen faces a "minor" impact from severe thunderstorms, winds, or tornadoes, with 10 percent or less of the Town affected.

The potential for locally catastrophic damage is a factor in any tornado, severe thunderstorm, or wind event. In Goshen, a tornado that hit the residential areas would leave much more damage than a tornado with a travel path that ran along the town's forested uplands, where little 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 an estimated 75% of Goshen's housing stock was built prior to this date.

Using a total value of all structures in Goshen of $146,224,000 and an estimated 10 percent of damage to 5 percent of all structures, the estimated amount of damage from a tornado is $2,924,480. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Population Impacts

Damage to homes and property and power outages are impacts from high wind events that could affect all Goshen residents. As is the case with hurricanes and tropical storms, power outages from thunderstorms and high wind events can cause lack of heating or cooling, and also access to drinking water, especially during an extended outage. Flooding from excessive rainfall with severe thunderstorms would impact residents as well. As with all hazards, vulnerable populations in Goshen are more likely to be impacted by damage from wind and flooding. These individuals may be physically or financially less able to both prepare for and respond to this hazard. It is important for Emergency Management, the Highway Department, the Council on Aging, and other Town departments to have strategies in place to provide assistance to vulnerable individuals impacted by severe thunderstorms, high wind events, or a tornado or microburst.

Land Use/Development Impacts

The limited amount of new residential and commercial development is not likely to impact the Town's vulnerability to severe thunderstorms, high wind events, tornadoes and microbursts.

Vulnerability

Based on the above assessment, Goshen has a hazard index rating of “2- high risk” from severe thunderstorms and winds, and a “4 – low risk” from tornadoes.

Wildfires / Brushfires

Hazard Description

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.

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 lightening
- Crown fires move quickly by jumping along the tops of trees. A crown fire may spread rapidly, especially under windy conditions.

Location

Hampshire County has approximately 252,000 acres of forested land, which accounts for 72% of total land area. Forest fires are therefore a potentially significant issue. In Goshen, approximately 82% of the town's total land area is in forest, or about 9,306 acres, and is therefore at risk of fire. The total amount of town that could be affected by wildfire is categorized as "large," at between 80 percent to 100 percent of the total area. In 2015, the Goshen Fire Department reported fires in the crowns of trees--something not at all common in the Northeast. It is the opinion of the Goshen local Hazard Mitigation planning committee that climate change is changing the way fires react in the Northeast. In addition to changing weather patterns, various insects are coming into the region and causing damage in tress, making the more susceptible to fire.

Extent

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

In Goshen, approximately 82 percent of the town's total land area is in forest, or about 9,306 acres, and is therefore at risk of fire. In drought conditions, a brushfire or wildfire would be a matter of concern. A large wildfire could damage much of the land mass, including vital watershed lands, in a short period of time. As described in the next section describing previous occurrences of wildfire, there have not been any major wildfires recorded in Goshen. However, based on other major wildfires that have occurred in western Massachusetts, it is estimated that such a fire would likely destroy around 50 to 500 acres of forested area.

The overall extent of wildfires is shown in Table 15 below:

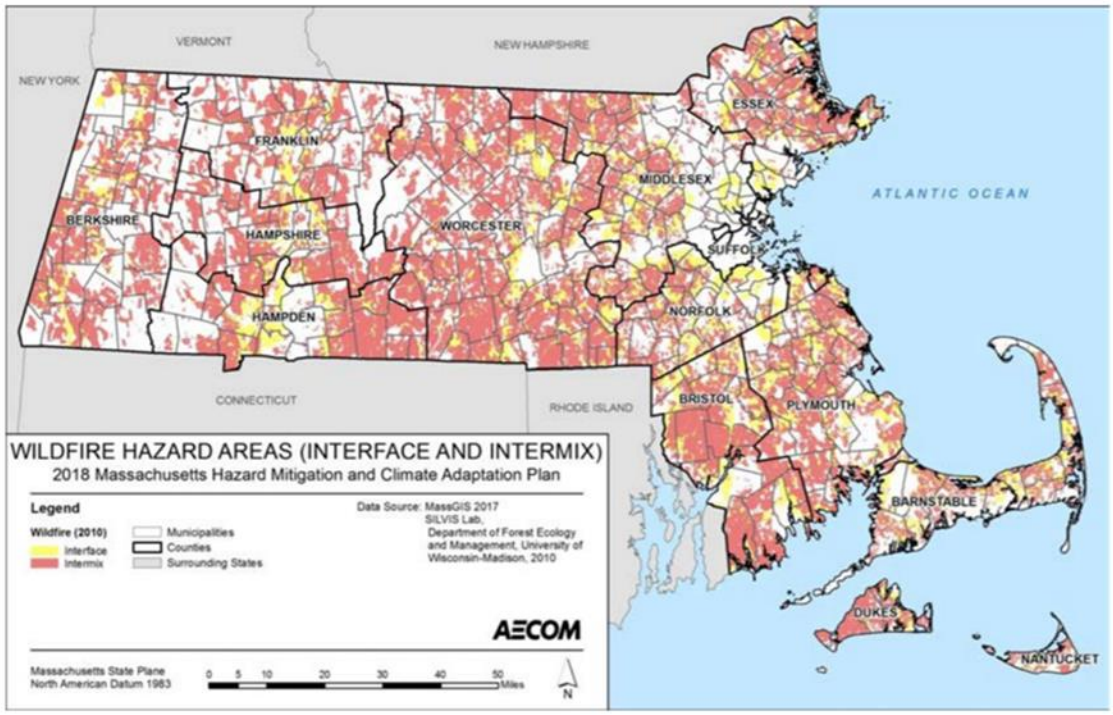
Table 15: Wildfire Severity Ratings and Descriptions

Wildfire Severity Rating		
Rating	**Basic Description**	**Detailed Description**
CLASS 1: Low Danger (L) Color Code: Green	Fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open or cured grassland may burn freely a few hours after rain, but wood fires spread slowly by creeping or smoldering and burn in irregular fingers. There is little danger of spotting.
CLASS 2: Moderate Danger (M) Color Code: Blue	Fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Woods fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel – especially draped fuel -- may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
CLASS 3: High Danger (H) Color Code: Yellow	Fires start easily and spread at a rapid rate	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fine fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
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 immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics - such as long-distance spotting - and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.
CLASS 5: Extreme (E) Color Code: Red	Fire situation is explosive and can result in extensive property damage	Fires under extreme conditions start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.

The SHMCAP describes the urban-wildland interface as areas that are more susceptible to wildfires. There are two classifications: Interface and Intermix. Interface communities are defined as being in the vicinity of contiguous vegetation, with more than one house per 40 acres and less than 50% vegetation, and within 1.5 miles of an area of more than about 200 acres that is more than 75% vegetated. Intermix communities are defined as those where

housing and vegetation intermingle, and where the area includes more than 50% vegetation and has a housing density of more than one house per 6.5 acres. According to the urban-wildland interface in Massachusetts shown below in Figure 6, Goshen has about 70% Intermix areas that would be most at risk.

Figure 6: Wildland-Urban Interface and Intermix in Massachusetts



Source: MA State Hazard Mitigation and Climate Adaptation Plan

Previous Occurrences

There have not been any brushfires in Goshen other than for small backyard burning of brush, for which the Town issues permits. In 2023 there were 206 burn permits issued, and in 2022 there were 275 burn permits issued.

During the past 100 years, there have not been many wildfires occurring in the Pioneer Valley. However, several have occurred during the past 20 years, as shown in the list below:

- 1995 – Russell, 500 acres burned on Mt. Tekoa
- 2000 – South Hadley, 310 acres burned over 14 days in the Litihia Springs Watershed
- 2001 – Ware, 400 acres burned
- 2010 – Russell, 320 acres burned on Mt. Tekoa
- 2012 – Eastern Hampden County, dry conditions and wind gusts created a brush fire in Brimfield, and burned 50 acres
- 2016 –Montgomery, 60 acres burned on Mt. Tekoa
- 2019 – Russell and Montgomery, 200 acres burned on Mt. Tekoa

Probability of Future Events

In accordance with the SMHCAP, the Goshen Hazard Mitigation Committee found it is difficult to predict the likelihood of wildfires in a probabilistic manner because of the number of variables involved. While wildland fires have not been a significant problem in Goshen, it is possible that changing land use patterns and climate conditions will increase the Town's vulnerability. Increased temperatures and periods of drought could result in more incidences of wildfires. 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 invasive pest damage could potentially create more debris in wooded areas and result in a larger risk of fires. However, given the occurrence of previous wildfires as well as the chance of wildfires increasing in the next five years, the Hazard Mitigation Committee identified the likelihood of a future wildfire to be "low," or between 1 to 10 percent in any given year.

Vulnerability Assessment

Impact to the Built Environment

The estimated impact from wildfires was determined by the HMP Committee to be "minor," with minor property damage and minimal disruption to quality of life for town residents. Using a total value of all structures in Goshen of $146,224,000 and an estimated 50 percent of damage to 1 percent of all structures, the estimated amount of damage from a forest fire is $731,120. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Population Impacts

Damage to homes and property are impacts from wildfires that could affect Goshen residents, especially the percentage that live in the wildland-urban interface area. Additionally, all Goshen residents could be impacted by smoke from wildfires in the Town or in the region. As residents of western Massachusetts experienced in 2022 and 2023, it is possible to be significantly impacted by poor air quality from wildfires from as far away as western Canada. Vulnerable populations in Goshen, such as the elderly, small children, outdoor laborers, and anyone with respiratory issues or compromised immune systems are more likely to be impacted by smoke from wildfires. It is important for Emergency Management, the Board of Health, the Council on Aging, and other Town departments to have strategies in place to provide assistance to vulnerable individuals impacted by wildfires and poor air quality events due to wildfire smoke.

An additional challenge for Goshen is that the Town is protected by an all-volunteer fire department, and is dependent on residents volunteering for the critical job of firefighter. This includes participating in weekly trainings and being available 24 hours a day for an emergency. In years when there are a smaller number of firefighters, the Town depends on mutual aid from surrounding towns.

Land Use/Development Impacts

The limited amount of new residential and commercial development in Goshen is not likely to have a significant impact on the Town's vulnerability to wildfire. Development in the wildland-urban interface would be most vulnerable, and while a small number of new homes have been built in these areas, this limited amount of development will not significantly increase the risk level.

Vulnerability

Based on the above assessment, Goshen has a hazard risk index of "3 – medium risk" from wildfires.

Earthquakes

Hazard Description

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. New England experiences an average of 30 to 40 earthquakes each year although most are not noticed by people.[3] 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.[4]

Location

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

Extent

The magnitude of an earthquake is 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. 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.

[3] Northeast States Emergency Consortium Web site: *www.nesec.org/hazards/earthquakes.cfm.*

[4] Federal Emergency Management Agency Web site: *www.fema.gov/hazards/earthquakes/quake.shtm.*

Table 16: Richter Scale for Earthquakes

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.

Table 17: Modified Mercalli Scale for Earthquakes

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

Source: US Federal Emergency Management Agency

Previous Occurrences

The most recent earthquakes to affect Goshen are shown in the table below. In addition to the New England earthquakes included in the table below, a quake of magnitude 5.8 on Aug. 23,

2011, centered in Virginia was felt all along the coast, including in Goshen. The earthquake that occurred on April 5, 2024, was felt by some Goshen residents, but no damage was reported.

Table 18: Largest Earthquakes Affecting the Northeast Region, 1925 – 2024

Location	Date	Magnitude
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Plattsburg, NY	April 20, 2002	5.1
Bar Harbor, NH	October 3, 2006	4.2
Hollis Center, ME	October 16, 2012	4.6
Tewksbury, NJ	April 5, 2024	4.8

Source: Northeast States Emergency Consortium website, www.nesec.org/hazards/earthquakes.cfm

Probability of Future Events

One measure of earthquake activity is the Earthquake Index Value. It is calculated based on historical earthquake events data using USA.com algorithms. It is an indicator of the earthquake activity level in a region. A higher earthquake index value means a higher chance of earthquake events. Data was used for Hampshire County to determine the Earthquake Index Value as shown in the table below.

Table 19: Earthquake Index for Hampshire County

Geography	Index Value
Hampshire County	0.17
Massachusetts	0.70
United States	1.81

Source: USA.com

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

Vulnerability Assessment

Impact to the Built Environment

According to the HMP Committee, the Town could face a "critical" impact from significant earthquakes, with more than 25 percent of Goshen affected. Using a total value of all structures in Goshen of $146,224,000 and an estimated 100 percent of damage to 25 percent of all

structures (“critical” impact), the estimated amount of damage from a strong earthquake would be approximately $36,556,000. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Structures in Goshen are generally of wood frame construction. 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 lines, electrical power lines and facilities built before the 1980s may not have been designed to withstand the forces of an earthquake. This is particularly true for a large number of the buildings in Goshen, most of which could likely be completely destroyed by a significant earthquake. The seismic standards have also been upgraded with the 1997 revision of the State Building Code. Liquefaction of the land near water could also lead to extensive destruction.

While a significant earthquake, estimated to be approximately of magnitude 6.1 or higher, would cause the impact described above, a smaller earthquake would have "minor" impact from a smaller earthquake, with only small damage to property. As shown in the table of the Richter Scale above, an earthquake of 6.0 or lower would result in at most slight damage to well-designed buildings, which are the vast majority of structures in Goshen. Earthquakes between 3.5 and 5.4 would be felt but rarely cause damage, and earthquakes smaller than 3.5 would not be noticed.

Population Impacts

Damage to homes and property are the primary impacts from earthquakes that could affect Goshen residents. As with all hazards, vulnerable populations are more likely to be impacted by damages from earthquakes. These individuals may be physically or financially less able to both prepare for and respond to this hazard. It is important for Emergency Management, the Board of Health, the Council on Aging, and other Town departments to have processes in place to provide assistance to vulnerable individuals who could be in need in the event of a damaging earthquake.

Land Use/Development Impacts

The limited amount of new residential and commercial development in Goshen will not have a significant impact on the Town’s vulnerability to earthquakes.

Vulnerability

Based on the above analysis, Goshen has a hazard index rating of “4- low risk” from earthquakes.

Dam Failure / Levee Breech

Hazard Description

Dams and levees 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 or levee failure is not a common occurrence, but dams do represent a potentially disastrous hazard. When a dam or levee fails, the potential energy of the stored water behind the dam is released rapidly. Most dam or levee failures occur when floodwaters above overtop and erode the material components of the dam. Often dam or levee breeches 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 State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

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.

The inspection schedule for dams is as follows:

- Low Hazard dams – 10 years
- Significant Hazard dams – 5 years
- High Hazard dams – 2 years

The time intervals represent the maximum time between inspections. More frequent inspections may be performed at the discretion of the state. Dams and reservoirs licensed and subject to inspection by the Federal Energy Regulatory Commission (FERC) are excluded from the provisions of the state regulations provided that all FERC-approved periodic inspection reports are provided to the DCR. All other dams are subject to the regulations unless exempted in writing by DCR.

Location

The Town of Goshen has 5 dams and one dike on public and private land. The names and hazard levels of the individual structures are shown in Table 20 below:

Table 20: Dams and Dikes in Goshen or Affecting Goshen

Dam	Primary Owner	Hazard Level	Date of Most Recent Phase I Inspection	Condition Rating	Dam Purpose	Regulatory Authority
Lower Highland Lake Dam	DCR	High	10/02/2020	Satisfactory	Recreation	Office of Dam Safety
Upper Highland Lake Dam	DCR	High	05/18/2022	Satisfactory	Recreation	Office of Dam Safety
Upper Highland Lake Dike	DCR	Significant	10/02/2020	Satisfactory	Recreation	Office of Dam Safety
Hammond Acres Lake Dam	Hammond Acres Club, Inc.	Significant	10/09/2019	Fair	Recreation	Office of Dam Safety
Sears Meadow Dam	William Kelly and Abigail Kingman	N/A				Non-Jurisdictional

The failure of a high hazard dam could affect a “medium” amount of the land area in Goshen, or between 10 and 50 percent of the total land area.

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.

Previous Occurrences

To date, there have been no catastrophic dam failures in Goshen.

Probability of Future Events

As described in the SHMCAP, dams are designed partly based on assumptions about a river's flow behavior, expressed as hydrographs. Changes in weather patterns can have significant effects on the hydrograph used for the design of a dam. If the hygrograph changes, it is conceivable that the dam can lose some or all of its designed margin of safety, also known as freeboard. If freeboard is reduced, dam operators may be forced to release increased volumes earlier in a storm cycle in order to maintain the required margins of safety. Such early releases of increased volumes can increase flood potential downstream. Dams are constructed with safety features known as "spillways." Spillways are put in place on dams as a safety measure in the event of the reservoir filling too quickly. Spillway overflow events, often referred to as "design failures," result in increased discharges downstream and increased flooding potential. Although climate change is not likely to increase the probability of catastrophic dam failure, it may increase the probability of design failures due to more frequent high-intensity rainfall events.

As Goshen's high hazard dams age, and if maintenance is deferred, the likelihood of a dam bursting will increase, but currently the frequency of dam failures is "very low" with a less than 1 percent chance of a dam bursting in any given year.

Vulnerability Assessment

Impact to the Built Environment

The Town faces a "limited" impact from the failure of a dam that is rated at a high hazard level, with approximately 10 percent of Goshen land area affected. If Upper Highland Lake Dam were to fail, then Lower Highland Lake Dam would fail also, compounding the potential impact. Using a total value of $146,224,000 of all structures in Goshen, and an estimated 25 percent of damage done to 10 percent of structures, an estimated damage due to dam failures is $3,655,600. The cost of repairing or replacing the roads, bridges, utilities, and contents of structures is not included in this estimate.

Population Impacts

The most critical impact from a dam failure would be injury or death from resulting flooding. Flood damage to property would also affect Goshen residents within the inundation zone of a dam failure. As with all hazards, more vulnerable residents would be most impacted by a dam failure. It is important for Emergency Management and Highway, along with other Town departments, to have strategies and procedures in place to provide assistance to vulnerable individuals who could be in need in the event of a dam failure.

Land Use/Development Impacts

The very limited amount of new residential and commercial development in Goshen will not have a significant impact on the Town's vulnerability to dam failure.

Vulnerability

Based on this analysis, Goshen has a hazard index rating of “3 – medium risk” from dam failure or levee breech.

Drought

Hazard Description

Drought 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 would impact the entire town, meaning the location of occurrence is "large" or over 50 percent of the Town affected.

Extent

The severity of a drought would determine the scale of the event and would vary among Town residents depending on the depth and capacity of their private well, as well as on the need and source of water for agriculture. The U.S. Drought Monitor also records information on historical drought occurrence. The U.S. Drought Monitor categorizes drought on a D0-D4 scale as shown below.

Table 21: US Drought Monitor Classifications and Descriptions

U.S. Drought Monitor		
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

Source: US Drought Monitor, http://droughtmonitor.unl.edu/classify.htm

Previous Occurrences

Goshen has had limited experience with severe drought conditions in the past, although this is changing as drought conditions related to climate change become more frequent. According to data in the Massachusetts SHMCAP, between 2001 and 2017 Hampshire County experienced up to 69 weeks of Severe Drought and 14 weeks of Extreme Drought.

Table 3.15 below shows the previous occurrences of drought since 2000, based on the US Drought Monitor. Since 2000, the longest duration of drought (D1-D4) in Massachusetts lasted 48 weeks beginning on June 07, 2016, and ending on May 2, 2017. The drought impacted the agricultural sector, some water supplies, the natural environment and many habitats and species in the state.[5]

Table 22: History of droughts in Massachusetts 2000-2022

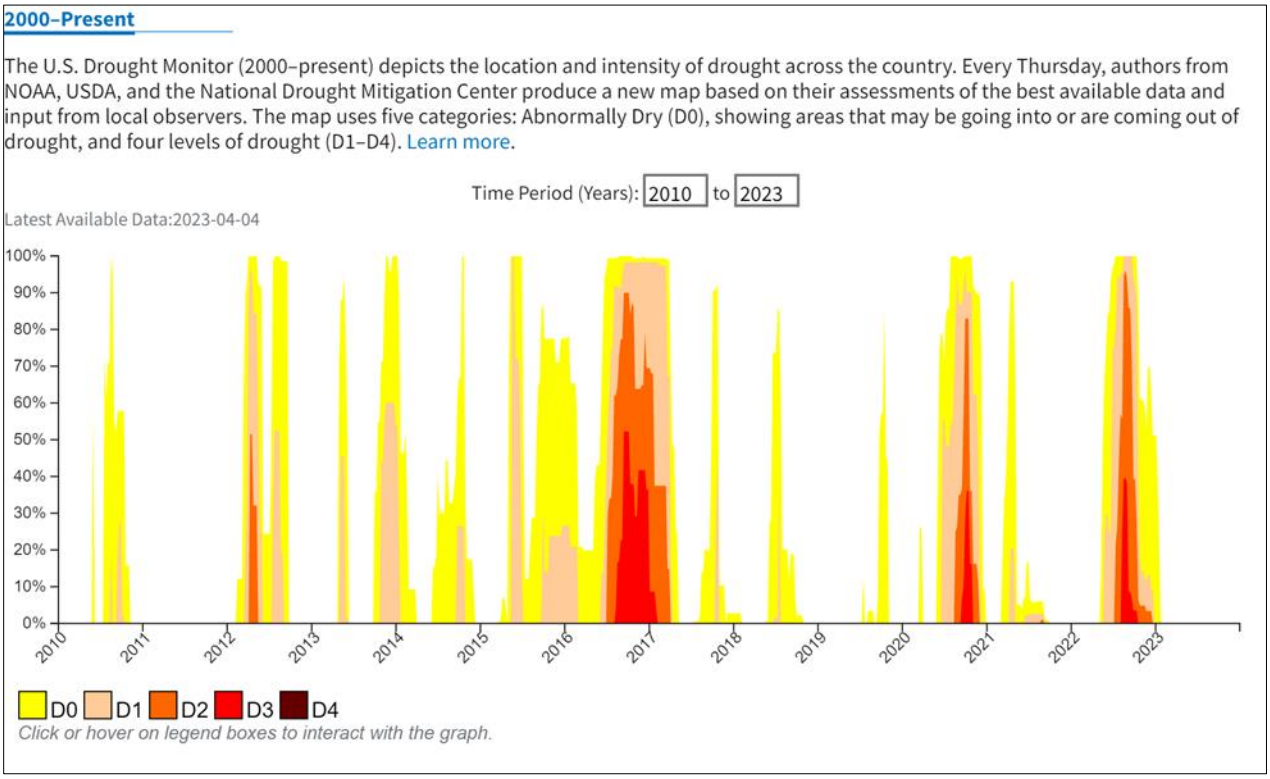
Annual Drought Classification Status in Massachusetts	
Year	**Maximum Severity**
2000	No drought
2001	D2 conditions in 21% of state
2002	D2 conditions in 99% of state
2003	No drought
2004	D0 conditions in 44% of state
2005	D1 conditions in 7% of state
2006	D0 conditions in 98% of state
2007	D1 conditions in 71% of state
2008	D0 conditions in 57% of state
2009	D0 conditions in 44% of state
2010	D1 conditions in 27% of state
2011	D0 conditions in 0.01% of state
2012	D2 conditions in 51% of state
2013	D1 conditions in 60%, D0 in 99.9% of state
2014	D1 conditions in 26%, D0 in 99.99% of state
2015	D1 conditions in 72%, D0 in 100 % of state
2016	D3 conditions in 52%, D2 in 90%, D1 in 98%, D0 in 100% of state
2017	D3 conditions in 9%, D2 in 69%, D1 in 98%, D0 in 99% of state
2018	D1 conditions in 36%, D0 in 85% of state
2019	D0 in 85% of state
2020	D3 conditions in 37%, D2 in 83%, D1 in 96%, D0 in 100% of state
2021	D1 conditions in 2.5%, D0 in 6% of state
2022	D3 conditions in 39%, D2 in 96%, and D1 in 100% of state

Source: U.S. Drought Monitor

[5] https://www.mass.gov/info-details/drought-status

Figure 3.2 below also shows the occurrences and intensity level of droughts in Hampshire County specifically from 2010 – 2022. The 2016-2017 drought can be seen to have the longest duration of drought at the D3 level (extreme drought). The droughts in 2020- 2021 and 2022-2023 also reached the D3 level for a significant amount of time.

Figure 7: Incidences of drought in Hampshire County from 2010 – 2023



In 2008 some people's ground wells started drying up and people had limited access to water. Members of the local Hazard Mitigation Committee do not know if this was caused by the D0 drought conditions occurring in 57% of the State in 2008. The problem resolved itself without any intervention required by the Town.

There have been a small number of shallow well failures in the last 10 years due to low water levels during droughts.

Probability of Future Events

Based on past events and current criteria outlined in the Massachusetts Drought Management Plan, it appears that western Massachusetts may be more vulnerable than 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. Climate change is likely to increase the risk of drought. Projected higher average temperatures, combined with the likelihood of more

consecutive days without precipitation in summer and fall, will increase the probability of more severe and longer-lasting droughts.

In Goshen, the probability of a future event is "low," with between a 1 and 10 percent chance of occurring in any given year.

Vulnerability Assessment

Impact to the Built Environment

The HMP Committee considered the impact of a drought in Goshen to be "minor," with very few damages to people or property likely to occur. Due to the water richness of western Massachusetts, Goshen is unlikely to be adversely affected by anything other than a major, extended drought. While such a drought would require water saving measures to be implemented, there would be no foreseeable damage to structures or loss of life resulting from the hazard.

Population Impacts

The primary impact of droughts on Goshen residents would be the risk of shallow well failures, as well as impacts to agricultural operations that would need to provide additional irrigation for crops. However, there are a very small number of farms in Goshen. It is important for the Board of Health, as well as the Fire Department and Emergency Management, to communicate with residents during extended drought conditions about steps to take in the event of well failure.

Land Use/Development Impacts

The very limited amount of new residential and commercial development in Goshen will not have a significant impact on the Town's vulnerability to drought.

Vulnerability

Based on the above assessment, Goshen has a hazard index rating of "4 –low risk" from drought. No loss of property, or damages to people or property is expected due to this hazard.

Extreme Temperatures

Hazard Description

Massachusetts has four clearly defined seasons. Extreme temperatures are considered outliers, or temperatures that fall outside the typical range for each season. Extreme temperatures can last from an afternoon to a few days. Day and nighttime temperature fluctuations also factor into the overall effects of temperature. For example, when the temperature does not cool off at night during an extreme heat wave, the risk of heat related illnesses is intensified.

Extreme Cold

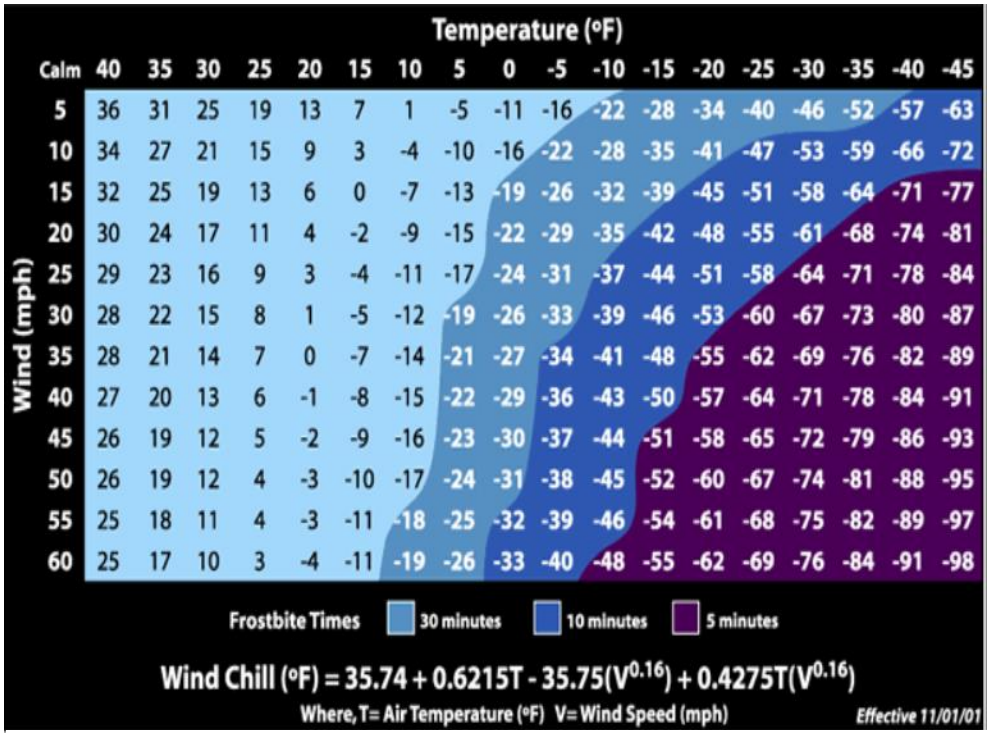
Extreme cold does not have a threshold temperature, but rather is defined as prolonged periods of excessively cold weather. This may vary by region based on average temperatures in the region. In Massachusetts, where temperatures regularly go below freezing during winter months, the community is often used to these temperatures. However, this does not lessen the risk. Extremely cold temperatures can create dangerous conditions for homeless populations, stranded travelers, and residents without sufficient insulation or heat in their homes. The homeless, the elderly, and people with disabilities are often most vulnerable. In Goshen, 22% of the population is over 65 years old and 7% of the population has a disability (2021 American Community Survey). Cold weather events can also have significant health impacts such as frostbite and hypothermia. Furthermore, power outages during cold weather may result in inappropriate use of combustion heaters, cooking appliances, and generators in poorly ventilated areas, which can lead to increased risk of carbon monoxide poisoning. During extreme cold, pipes may freeze and burst in many buildings with unreinforced masonry.

Extent

Extremely cold temperatures are measured using the Wind Chill Temperature Index provided by the National Weather Service (NWS). The updated index was implemented in 2001 and helps explain the impact of cold temperatures on unexposed skin. Figure 3.3 below provides more information. According to NOAA's National Centers for Environmental Information Storm Events Database records data for extreme cold events, between 2000 and September 2020, Massachusetts experienced 20 extreme cold and wind chill events. None of these events were reported for Hampshire County, however.[6]

[6] https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+Extreme+Cold%2FWind+Chill&beginDate_mm=11&beginDate_dd=01&beginDate_yyyy=1999&endDate_mm=11&endDate_dd=30&endDate_yyyy=2021&county=ALL&hailfilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitbutton=Search&statefips=25%2CMASSACHUSETTS

Figure 8: Extreme Cold and Wind Chill Index



Source: National Weather Service

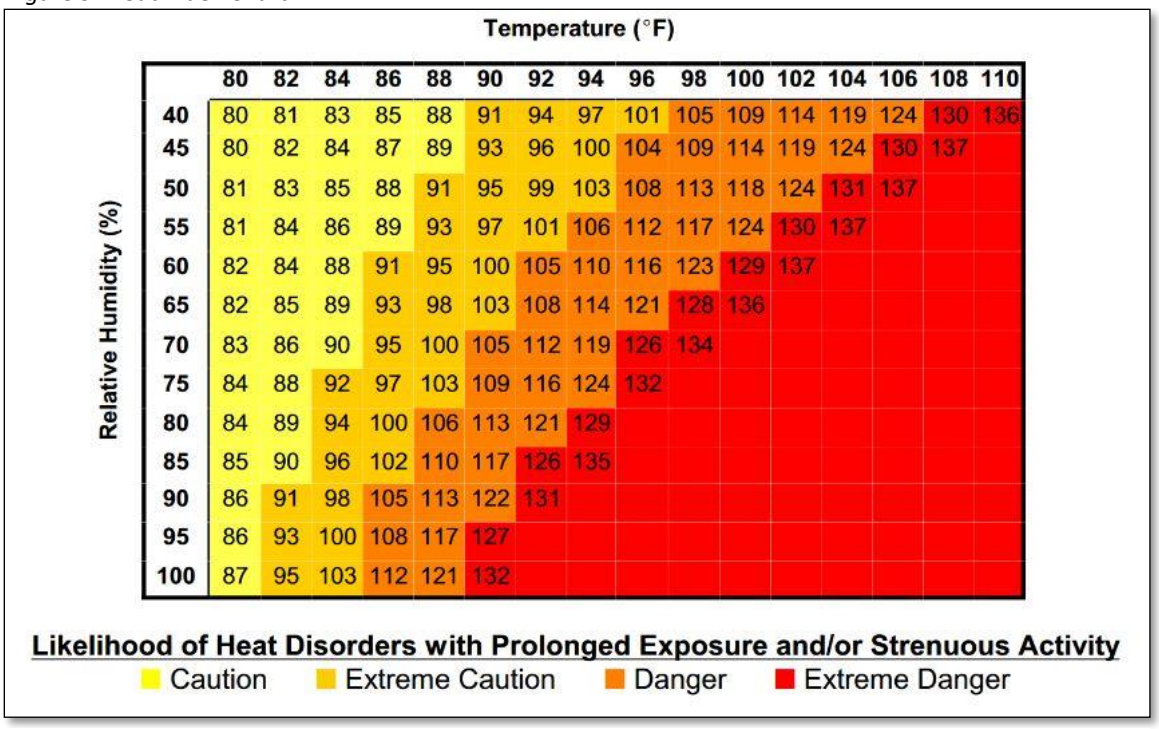
Extreme Heat

Extreme heat is when the maximum temperature reaches above 90°F during the day. A heat wave is defined as 3 or more days of temperatures of 90°F or above. Projected heat days and heat waves can have an increased impact in areas with a greater amount of impervious surface, such as buildings, roads, parking lots, and driveways. These can become "heat islands" as dark asphalt and roofs store the heat from the sun. Impacts from heat stress can exacerbate pre-existing respiratory and cardiovascular conditions.

Extent

The NWS issues a Heat Advisory when the Heat Index (Figure 3.4) is forecast to reach 100-104˚ F for two or more hours (NOAA, n.d.). The NWS issues an Excessive Heat Warning if the Heat Index is forecast to reach 105˚+F for two or more hours. Heat waves cause more fatalities in the U.S. than the total of all other meteorological events combined. According to the SHMCAP, a study of heat-related deaths across Massachusetts estimated that when temperatures are between 85 and 92°F, there are between five and seven excess deaths per day in the state.

Figure 9: Heat Index Chart



Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Source: National Weather Service

Because most heat-related deaths occur during the summer, people should be aware of those at greatest risk and what actions can be taken to prevent a heat-related illness or death. According to the Centers for Disease Control and Prevention, the populations most vulnerable to extreme heat impacts include the following:

- People over the age of 65
- Children under the age of five
- Individuals with pre-existing medical conditions that impair heat tolerance
- Individuals without proper cooling
- Individuals with respiratory conditions
- Individuals that overexert themselves during extreme heat events

Location

Because of this hazard's regional nature, extreme temperatures would impact the entire town, resulting in a "large" location of occurrence, or more than 50 percent of total land area affected.

Previous Occurrences

NOAA's National Centers for Environmental Information Storm Events Database provides data on excessive heat. Between 2000 and 2023, Massachusetts experienced 16 heat or excessive

heat days, which did not result in any injury or property damage. None of these events were reported for Hampshire County. Extreme temperatures are classified as medium frequency events. As defined by the 2013 State Hazard Mitigation and Climate Adaptation Plan, these events occur from once in 5 years to once in 50 years or have a chance of occurrence of 2% to 20% per year. According to the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan, between four and five heat waves (3 or more consecutive days of 90˚+F temperatures) occur annually in Massachusetts.

While there is not currently a building available in Goshen for cooling or warming, there are centers available in neighboring towns – residents can utilize both the Chesterfield Community Center and the Anne T. Dunphy School in Williamsburg for cooling, and a small number of individuals have gone to these locations during heat waves. In the case of power outages during cold weather, Goshen residents can use the Town Hall/Town Offices for warming, or the New Hingham School in Chesterfield. It would benefit the Town to have a building available as a cooling center, so residents don't have to go to a neighboring town, and may be more likely to utilize it.

Probability of Future Events

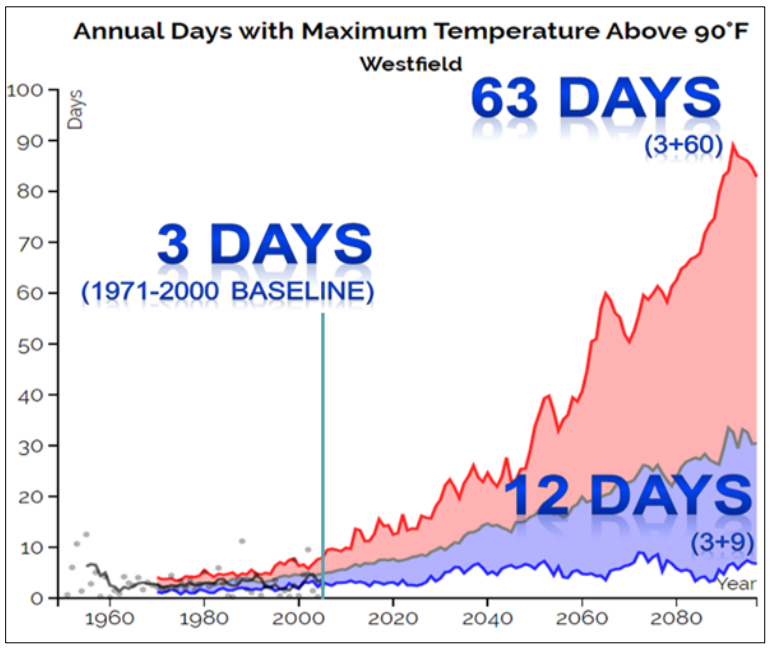
The probability of future extreme heat and extreme cold is considered by the HMP Committee to be "moderate," or between 10 and 40 percent in any given year.

The baseline average temperature for the Westfield River Basin in the years 1971-2000 was 45 degrees, and in 2021 it was approximately 47 degrees. By the end of the century, it is predicted to rise between 4.2 and 11.2 degrees, depending on levels of greenhouse gas emissions. Both the average temperature and number of extreme heat days are predicted to increase in future climate conditions.[7]

The number of days annually above 90 degrees in the Westfield River Basin is projected to rise dramatically, as shown in Figure 3.5 below. Projections indicate an increase of up to 60 more days per year of temperatures above 90 degrees by the end of the century, from a baseline average of three days per year. At temperatures over 90°F, heat-related illnesses and mortality show a marked increase, and heat waves with multiple days over 90°F can be especially dangerous for vulnerable individuals. Higher temperatures can also exacerbate air pollution, which can lead to negative health impacts such as asthma and other respiratory problems.

[7] https://resilient.mass.gov/home.html

Figure 10: Extreme Heat Projects for Westfield River Basin



Source: NECIA 2018

Vulnerability Assessment

Impact to the Built Environment

The impact of extreme heat or cold in Goshen is considered by the HMP Committee to be "minor," with little to no property damage, and limited effect on humans. Extreme heat is unlikely to impact physical structures, although it can negatively affect agricultural operations and contribute to both drought conditions and wildfire risk. Extreme cold can cause water pipes to freeze and burst. Increased temperature fluctuations in the winter can cause more freeze-thaw issues with roads and other infrastructure.

Population Impacts

The largest concern in Goshen during heat waves is older adults (over 65) that make up 22% of the population and are more likely to have pre-existing health conditions. There are also individuals with medical conditions who are vulnerable to extreme heat, and even young adults and healthy individuals can succumb to heat if they participate in strenuous physical activities outside. Other vulnerable individuals include the homeless, those with lower incomes and renters, who are less likely to have air conditioning or may not use it due to the cost. The primary concern during extreme cold events is residents that may also have lost power due to a snow or ice storm, especially vulnerable groups such as older adults. During both extreme heat and cold events, the Town opens cooling/warming centers for any residents who don't have adequate cooling or warmth at home. It is important for Emergency Management, the Board of Health, the Council on Aging, and other Town departments to have processes in place to

provide assistance to vulnerable individuals who could need assistance during both extreme heat and extreme cold events.

Residents have dependable heat sources, other than in the event of a power outage. Because most of Goshen is wooded and has variability in elevation, temperatures lower significantly at night, and extended heat waves resulting in health impacts are unlikely.

Vulnerability

Goshen's vulnerability from extreme heat and cold is considered to be, "5 - Lowest Risk."

4: CRITICAL FACILITIES

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

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

Critical Facilities within Hazard Areas

Goshen's Hazard Mitigation Committee has broken up this list of facilities into three categories:

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

The Critical Facilities Map at the end of this Plan identifies these facilities.

Category 1 – Emergency Response Services

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

Emergency Operations Center

- Primary: Town Hall and Town Offices– 40/42 Main Street
- Secondary: Goshen Fire Station – 56 Main Street

Fire Station

- Goshen Fire Department – Headquarters: 56 Main St.

Police Station

- Goshen Town Police Department – 40 Main St.

Highway Department

- Highway Department – 8 Highland Rd.

Water

- Transient/non-transient non-community wells
- 20,000-gallon cistern
- Dry Hydrants: gravity fed on East St., Brook on East St./Mill River, Pond Hill Rd, at upper end of Hammond Pond, Dam House at Hammond Pond

Emergency Fuel Stations

- Highway Department – 8 Highland Rd.

Emergency Electrical Power Facility

- Town Hall, Town Offices, EOC, Police Department, and Fire Departments all have fixed generators capable of providing back-up power to the entire facility.
- There are 3 portable generators – located with the Fire Department, the Police Department, and the Emergency Management Director

Emergency Shelters

- Goshen Town Hall- 42 Main Street (Route 9)
- New Hingham Regional Elementary School, 30 Smith Rd., Chesterfield

Emergency Medical Services Station

- Highland Ambulance – 12 Williams Drive

Transfer Station

- Town of Goshen Refuse Disposal and Recycling Center- Wing Hill Rd. and East St.

Helicopter Landing Sites

- Riding club, Ball Rd. and anywhere there is 100 x 100 landing spot
- Tilton Field
- (Permitted anywhere feasible)

Communications

- Goshen EOC 42 Main St.
- Goshen Public Library- 42 Main St. (Wireless Internet Access)
- Goshen Fire Department – Headquarters: 56 Main St.
- Fiber Optic Hut – Main St
- Cell Towers – At George Propane (Verizon), Loomis Road (AT&T)

Primary Evacuation Routes

- Route 112
- Route 9

Bridges/Culverts Located on Evacuation Routes

Evacuation Route	Crosses	Owner	Year Built	Year Rebuilt
State Route 9	Stone Brook	Mass Highway	1950	NA
State Route 9	Stone Brook	Mass Highway	1950	NA

There is a bridge heading east on Rt. 9 after Shaw Rd. that has a problem culvert. This is a State highway and is not included in the DPW's list of remaining problem culverts.

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 Goshen.

Non-Potable Water Supply

- Hammond Pond
- Mill River West Branch
- Stone Brook
- Swift River
- Upper and Lower Highland Lake
- Sears Meadow
- Webster Brook
- Damon Pond

Problem Culverts

- 74 Fuller Rd.
- Sears Road at the Ashfield Town line
- 13 Hyde Hill Road

Category 3 – Facilities/Populations to Protect

The third category contains people and facilities that need to be protected in event of a disaster.

Access and Functional Needs Population

- Nursing Home – none
- Group Home – none
- Neighborhoods with language barriers - none

Elderly Housing/Assisted Living

- Highland Village Senior Housing – 41 Main Street

Recreational and Cultural Facilities

- Camp Holy Cross- 108 Cape Street
- Camp Howe Youth Summer Camp- DAR Forest Rd.
- DAR State Forest- 78 Cape St.
- Institute for the Musical Arts - 165 Cape Street
- Three Sisters Sanctuary – 188 Cape Street

- Tilton Town Farm and Field – 1-31 Wing Hill Road

Schools/Daycare

- In-home 185 West St.

Churches

- Goshen Congregational Church- 45 Main St.

Historic Buildings/Sites

- Goshen Cemetery – Mollison Hill Rd.
- Goshen Museum- 13 Main St.
- John Williams House – 2 Williams Drive
- Town Hall – 42 Main Street (eligible for National Register)

Apartment Complexes

- General Store (3 units) - 31 Main St.
- Whale Inn (3 units) – 2 Main St.
- Mountain Rest Historic District – 1-7 Wildwood Lane
- Log Cabins – 8 Berkshire Trail

Employment Centers/Businesses

- Goshen Stone – 145 Berkshire Trail
- George Propane – 3 Berkshire Trail
- AccuFab – 83 South Main Street
- Lashway Lumber
- Appalachian Naturals – Ball Road
- Spruce Corner Restaurant – 188 Berkshire Trail
- Highland Ambulance EMS – 12 Williams Drive

Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas			
Hazard Type	**Hazard Area**	**Critical Facilities Affected**	**Evacuation Routes Affected**
Flooding			Route 9
Severe Snowstorms / Ice Storms	Ridge lines and high areas	Yes	Local roads and Rt. 9
Severe Thunderstorms / wind / tornadoes			Local roads and Rt. 9
Hurricanes			Local roads and Rt. 9
Wildfire/Brushfire	Whole community	Whole community	Whole community
Earthquakes			
Dam Failure	East St.	Highway Garage-based on inundation maps and only after several days of steady rain	Rt. 9 Eastbound, East Street
Drought			

(Critical Facilities Map Located In the Appendix)

5: MITIGATION CAPABILITIES AND STRATEGIES

One of the steps of this Hazard Mitigation Plan is to evaluate all of the Town's existing plans, policies and practices related to natural hazards and identify potential gaps in protection. After reviewing these plans, policies and the hazard identification and assessment, the Hazard Mitigation Committee developed a set of hazard mitigation strategies it will work to implement in the five years after FEMA approval of this plan.

Plans reviewed include the Town's Open Space and Recreation Plan, the Community Development Plan, the Green Communities Plan, and the Comprehensive Emergency Management Plan (CEMP). As noted previously, Town zoning and land use regulations were also reviewed. All boards, departments, committees that regulate development were represented on the plan committee.

Existing Mitigation Capabilities/Strategies

The Town of Goshen had many mitigation strategies and various mitigation capabilities in place prior to the update of this Hazard Mitigation Plan in 2024. These capabilities/strategies are described on the following pages and have been summarized in a table at the end of this chapter.

The CEMP details specific Town responsibilities for each natural (as well as man-made) hazard, providing detailed assignments for each hazard by mitigation and preparedness. To obtain a copy of the CEMP, contact Town EMD.

For a list of completed strategies that were previously identified as part of the prioritized implementation list, see the table of "Deleted and Completed Strategies" later in this section.

Goshen's local Hazard Mitigation Committee used the FEMA Capability Assessment worksheet, as a guide to assess local capabilities to mitigate the consequences on natural hazards in the community.

Goshen 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 floodplains, stormwater management, tree maintenance, etc. Goshen also has appropriate staff dedicated to hazard mitigation-related work for a community its size, including an Emergency Management Director, a professionally run Department of Public Works, a part-time Building Inspector, a Conservation Commission and a Planning Board, as well as a Tree Warden, and Goshen has recommended plans in place, including an Open Space and Recreation Plan, and a Comprehensive Emergency Management Plan. Not only does Goshen 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 and Committees and in Volunteer

positions. The Town collaborates closely with surrounding communities and is party to the Statewide Mutual Aid agreements, the Western Massachusetts Mutual Aid agreement sponsored by the Western Regional Homeland Security Council, as well as mutual aid agreements for the fire service and law enforcement. Goshen is also an active member community of the Pioneer Valley Planning Commission (PVPC) and can take advantage of no cost local technical assistance as needed provided by the professional planning staff at the PVPC.

Goshen's most obvious hazard mitigation need is for federal funds to implement prioritized actions. While Goshen is a well-managed fiscally sound Town, it is not a wealthy community and with state constraints on municipalities raising their own funds, Goshen has very limited financial resources to invest in costly hazard mitigation measures. Goshen is, however, committed to locally matching all HMGP grants received.

Flooding

The key factors in flooding are the water capacity of water bodies and waterways, the regulation of waterways by flood control structures, and the preservation of flood storage areas and wetlands. As more land is developed, more flood storage is demanded of the town's water bodies and waterways. The Town currently addresses this problem with a variety of mitigation tools and strategies. Flood-related regulations and strategies are included in the Town's zoning ordinance, and subdivision regulations. Infrastructure like dams and culverts are in place to manage the flow of water.

Management Plans

The Comprehensive Emergency Management (CEM) Plan for Goshen lists the following measures for flood planning:

- Identify areas in the community that are flood prone and define methods to minimize the risk. Review National Flood Insurance Maps.
- Disseminate emergency public information and instructions concerning flood preparedness and safety.
- Community leaders should ensure that Goshen continues to be enrolled in the National Flood Insurance Program.
- Strict adherence should be paid to land use and building codes, (e.g. Wetlands Protection Act), and new construction should not be built in flood-prone areas.
- Ensure that flood control works are in good operating condition at all times.
- Natural water storage areas should be preserved.
- Maintain plans for managing all flood emergency response activities including addressing potentially hazardous dams.

Subdivision Rules and Regulations/Zoning Ordinance

Highlights from Goshen's most recent draft of its Subdivision Rules and Regulations and Zoning Ordinances which mitigate the potential effects of flooding hazards on the Town are summarized in the Table at the end of this chapter. The whole Town is zoned Residential/Agricultural. To opt out of this zoning (to build anything other than AG/Res), applicants must go through a special permit process which effectively regulates development in the community.

National Flood Insurance Program

The National Flood Insurance Program has produced maps that identify floodways across America. Goshen is a participating member of the National Flood Insurance Program, but currently there are no homeowners that have NFIP policies. In the past there were 12 NFIP policies in Goshen, but 11 policies were eventually cancelled and 1 policy expired.

The Flood Insurance Rate Maps (FIRM) in Hampshire County have not been updated since 1980. The Town will maintain compliance with the NFIP throughout the next five-year Hazard Mitigation Planning cycle. The Town has prioritized adoption of the Floodplain Protection district. The FIRM maps are scheduled to be updated by FEMA in the next few years. When these maps are updated, the Town of Goshen will adjust its zoning to accommodate changes to the location of floodplains. There have been no repetitive loss claims in Goshen. Compliance with the NFIP is also addressed on pages 83-84.

Severe Snowstorms / Ice Storms

Winter storms can be especially challenging for emergency management personnel. The Massachusetts Emergency Management Agency (MEMA) serves as the primary coordinating entity in the statewide management of all types of winter storms and monitors the National Weather Service (NWS) alerting systems during periods when winter storms are expected. Even though the storm has usually been forecast, there is no certain way for predicting its length, size or severity. Therefore, mitigation strategies must focus on preparedness prior to a severe snow/ice storm.

The Town's current mitigation tools and strategies focus on preparedness, with many regulations and standards established based on safety during storm events. To the extent that some of the damages from a winter storm can be caused by flooding, flood protection mitigation measures also assist with severe snowstorms and ice storms.

Management Plans

Goshen's Comprehensive Emergency Management Plan (CEM Plan) is focused on the procedural response to an emergency, however it also organizes information, includes supply and information inventories, and outlines detailed steps for increasing preparedness.

Restrictions on Development

The Town of Goshen Bylaws set grade limits on driveways that are included in Section XV 4.D.: Gradients, which, although not specified as weather hazard mitigation, can serve to minimize accident potential and power loss from severe winter storms.

State Building Code

For new or recently built structures, the primary protection against snow-related damage is construction according to the International Building Code, which addresses designing buildings to withstand snow loads. Goshen has a part-time, professional building inspector on its staff.

Improvements to Backup Power Supply

Over time, the Town has significantly increased the resilience of its emergency facilities, in case of power loss from hazards such as ice storms. Regular tree maintenance and maintenance from the utility also reduce the risk of power loss resulting from snow and ice storms.

Hurricanes / Severe Thunderstorms / Wind / Tornadoes

Hurricanes, severe thunderstorms, and tornadoes all generate high winds that can fell trees, down electrical wires, and generate hurtling debris. This common characteristic means that the same set of mitigation strategies applies equally to all four hazards. For example, current land development regulations, such as restrictions on the height of telecommunications towers, can help prevent wind damages from all four types of hazards. In addition to wind damage, hurricanes can generate significant flooding that damages buildings, infrastructure and threatens human lives. All of the existing mitigation measures listed in the Flooding section are also hurricane mitigation measures.

Management Plans

Goshen's Comprehensive Emergency Management Plan (CEM Plan) is focused on the procedural response to an emergency, however it organizes information, includes supply and information inventories, and outlines detailed steps for increasing preparedness.

Zoning

The Protective Bylaw requires that any year-round dwelling be on permanent foundations. Seasonal dwellings are allowed without a foundation.

Restrictions on Development - Mobile Homes

According to the Town of Goshen Bylaw, mobile homes are an allowed use by special permit only for temporary residence if one's home is damaged or destroyed by a hazard, allowing time to re-build a permanent structure.

State Building Code

For new or recently built structures, the primary protection against wind-related damage is construction that adheres to the State (International--because the Commonwealth adheres to the International Building Code) Building Code, which, when followed, results in buildings that withstand high winds. The Town of Goshen employs a part-time building inspector for all inspection duties and responsibilities.

Flood Mitigation Strategies/Capabilities

Because one of the primary impacts of hurricanes and severe thunderstorms is intense rainfall that generate flooding, all of the flood mitigation strategies/capabilities discussed above are also mitigation strategies for hurricanes and severe thunderstorms.

Wildfires/Brushfires

Wildfire and brushfire mitigation strategies involve educating people about how to prevent fires from starting, as well as controlling burns within the town.

Management Plans

Goshen's Comprehensive Emergency Management Plan (CEM Plan) is focused on the procedural response to an emergency; however it also organizes information, including supply and information inventories, and outlines detailed steps for increasing preparedness.

Burn Permits*:* The Town of Goshen does allow open burning under the guidelines of the Department of Environmental Protection. Open Burning is authorized from January to May (State law). Burning is permitted between the hours of 10 am to 4 pm (State law). The Officer in Charge of the Fire Department will determine if burning will be allowed at the beginning of the shift and can suspend burning if weather conditions change.

Subdivision Review: The procedures for the submission of preliminary and definitive subdivision plans require that the Fire Department be an active participant in the review of proposed subdivision plans. This involves verifying that proficient water supplies exist and that access routes to and from a given subdivision adequately meet public safety needs.

Public Education/Outreach: The Goshen Fire Department maintains a public outreach program that targets children and seniors with the intention of spreading information about fire safety within these two populations. Furthermore, the Town has a safety inspection program that works to ensure that fire safety standards are being met.

Earthquakes

Although there are five mapped seismological faults in Massachusetts, there is no discernible pattern of previous earthquakes along these faults nor is there a reliable way to predict future

earthquakes along these faults or in any other areas of the state. Consequently, earthquakes are arguably the most difficult natural hazard for which to plan.

Most buildings and structures in the state were constructed without specific earthquake resistant design features. In addition, earthquakes precipitate several potential devastating secondary effects such as building collapse, utility pipeline rupture, water contamination, and extended power outages. Therefore, many of the mitigation efforts for other natural hazards identified in this plan may be applicable during the Town's recovery from an earthquake.

Management Plans

Goshen's Comprehensive Emergency Management Plan (CEM Plan) is focused on the procedural response to an emergency; however, it also organizes information, includes supply and information inventories, and outlines detailed steps for increasing preparedness.

State Building Code

State and local building inspectors are guided by regulations put forth in the Massachusetts State Building Code. The first edition of the Massachusetts State Building Code went into effect on January 1, 1975 and included specific earthquake resistant design standards. These seismic requirements for new construction have been revised and updated over the years and are part of the current, 8th edition of the Massachusetts State Building Code. Given that most structures in Massachusetts were built before 1975, of many buildings and structures do not have specific earthquake resistant design features. In addition, built areas underlain by artificial fill, sandy or clay soils are particularly vulnerable to damage during an earthquake.

Restrictions on Development

There are no seismic-related restrictions on development beyond that in the building code.

Dam Failures

Dam or levee failure is a highly infrequent occurrence, but a severe incident could prove catastrophic. In addition, dam failure most often coincides with flooding, so its impacts can be multiplied, as the additional water has nowhere to flow.

Management Plans and Regulatory Measures

Goshen's Comprehensive Emergency Management Plan (CEM Plan). Although the CEM Plan is focused on the procedural response to an emergency, it organizes information, includes supply and information inventories, and outlines detailed steps for increasing preparedness.

Permits Required for New Dam Construction

Massachusetts State Law (M.G.L. Chapter 253 Section 45) regulates the construction of new dams. A permit must be obtained from the Department of Conservation and Recreation (DCR) before construction can begin. One of the permit requirements is that all local approvals or

permits must be obtained. All new dams must adhere to seismic requirements set forth in the 8th Edition of the Massachusetts State Building Code.

Dam Inspections and Removal of Dams

The DCR requires that dams rated as Low Hazards are inspected every ten years and dams that are rated as Medium/Significant Hazards are inspected every five years. High Hazard dams must be inspected every two years.

The Town works with the Department of Conservation and Recreation (DCR), Office of Dam Safety and with the Army Corps of Engineers to assure Dam Safety. The Conservation Commission and the EMD are the Town's primary contacts.

Restrictions on Development

There are no Town restrictions on dam locations. The DCR issues permits for new dams and does have the authority to deny a permit if it is determined that the design and/or location of the dam is not acceptable.

Emergency Action Plan for Upper Highland Lake Dam and Lower Highland Lake Dam

The Town received copies of these plans from GZA Associates. They were updated in June 2022.

Drought

Although Massachusetts does not face extreme droughts like many other places in the country, it is susceptible to dry spells and drought. Drought can most likely be effectively mitigated in regions like the Pioneer Valley if measures are put into place, such as ensuring that groundwater is recharged.

State Regulations

The Town of Goshen follows the state's Water Management Act, which limits the amount of water consumption during a state-issued Water Emergency Declaration. For more information, visit https://www.mass.gov/water-management-act-program.

Extreme Temperatures

Extreme temperatures are projected to occur more frequently due to climate change, particularly extreme high temperatures. The impacts of extreme temperatures are often emergency response-related, such as the provision of heating or cooling centers during extreme temperature events. Other mitigation measures include providing information to residents, especially more vulnerable populations, about extreme temperature risk to health

and properties, and assisting vulnerable populations in extreme temperature events. Goshen already has partnerships in place with the Council on Aging to identify vulnerable residents.

Table 23: Existing Hazard Mitigation Capabilities with Potential Changes Noted

Existing Measure	Description	Area Covered	Effectiveness	Potential Changes
Goshen Open Space and Recreation Plan	Inventories natural features and promotes natural resource preservation in the town, including areas in the floodplain; such as wetlands, groundwater recharge areas, farms and open space, rivers, streams and brooks.	Entire Town	Effective	Work to implement relevant goals and policies in Plan.
Subdivision Rules and Regulations	Definitive plan requires delineating natural waterways and floodways Design standards require drainage, stormwater easements when near watercourse Utilities – catch basins must be provided to remove surface water off roads	Entire Town	Somewhat effective for mitigating or preventing localized flooding of roads and other infrastructure. Somewhat effective for controlling impacts from stormwater runoff. Prevents flood damage to infrastructure.	Consider adding stormwater retention/detention requirements
Zoning Ordinance: Use Regulations – Special Permit	Earth removal/excavation projects in excess of 100 cubic yards require permit.	Entire town	Limited effectiveness	Consider adding performance standards for run-off, drainage, water pollution caused during earth removal/excavation
Participation in the National Flood Insurance Program	According to current FEMA data, there are no active NFIP policies in Goshen at this time.	Areas identified by the FEMA maps.	Somewhat effective, provided that the Town remains enrolled in the National Flood Insurance Program.	The Town considered becoming a part of FEMA's Community Rating System and has determined that it is not cost effective to do so at this time.

Existing Measure	Description	Area Covered	Effectiveness	Potential Changes
Culvert Replacement	Replace top priorities on culvert replacement list	Areas affected by culverts-varies	Very effective as funding becomes available	Try to obtain additional funding. Since the 2016 plan the Town has replaced the top priority culverts on the list but has four remaining.
Dam Inspection	Ensure private dam owners understand their responsibility to inspect the dams regularly (only applies to Hammond Pond Dam)	Varies by dam-see chart in Dam section	Effective	None
Floodplain Protection District	Add a Floodplain Protection District to Zoning Regulations to limit or restrict development within the floodplains.	Targeted areas	Anticipated to be effective	This has been drafted and will come before Town Meeting in September 2023
Subdivision Regulations – Design Standards for Roads	Standards include street grade regulations (eight to fifteen percent maximum).	Entire Town.	Effective	None
Zoning Bylaw – Driveway Bylaw	Driveways must be approved, and bylaw also regulates grade of driveways where they meet with roadway	Entire Town.	Effective for preventing incompatible driveways or loss of access.	None
State Building Code	Goshen follows the Massachusetts State (International) Building Code.	Entire Town.	Effective	None
Backup Electric Power	Shelters have backup power, three portable generators, one mobile generator (light tower)	Entire Town.	Effective	None
Tree Management	List of dangerous trees created annually for National Grid. Municipal Light Plant (for Internet) also manages trees in coordination with Town.	Entire Town.	Effective	None
Snow Removal Restrictions	Increase enforcement of restrictions prohibiting residents from plowing snow into the road.	Entire Town	Effective	None

Existing Measure	Description	Area Covered	Effectiveness	Potential Changes
Regional Debris Management Plan	The Town planned to participate in the Regional Debris Management Plan that was proposed in 2008 and was never developed. The WRHSAC funded a debris management plan in Franklin County and if funds are available for Hampshire County-Goshen will participate	Entire Town	Effective	None, would be beneficial and would establish one if surrounding communities were willing to participate/be a receiving town. Consider establishing town-wide plan. Town could possibly get some income with market for wood chips.
Zoning Bylaw – Permissible Uses by Special Permit	Allows mobile homes/trailers, for temporary use if home is destroyed or damaged	Entire Town.	Somewhat effective for preventing damage to susceptible structures	None
Zoning Bylaw- Protective Bylaw	Requires any year-round dwelling to be on permanent foundations	Entire Town.	Somewhat effective for preventing damage to susceptible structures	None
State Building Code	The Town of Goshen has adopted the Massachusetts State Building Code.	Entire Town.	Effective.	None
Zoning Bylaw – Use Regulation	Sawmills and lumberyards must clean up residue to prevent fire – No active commercial sawmills at this time	Entire Town.	Effective	None
Burn Permits	Residents can obtain burn permits over the phone or online. State police personnel provide information on safe burn practices.	Entire Town.	Effective.	None
Subdivision Review: Fire Safety	The Fire Department is involved in the review of subdivision plans.	Entire Town.	Effective.	None
Public Education/Outreach	The Fire Department has an ongoing educational program in the schools and in Senior Center	Entire Town.	Effective.	None
Permits required for new dam construction	State law requires a permit for the construction of any dam.	Entire Town.	Effective. Ensures dams are adequately designed.	None

Existing Measure	Description	Area Covered	Effectiveness	Potential Changes
Dam Inspections and EAPs	DCR Office of Dam Safety has an inspection schedule that is based on the hazard rating of the dam (low, medium, high hazard). Dam owners provide EAPs for high and significant hazard dams.	Entire Town.	Somewhat effective. The responsibility for this is on dam owners, who may not have sufficient funding to comply.	Communicate with DCR about private dam owner inspections.
Subdivision Regulations – Definitive Plan	Proposed layout of water supply must be included.	Entire Town.	Somewhat Effective.	None
CODERED/Reverse911	Information and warning for hazards disseminated to residents by phone and text. Residents have to sign up.	Entire Town	Effective but need more residents to enroll.	Conduct outreach to increase enrollment.

Participation in the National Flood Insurance Program

The National Flood Insurance Program (NFIP) was created by the United States Congress in 1968. The purposes of the NFIP are to mitigate the risk of flood losses through flood insurance, and to reduce flood damages by restricting development in floodplains. Goshen is a participating member of the National Flood Insurance Program.

The following table summarizes Goshen's participation in and compliance with the NFIP, including NFIP policy and claim statistics as of 2023.

Table 24: Town participation in and compliance with the NFIP

NFIP Topic	Sources of Information	Comments
Number of NFIP policies in the community and total coverage.	FEMA NFIP Services	Goshen is a participating member of the National Flood Insurance Program, but currently there are no homeowners that have NFIP policies. In the past there were 12 NFIP policies in Goshen, but 11 policies were eventually cancelled and 1 policy expired.
History of claims and insurance payments.	FEMA NFIP Services	There have not been any NFIP claims in Goshen and no payments made. There are no repetitive loss properties.
Format and location of FIRMS	Community	FIRMS are on file with the Town Clerk.
Date the community entered the NFIP and date of most recent FIRMS	FEMA NFIP Services	Goshen entered the NFIP on 08/16/1974. FIRMs have been effective since 1978 with the current map in effect since 03/07/1980.
Number of structures exposed to flood risk within the community	GIS Analysis	There are an estimated 64 structures within the SFHA and thus exposed to flood risk. Some of these may be garages, barns or other outbuildings.
Areas of flood risk with limited NFIP policy coverage	GIS Analysis, FPA	There is not address-specific data available from FEMA, but it is likely that property owners in the SFHA are underinsured, based on the number of properties in flood zones and the fact that there are only 8 current NFIP policies.
NFIP Administration in the community	Community	The Town complies with the NFIP by enforcing floodplain regulations, maintaining current floodplain maps, and providing information to property owners and developers about floodplain regulations and building requirements. Floodplain regulations are administered through the enforcement of the Town's zoning bylaws, by the Planning Board, the Conservation Commission, and the Building Inspector.

NFIP Topic	Sources of Information	Comments
NFIP compliance	Community, FEMA NFIP program	The Town is in good standing with the NFIP, and there are no outstanding compliance issues. The Town will maintain compliance with the NFIP throughout the next 5-year hazard mitigation planning cycle by monitoring its Floodplain Zone and ensuring that this zoning district accurately reflects the 100-year floodplain and FEMA Flood Insurance Rate Map.
Adoption of NFIP minimum floodplain management criteria via local regulation.	Community	Zoning Bylaw Article I-V: Floodplain District
Adoption of the latest effective Flood Insurance Rate Map (FIRM), if applicable	Community	Zoning Bylaw Article II, Section A: The Floodplain District is herein established as an overlay district. The District includes all special flood hazard areas designated on the Town's Flood Insurance Rate Map (FIRM) 5 issued by the Federal Emergency Management Agency for the administration of the National Flood Insurance Program, dated March 7, 1980. These maps indicate the 1%-chance regulatory floodplain. There is currently no Flood Insurance Study (FIS) for the Town. The effective FIRM is incorporated herein by reference and is on file with the Town Clerk.
Appointment of a designee or agency to implement the addressed commitments and requirements of the NFIP	Community	The Floodplain Administrator is appointed annually by the Select Board.
Implementation and enforcement of local floodplain management regulations to regulate and permit development in SFHAs.	Community	Floodplain regulations are administered through the enforcement of the Town's zoning bylaws, by the Planning Board, the Conservation Commission, the Floodplain Administrator, and the Building Inspector.
Description of how participants implement the substantial improvement/substantial damage provisions of their floodplain management regulations after an event.	Community	The Town implements the SI/SD provisions of its floodplain management regulations as required per the NFIP (CFR Title 44, Parts 59 - 65) and Massachusetts State Building Code (780 CMR). The Town will also coordinate with State Flood Hazard Management Program staff to assure that proper practices are followed and that a post-disaster plan will be in place to implement all SI/SD provisions.

Status of Previous Mitigation Actions

Several of the action items previously identified in the 2016 Hazard Mitigation Plan are being carried over into the current plan. This is either because they are ongoing strategies that should be repeated over time, or because they were not completed or only partially completed due to lack of funding or staff and volunteer time. The Hazard Mitigation Plan Committee identified several new strategies that are also being pursued. These new strategies are based on experience with currently implemented strategies, as well as the hazard identification and risk assessment in this plan.

Status of Previous Mitigation Strategies

The table below provides the status of mitigation strategies from the 2016 HMP. A number of strategies were completed; others were not completed due to lack of staff or financial resources or other reasons which are explained in the "status" column. Some of the strategies that were not completed have been carried over into the current plan.

Table 25: Status of Previous Mitigation Strategies

Mitigation Action	Description	Action Type	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority	Status
Adopt draft Floodplain Protection District	The Town has drafted a Floodplain Protection District to limit or restrict development within the floodplains, and/or a Groundwater Supply Protection District to limit or restrict development in groundwater recharge areas.	Regulatory	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	Planning Board	Start Jan 2017 with adoption by Oct 2017	Local, State $$-District Local Technical Assistance (DLTA) if necessary	low	1	Completed
Expand requirement that seasonal dwellings converted into year-round residence must show that ground water supply is not impacted to all development near water bodies	New action--building on existing capacity. Modify special permit use regulation in Zoning Ordinance to require that all new development near water bodies must show that soil absorption, filtration, and ground water supply are not to mitigate flooding	Regulatory	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	Planning Board, Open Space Committee	Start Jan 2018-conclude by Dec 2-18	Local, DLTA if necessary and/or Local Technical Assistance (LTA) from the PVPC	low	2	No longer relevant as converting seasonal dwellings into year round is no longer allowed.

Mitigation Action	Description	Action Type	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority	Status
Replace Fuller Road Culvert	Town made considerable progress from 2009 plan and has one problem culvert remaining on local roads	Construction/ implementation	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	DPW	After funding has been secured, anticipate 9 months of work	HMGP/Local	medium	High	Not completed due to lack of funding. Need additional funding to replace culvert. Carry over to new plan.
Permanent repair of problem culverts on Sears Road	The culverts were repaired temporarily and have been scheduled for permanent repair in 2017	Construction/ Implementation	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	DPW	2027	Local	low	Medium	Partially completed – one culvert repaired and a second needs to be replaced. Additional funding is needed for replacement.
Add stormwater retention/detention requirements to subdivision rules and regulations	This is a new action that the Hazard Mitigation committee recommends be taken by the Town.	Planning/ Regulatory	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	Planning Board, OSRP and/or Master Plan committee	2027	Local, DLTA if necessary	low	Low	Not completed. Planning board not been fully staffed, has not been able to address. Carry over to new plan
Add performance standards for run-off, drainage, water pollution caused during earth removal/excavation	This is a new action that the Hazard Mitigation committee recommends be taken by the Town.	Planning/ Regulatory	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	Planning Board, OSRP and/or Master Plan committee	2027	Local, DLTA if necessary	low	Low	Not completed. Planning board not been fully staffed, has not been able to address. Carry over to new plan

Mitigation Action	Description	Action Type	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority	Status
Participate in regional debris management plan by attending and actively participating in meetings, collecting and analyzing data, developing an action plan and engaging residents and key stakeholders and assuring adoption as needed.	In 2009 when original Hazard Mitigation plan was finalized, the Western Region Homeland Security Advisory Council (WRHSAC) had planned to fund a regional debris management plan, but funding was diverted. In 2016 WRHSAC is supporting development of a regional debris management plan template for Franklin county; if WRHSAC makes funds available for Hampshire County, Goshen will participate.	Planning/ Management	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	EMD	2025	WRHSAC	low	Medium	Not completed due to difficulty identifying a community willing to take debris. Carry over to new plan.
Ensure dam owners realize their responsibility to inspect and maintain the dams. EMD will secure proof from owner of up to date inspection.	This is an ongoing effort and needs to be implemented every two years	Education/ Enforcement	Flooding and all hazards that can result in flooding- severe thunderstorms, hurricanes, tornadoes	EMD	2017, 2019	local	low	8	Completed

Mitigation Strategies and Prioritized Implementation Plan

The Town of Goshen has developed the following goals to serve as a framework for mitigation of the hazards identified in this plan.

The Town of Goshen aims to minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to flooding, severe snowstorm and ice storms, severe thunderstorms, hurricanes, tornadoes, wildfires, earthquakes, dam failures, drought, and extreme heat through the following methods:

Protection: Develop programs, strategies, and actions to protect the following Town assets from natural hazards and climate change impacts:

- Residents, with an emphasis on supporting the most vulnerable populations
- Cultural and historic resources
- Critical infrastructure
- Utilities, including electric power, water, and wastewater
- Public facilities and services
- Homes and businesses
- Open space and other environmental features
- Future development

Planning: Incorporate hazard mitigation and climate resilience measures into local plans, bylaws, regulations, and practices to protect critical infrastructure and property and to encourage resilient development, based on up-to-date information on climate change projections and emerging risks.

Nature-based Solutions: Investigate, design, and implement hazard mitigation and climate resilience measures that employ nature-based solutions and protect the natural environment.

Coordination: Collaborate in hazard mitigation and climate resilience planning with utility providers, local businesses, institutions, non-profits, surrounding communities, and state, regional and federal agencies.

Capacity: Increase the capacity for all Town departments, committees, and boards to respond to natural hazard events with adequate data, guidance, staff, training, and equipment.

Public Outreach: Increase awareness and provide resources for hazard mitigation and climate resilience to businesses and residents through outreach and education.

Funding: Identify and seek funding for measures to mitigate the impacts of natural hazards and reduce the impacts of climate change.

Prioritization Methodology

The Goshen Hazard Mitigation Planning Committee reviewed and prioritized a list of previously identified and new mitigation strategies using the following criteria:

Application to multiple hazards – Strategies are given a higher priority if they assist in the mitigation of several natural hazards.

Time required for completion – Projects that are faster to implement, either due to the nature of the permitting process or other regulatory procedures, or because of the time it takes to secure funding, are given higher priority.

Estimated benefit – Strategies which would provide the highest degree of reduction in loss of property and life are given a higher priority. This estimate is based on the Hazard Identification and Analysis Chapter, particularly with regard to how much of each hazard's impact would be mitigated.

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 identified potential funding streams, such as the Hazard Mitigation Grant Program, are also given higher priority.

Eligibility Under Hazard Mitigation Grant Program – The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. Funding is made available through FEMA by the Massachusetts Emergency Management Agency. Municipalities apply for grants to fund specific mitigation projects under MEMA requirements

The following categories are used to define the priority of each mitigation strategy:

Low – Strategies that would not have a significant benefit to property or people, address only one or two hazards, or would require funding and time resources that are impractical

Medium – Strategies that would have some benefit to people and property and are somewhat cost effective at reducing damage to property and people

High – Strategies that provide mitigation of several hazards and have a large benefit that warrants their cost and time to complete

Several hazard mitigation strategies identified in the previous Hazard Mitigation Plan have not yet been completed, but were changed in priority during the update of this plan by the Hazard Mitigation Committee. The Committee changed priorities by evaluating the entire list of

mitigation strategies in a comprehensive manner according to the factors listed above. For strategies that have changed in priority, the previous priority is provided in parenthesis in the "Priority" column.

Cost Estimates

Each of the following implementation strategies is provided with a cost estimate. Projects that already have secured funding are noted as such. Where precise financial estimates are not currently available, categories were used with the following assigned dollar ranges:

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

Cost estimates take into account the following resources:

- Staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from city and general knowledge of previous work in city)
- Staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Project Timeline

Each strategy is provided with an estimated length of time it will take for implementation. Where funding has been secured for the project, a specific future date is provided for when completion will occur. However, some 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.

Table 26: Mitigation Strategies to be Implemented

Mitigation Action	Description	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority
Replace culverts: Sears Rd at the Ashfield Town line, 74 Fuller Rd, and 13 Hyde Hill Rd.	Three culverts are in need of replacement. The Town needs to obtain funding in order to cover the cost of replacing them and meet stream crossing standards.	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes , dam failure	DPW	After funding has been secured, anticipate 9 months of work	BRIC (FEMA); MVP; DER; Capital Budget	medium	High
Set up a cooling center in Town Hall	Need to install AC so the space can be used for cooling during extreme heat	Extreme Heat	EMD- lead Select Board	2027-2028	Green Communities; MVP; Capital planning	Medium	High
Replace Highway Buildings (Garage/Office)	The current building is in poor condition and needs to be replaced so the Town can more effectively prevent and respond to hazards.	All hazards	Select Board	2024 - 2029	Capital Planning, Bonding, possibly grant funding	High	High
Increase CodeRed Enrollment	Currently at 65 – 70%, try to get to 80 – 90% enrollment	All hazards	EMD, Town Administrator	2024-2025	Emergency Management Budget	Low	High
Implement system to document hazard events	Set up a digital system to document incidences of flooding and other hazards that affect public infrastructure	Flooding, Hurricanes, Tornadoes, Severe Thunderstorms, Severe Snow and Ice Storms, Earthquakes, Dam Failure	Highway, IT	2025 and ongoing	Highway and Emergency Management budgets; MVP	Low	High
Add stormwater retention/detention requirements to subdivision rules and regulations	Stormwater retention/detention requirements will improve infiltration and reduce flooding risk in new subdivisions.	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	Planning Board, OSRP and/or Master Plan committee	2026	Local, DLTA if necessary	low	Medium

Mitigation Action	Description	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority
Add performance standards to subdivision regulations for run-off, drainage, and water pollution caused during earth removal/excavation	These regulations will reduce the incidence of stormwater runoff and water pollution resulting from earth removal and excavation.	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	Planning Board, OSRP and/or Master Plan committee	2026	Local, DLTA if necessary	low	Medium
Improve communication and outreach to residents about natural hazard preparedness	Post information on website and social media; send mailings once per year; hold information session at COA	All hazards	MVP Core Team, EMD	2024-2025, ongoing	MVP; Emergency Management and COA budget	Low	Medium
Hazard tree removal	Identify and remove hazard trees and seek funding for doing so	Severe Snow and ice Storms, Hurricanes, Tornadoes, Severe Thunderstorms	Tree Warden, Highway	2027, ongoing	MLP Enterprise Fund; Highway Budget	Low (on an annual basis)	Medium
Determine roads/areas of localized flooding, stormwater runoff	Implement survey or mapping tool that allows residents to enter information and location of incidents of flooding and stormwater runoff.	Flooding, severe storms	Select Board	2025	PVPC, MVP, HCDC	Low	Medium
Fund infrastructure improvements for hazard mitigation through Betterment Assessments	Research/Explore the possibility of Betterment Assessment for funding infrastructure improvements and hazard mitigation	All Hazards	Select Board, Finance Committee, Assessors	2025	Select Board and Assessors budgets	Low	Medium
Develop a drought communication plan and early warning system	Develop a drought communication plan and early warning system to facilitate timely communication of relevant information to officials,	Drought	Board of Health, Emergency Management	2026	Board of Health and EM Budgets	Low	Low

Mitigation Action	Description	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority
	emergency management and the general public.						
Work with other communities to develop a plan for separation, removal, collection, disposal and recycling of disaster-related debris.	In 2009 the Western Region Homeland Security Advisory Council (WHRSAC) had planned to fund a regional debris management plan, but funding was diverted. WRHSAC supported development of a regional debris management plan template for Franklin county; if WRHSAC makes funds available for Hampshire County, Goshen will participate.	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	EMD	2025, ongoing	WRHSAC	low	Low
Evaluation of older critical facilities for earthquake resistance	Evaluate critical facilities for earthquake resistance and consider seismic retrofitting for those that need it. Use FEMA evaluation tool and seismic rehabilitation guidelines	Earthquakes	Building Department, Emergency Management	2027	Building Department	Medium	Low

6: PLAN REVIEW, EVALUATION, IMPLEMENTATION, AND ADOPTION

Plan Adoption

Upon completion of the draft Hazard Mitigation Plan, a public meeting was held on December 10, 2024 to receive comments. The Hazard Mitigation Plan was then submitted to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency for their review. Upon receiving conditional approval of the plan by FEMA, the plan was presented to the Goshen Board of Selectmen and adopted.

Plan Implementation

The implementation of this plan began upon its formal adoption by the Board of Selectmen and approval by MEMA and FEMA. Those Town departments and boards responsible for ensuring the development of policies, ordinance revisions, and programs as described in Sections 5 and 6 of this plan will be notified of their responsibilities immediately following approval. The Hazard Mitigation Committee will oversee the implementation of the plan.

Incorporation with Other Planning Documents

During yearly update meetings for the Hazard Mitigation Plan, the Hazard Mitigation Committee will review whether any of the plans or documents listed below are in the process of being updated or revised, as well as whether any new plans are being developed. If so, the Hazard Mitigation Committee will provide the Hazard Mitigation Plan to relevant Town staff and brief them on the contents of the Plan, and work with them on incorporating the data and actions from the plan into their planning efforts. The Hazard Mitigation Committee will also review current Town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan.

- *Comprehensive Emergency Management Plan*
- *Zoning Bylaws and Subdivision Regulations*
- *Open Space and Recreation Plan*

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 Plan implementation process, the Hazard Mitigation Committee will review whether any of these plans are in the process of being updated. If so, the Hazard Mitigation Committee 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 Committee will also review current Town programs and policies to ensure that they are consistent with the mitigation strategies described in this plan.

Plan Monitoring and Evaluation

The measure of success of the Goshen Hazard Mitigation Plan will be the number of identified mitigation strategies implemented. In order for the Town to become more disaster resilient, there must be a coordinated effort between elected officials, appointed bodies, Town employees, regional and state agencies involved in disaster mitigation, and the general public.

The Goshen Hazard Mitigation Committee will meet on an annual basis or as needed (i.e., following a natural disaster) to monitor the progress of implementation, evaluate the success or failure of implemented recommendations, and brainstorm for strategies to remove obstacles to implementation. Following these discussions, it is anticipated that the committee 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 committee will review and update the plan every year, beginning in the fall of 2016. The meetings of the committee will be organized and facilitated by the Emergency Management Director. Public participation will be a critical component of the Hazard Mitigation Plan maintenance process. The Hazard Mitigation Committee will hold all meetings in accordance with Massachusetts open meeting laws. Hard copies of the plan will be available in Goshen Town Offices at 40 Main Street, open 10 am to 2 pm, Monday through Thursday. The Hazard Mitigation Committee will meet annually to discuss any needs and amendments. Any proposed amendments will be advertised and posted on the Town's website. Any changes will be preceded by a public hearing and solicitation of public comments.

The Town's Emergency Management Director will call meetings of all responsible parties to review plan progress as needed, based on 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 the meeting.

Meetings will involve evaluation and assessment of the plan, regarding its effectiveness at achieving the plan's goals and stated purpose. The following questions will serve as the criteria that is 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 effect of any recent hazard events?
- Has there been any damage to property since the plan was last reviewed?
- How could the existing mitigation strategies be improved upon 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 Town's vulnerability and impact from 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, 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 committee 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 committee 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 HMP Committee will hold all meetings in accordance with Massachusetts open meeting laws and the public will be invited to attend. The public will be notified of any changes to the Plan via the meeting notices board at Town Hall and on the Town website, and copies of the revised Plan will be made available to the public at Town Hall and on the Town website.

7: APPENDICES

Appendix A – Documentation of the Planning Process

Meeting #1 Agenda and Sign-In

Meeting #2 Agenda and Sign-In

Meeting #3 Agenda and Sign-In

Public Meeting #1 Publicity and Meeting Materials

MEDIA RELEASE

CONTACT: Mimi Kaplan, PVPC Senior Planner, (413) 285-1188 or mkaplan@pvpc.org

FOR IMMEDIATE RELEASE
July 24, 2023

Town of Goshen to hold Public Engagement Event for Hazard Mitigation Plan Update

Goshen residents, businesses, and surrounding community residents and representatives are invited to learn about and provide input on the Town of Goshen Hazard Mitigation Plan, on Thursday, August 3, 2023 at 6:30 pm at the Goshen Town Hall, 42 Main Street, Goshen, in the 2nd Floor Meeting Room.

The purpose of the Hazard Mitigation Plan is to identify and assess the risks to Goshen from natural hazards and climate change impacts, and to develop strategies and actions to mitigate these. A mitigation action is any action taken to reduce or eliminate the long-term risk to human life and property from hazards.

The meeting will include an overview of the hazard mitigation planning process, a discussion of natural hazards and climate change impacts in Goshen, and the current mitigation strategies and capabilities. Municipal officials and PVPC staff will be available to answer questions and respond to comments about the plan. The meeting provides an opportunity for you to share your opinions and participate in the mitigation planning process. All members of the public, representatives from surrounding communities and other interested parties are welcome to attend the event. Public participation and input are essential!

The plan is being updated by the Town with assistance from the Pioneer Valley Planning Commission and is funded by the Federal Emergency Management Agency (FEMA) and the Massachusetts Emergency Management Agency (MEMA).

Upon completion, the plan will be submitted to MEMA and FEMA for review and approval. A FEMA approved plan makes the community eligible for federal and state mitigation grant funding.

For more information, please contact PVPC's Mimi Kaplan at mkaplan@pvpc.org or (413) 285-1188.

Town of Goshen Hazard Mitigation Plan Public Meeting –
Wednesday, July 12
at 6:30 pm

2nd Floor Meeting Room
Goshen Town Hall,
42 Main Street, Goshen

Photo credit: Daily Hampshire Gazette

Learn about Natural Hazards and Climate Change Impacts affecting Goshen, Hazard Mitigation Plans and the Planning Process, ask questions and provide comments.

GOSHEN
HAZARD MITIGATION
PLAN (HMP) UPDATE

PUBLIC MEETING
AUGUST 17, 2023

1

WHAT IS HAZARD MITIGATION?

FEMA

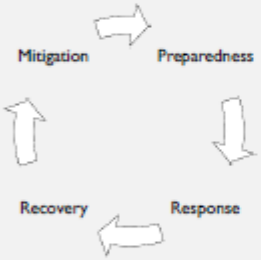
"Any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards."

Examples:

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

2

EMERGENCY MANAGEMENT CYCLE



3

MITIGATION VS. PREPAREDNESS

Hazard Mitigation	Emergency Preparedness
Local planning and regulations	Evacuation plans and emergency shelters
Natural systems protection	Radio communications equipment
Education and outreach	Emergency response drills
Structure and infrastructure improvements	

4

BENEFITS OF HAZARD MITIGATION

- Makes communities eligible to apply for Hazard Mitigation funds from FEMA
- Increases community resilient to natural hazards and impacts of climate change
- Mitigation is less expensive than disaster clean up
- Having a plan helps a community use limited resources more effectively

5

COMPONENTS OF A HAZARD MITIGATION PLAN

- Identification of hazards
- Analysis of Town's vulnerabilities - how hazards impact buildings, property, and residents, especially vulnerable populations
- Identification/mapping of critical infrastructure
- Assessment of existing mitigation capabilities and strategies
- Identification of new mitigation strategies

6

HMP UPDATE STEPS

- 4-5 Committee Meetings
- First Public Meeting
- Complete Draft Plan
- Second Public Meeting/Revise Plan based on Public Comments
- Submit Plan to MEMA and FEMA/revise as needed
- FEMA Approval
- Select Board adopts
- Town eligible to apply for funds from FEMA

7

THANK YOU TO THE HMP COMMITTEE

- Larry Holmberg, EMD
- Cameron Lacey – Fire Chief
- Kristine Bissell - Select Board Member
- Michael Rock – Service Director, Highland EMS
- Tiffany Marcinek - Chair, Board of Health
- Todd Dewkett – Highway Superintendent
- William Bissell – Police Department
- Julie Hooks - Planning Board Member
- Fred Beato – Police Chief
- Kerry Normandin – Director, COA
- Tom Catino – Conservation Commission Member

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NATURAL HAZARD RISK ASSESSMENT 2023 UPDATE

Hazard Identification and Analysis Worksheet for Goshen

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Hazard Risk Index Rating
Flooding	Medium	High	Limited, but increasing	2 - High risk
Severe Thunderstorms / Ice Storms	Large	Very High	Critical	1 - Highest Risk
Severe Thunderstorms and Winds / Tornadoes	Medium	Severe Thunderstorms and Winds: Moderate Tornadoes: Very low	Limited	Severe thunderstorms and Winds: 2 - High Risk Tornadoes: 4 - Low Risk
Hurricanes/Tropical Storm	Large	Very Low	Limited	4 - Low Risk
Wildfire / Brushfire	Small	High	Minor	3 - Medium Risk
Earthquakes	Large	Very low	Critical	4 - Low Risk
Dam Failure / Levee Breach	Medium	Very low	Limited	3 - Medium Risk
Drought	Small	Low	Minor	4 - Low Risk
Extreme Temperatures	Large	Moderate	Minor	4 - Low Risk

9

INVENTORY OF CRITICAL FACILITIES AND FACILITIES/POPULATIONS TO PROTECT

- **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.
- **The following are examples of critical facilities and services, and facilities/populations to protect:**
  - Police, Fire
  - DPW, Water and Sewer
  - Roads, Bridges/Culverts, Dams
  - Electric Grid, Emergency Power
  - Communications
  - Evacuation Routes
  - Vital records
  - Historic Buildings and Sites
  - Vulnerable Populations (youth, elderly, disabled)

10

EXAMPLES OF EXISTING MITIGATION CAPABILITIES

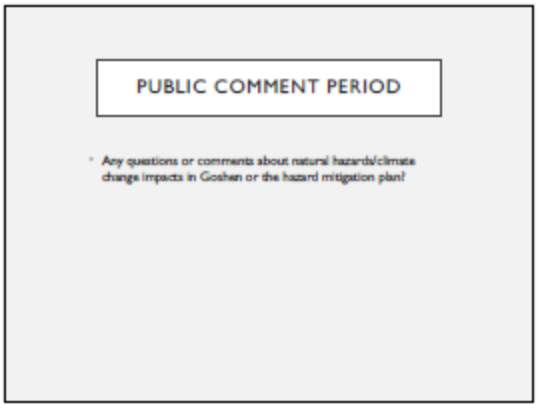
- Zoning Ordinance, Bylaws, Codes
  - Site Plan Review
  - State Building code
- Existing plans: CEMP, OSRP, MVP
- NFIP enrollment (currently no policies in force)
- Burn Permit Requirement
- Cooling/Heating Center
- Tree Management
- Fire Safety Education – SAFE program
- Emergency Communication - CodeRed

11

EXAMPLES OF MITIGATION STRATEGIES FROM PREVIOUS PLAN

- ☐ Adopt draft floodplain protection district
- ☐ Replace Fuller Road Culvert and permanently repair problem culverts on Sears Road
- ☐ Add stormwater retention/detention requirements to subdivision rules and regulations
- ☐ Add performance standards for run-off, drainage and water pollution caused during earth removal/excavation
- ☐ Participate in a regional debris management plan

12


PUBLIC COMMENT PERIOD
Any questions or comments about natural hazards/climate change impacts in Goshen or the hazard mitigation plan?

13


THANK YOU!
MY CONTACT INFO IS BELOW IF YOU HAVE ANY ADDITIONAL COMMENTS OR QUESTIONS
Mimi Kaplan
Pioneer Valley Planning Commission
mkaplan@pvpc.org
413-285-1188

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Public Meeting #2 Publicity and Meeting Materials

MEDIA RELEASE

FOR IMMEDIATE RELEASE
November 25, 2024

Contact: Kate Norton, publicaffairs@pvpc.org, 617-838-6083

Town of Goshen to hold Joint Public Engagement Event for the Hazard Mitigation Plan and Unpaved Roads Project

GOSHEN – Residents, businesses, and surrounding community members are invited to provide input on the Town of Goshen Hazard Mitigation Plan and Unpaved Roads Project at a public listening session on December 10, 2024, from 5-7 p.m. at the Goshen Town Hall, located at 42 Main Street, Goshen. Dinner will be provided. Attendees will learn about what the Town is doing to prepare for natural hazards and the impacts of climate change, including improving the resiliency of dirt roads. They will have an opportunity to provide feedback on their experiences with hazards in Goshen, and in particular where there are unpaved road issues. Municipal officials and PVPC staff will be available to answer questions and respond to input about these projects.

The purpose of the Hazard Mitigation Plan (HMP) is to assess Goshen's risks from natural hazards and climate change impacts, and to provide an action plan to reduce the Town's vulnerabilities. The Hazard Mitigation Plan is being completed by the Town with assistance from the Pioneer Valley Planning Commission (PVPC) and is funded by the Federal Emergency Management Agency (FEMA). Upon completion, the plan will be submitted to the Massachusetts Emergency Management Agency (MEMA) and FEMA for review and approval. A FEMA-approved HMP makes the community eligible for federal and state mitigation grant funding.

The Western Massachusetts Unpaved Roads Project is a collaborative effort between the Berkshire Regional Planning Commission (BRPC), the Pioneer Valley Planning Commission (PVPC), and the Franklin Regional Council of Governments (FRCOG) as well as the Towns of Lanesborough, Goshen, Blandford, and Shutesbury. With climate change, municipalities are experiencing more unpaved road failures due to the increased intensity of precipitation events. This project will further develop FRCOG's new Dirt Road Toolkit which allows municipal staff to assess their vulnerable unpaved roads, determine which best practices are recommended to increase their climate resiliency and how to install these best practices using existing resources. The Toolkit will be field tested in the partnering municipalities. This project is funded by the Executive Office of Energy & Environmental Affairs, Municipal Vulnerability Preparedness (MVP) program.

For more information about this event, please contact PVPC's Mimi Kaplan at mkaplan@pvpc.org or (413) 781-6045.

GOSHEN HAZARD MITIGATION PLAN (HMP) PUBLIC MEETING

DECEMBER 10, 2024

1

THANK YOU TO THE COMMITTEE

- Larry Holmberg, Emergency Management Director
- Cameron Lacey - Fire Chief
- Kristine Bissell - Select Board Member
- Michael Rock - Service Director, Highland EMS
- Tiffany Marcinek – Chair, Board of Health
- Todd Dewkett, Highway Superintendent
- William Bissell – Police Department
- Julie Hooks – Planning Board Member
- Fred Bezio – Police Chief
- Kerry Normandin – Director, COA
- Tom Cairns – Conservation Commission

2

WHAT IS HAZARD MITIGATION?

FEMA

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

Examples:

- Limiting development in high-risk areas
- Retrofitting structures to protect them from floods, high winds, etc.
- Drainage and flood control projects
- Fire safety education

3

MITIGATION VS. PREPAREDNESS

Hazard Mitigation	Emergency Preparedness
Planning and zoning	Evacuation plans and emergency shelters
Open space preservation	Radio communications equipment
Education and outreach	Emergency response drills
Infrastructure improvements	

4

BENEFITS OF UPDATING THE HAZARD MITIGATION PLAN

- Makes communities eligible to apply for Hazard Mitigation funds from FEMA
- Identifies cost-effective actions to reduce risk
- Helps communities prevent future losses and save money on disasters
- Makes communities more resilient to natural hazards and impacts of climate change
- Increases awareness of hazards and risks
- Can save lives!

5

COMPONENTS OF A HAZARD MITIGATION PLAN

1. Hazard identification and description
2. Identification/mapping of critical infrastructure
3. Risk Assessment – how hazards impact buildings, property, and residents, especially vulnerable populations
4. Assessment of Town's mitigation capabilities
5. Review of previous mitigation strategies and identification of new mitigation strategies

6

NATURAL HAZARD RISK ANALYSIS

Hazard Identification and Analysis Worksheet for Goshen

Type of Hazard	Location of Occurrence	Probability of Future Events	Impact	Hazard Risk Index Rating
Flooding	Medium	High	Limited, but increasing	2 - High risk
Severe Snowstorms / Ice Storms	Large	Very High	Critical	1 – Highest Risk
Severe Thunderstorms and Winds / Tornadoes	Medium	Severe Thunderstorms and Winds: Moderate Tornadoes: Very low	Limited	Severe thunderstorms and Winds: 2 – High Risk Tornadoes: 6 – Low Risk
Hurricanes/Tropical Storm	Large	Very low	Limited	4 - Low Risk
Wildfire / Brushfire	Small	High	Minor	3 – Medium Risk
Earthquakes	Large	Very low	Critical	4 - Low Risk
Dam Failure / Levee Breach	Medium	Very low	Limited	3 – Medium Risk
Drought	Small	Low	Minor	4 - Low Risk
Extreme Temperature	Large	Moderate	Minor	4 - Low Risk

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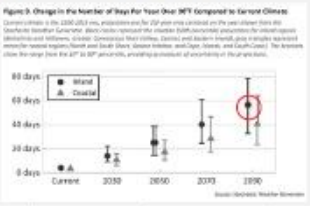
IMPACTS OF CLIMATE CHANGE



2030	2050	2070	2090
NEAR TERM	MID-CENTURY	MID-LATE CENTURY	END OF CENTURY
The summer mean temperature could increase by 3.6°F from the historical period (1950-2013), increasing urban heat stress and reducing local crop yields.	The 1 percent annual chance river flood could be three times more likely to occur, increasing Connecticut River and other area flood risk.	There could be 65 fewer days below freezing, increasing the chance of ticks overwintering and reducing winter recreation opportunities.	The historical 10 percent annual chance daily rainfall event (2.6 to 4 inches) could occur four times more frequently.

MA Climate Change Assessment, 2022

8

MOST URGENT IMPACTS OF CLIMATE CHANGE FOR THE CONNECTICUT RIVER VALLEY

9

MITIGATION CAPABILITIES

- Updated Open Space and Recreation Plan
- Participation in the National Flood Insurance Program
- Priority culvert replacement list
- Replace culverts as funding becomes available
- Burn permit regulations
- Town receives inspection reports and EAPs for high and significant hazard dams
- Generators at critical facilities
- Tree management – coordination between Town and National Grid
- CodeRed for communication about hazards and emergencies

10

VULNERABILITIES TO ADDRESS

- Additional funding needed for culvert replacements
- Need for Town cooling center. Extreme heat affects vulnerable populations, especially older adults who are lower-income, disabled, and/or living alone.
- Better data recording needed to document hazard events
- Emergency communications don't reach all residents – more enrollment in CodeRed needed
- Need to provide more information and outreach to residents on preparing for natural hazards

11

UPDATED PLAN MITIGATION STRATEGIES

Mitigation Action	Description	Hazards Mitigated	Responsible Department(s)/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority
Replace culverts: Sears Rd at the Ashfield Town line, 74 Fuller Rd, and 15 Rule Rd #2.	Three culverts are in need of replacement. The Town needs to obtain funding in order to cover the cost of replacing them and meet stream crossing standards.	Flooding and all hazards that can result in flooding severe thunderstorms, hurricanes, tornadoes, dam failure	DPW	ARPA funding has been secured, anticipate 6 months of work	BRIC (FEMA), MVP, CEC Capital Budget	medium	High
Set up A/C cooling center in Town Hall	Need to install AC so the space can be used for cooling during extreme heat	Extreme Heat	EMD, Select Board, Select Board	2027-2028	Green Communities MAP, Capital planning	Medium	High
Replace Highway Buildings (Garage/Office)	The current building is in poor condition and needs to be replaced so the Town can more effectively prevent and respond to hazards.	All hazards	Select Board	2024 - 2030	Capital Planning, Bonding, possibly grant funding	High	High
Increase CodeRed Enrollment	Currently at 60 – 70%, try to get to 80 – 90% enrollment	All hazards	EMD, Town Administrator	2024-2025	Emergency Management Budget	Low	High
Implement system to document hazard events	Set up a digital system to document incidences of flooding and other hazards that affect public infrastructure	Flooding, Hurricanes, Tornadoes, Severe Thunderstorms, Severe Snow and Ice Storms, Earthquakes, Dam Failure	Highway, IT	2025 and ongoing	Highway and Emergency Management budgets, MVP	Low	High
Add stormwater retention/detention requirements to subdivision rules and regulations	Stormwater retention/detention requirements will improve infiltration and reduce flooding risk in new subdivisions.	Flooding and all hazards that can result in flooding severe thunderstorms, hurricanes, tornadoes	Planning Board, DPW and/or Master Plan committee	2026	Local, EOTA if necessary	low	Medium

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UPDATED PLAN MITIGATION STRATEGIES

Mitigation Action	Description	Hazards Mitigated	Responsible Department/ Board	Timeframe	Potential Funding Source(s)	Estimated Cost	Priority
Add performance standards to subdivision regulations for run-off, drainage, and water pollution caused during earth removal/excavation	These regulations will reduce the incidence of stormwater runoff and water pollution resulting from earth removal and excavation.	Flooding and all hazards that can result in flooding-severe thunderstorms, hurricanes, tornadoes	Planning Board, CEMP and/or Master Plan committee	2025	Local, BCRAP necessary	low	Medium
Improve communication and outreach to residents about natural hazard preparedness	Post information on website and social media; send mailings once per year; hold information session at COA	All hazards	MVP Core Team, EMD	2024-2026, ongoing	MVP, Emergency Management and COA budget	Low	Medium
Hazard tree removal	Identify and remove hazard trees and seek funding for doing so	Severe Snow and Ice Storms, Hurricanes, Tornadoes, Severe Thunderstorms	Tree Warden, Highway	2027, ongoing	MVP/Enterprise Fund, Highway Budget	Low (on an annual basis)	Medium
Determine roads/areas of localized flooding, stormwater runoff	Implement survey or mapping tool that allows residents to enter information and location of incidents of flooding and stormwater runoff.	Flooding, severe storms	Select Board	2025	PVPC, MVP, FCEC	Low	Medium
Fund infrastructure improvements for hazard mitigation through Betterment Assessments	Research/explore the possibility of Betterment Assessment for funding infrastructure improvements and hazard mitigation	All Hazards	Select Board, Finance committee, Assessors	2025	Select Board and Assessors budgets	Low	Medium
Develop a drought communication plan and early warning system	Develop a drought communication plan and early warning system to facilitate timely communication of relevant information to officials.	Drought	Board of Health, Emergency Management	2025	Board of Health and EMD Budgets	Low	Low

13

PUBLIC COMMENT PERIOD

- What are your thoughts about natural hazard and climate change vulnerabilities in Goshen?
- Suggestions for additional mitigation actions?
- Other questions or comments?

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THANK YOU!

CONTACT INFORMATION:
MIMI KAPLAN
PIONEER VALLEY PLANNING COMMISSION
MKAPLAN@PVPC.ORG
413-285-1188

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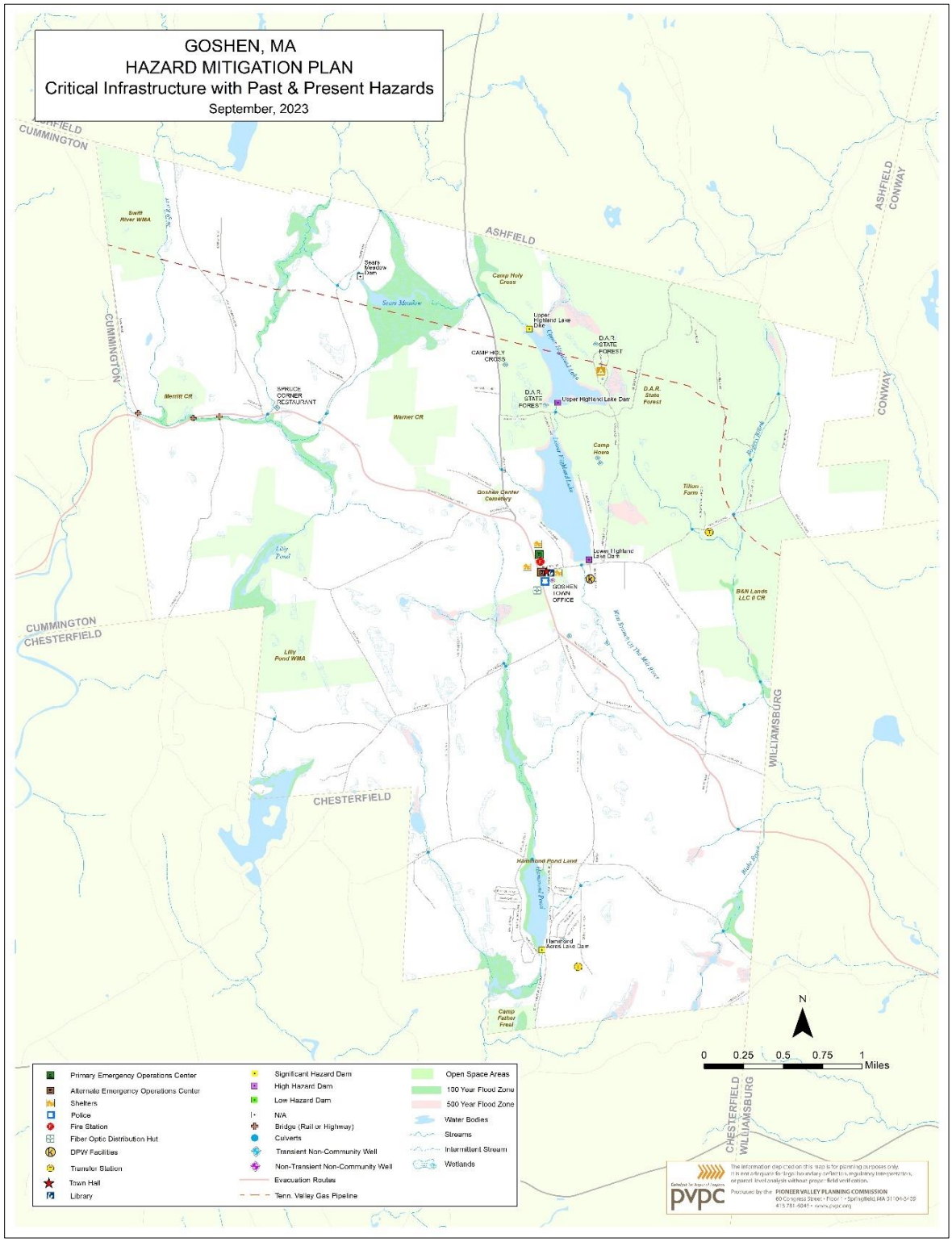
Appendix B: Hazard Mitigation Map



Appendix C: Mitigation Capabilities Worksheet

Appendix E - Capability Assessment Worksheet

Worksheet 4.1 Capability Assessment Worksheet

Jurisdiction: ____Goshen_____

Local mitigation capabilities are existing authorities, policies, programs, and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible. Complete one worksheet for each jurisdiction.

Planning and Regulatory

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Please indicate which of the following your jurisdiction has in place.

Plans	**Yes/No** **Year**	**Does the plan address hazards?** **Does the plan identify projects to include in the mitigation strategy?** **Can the plan be used to implement mitigation actions?**
Comprehensive/Master Plan	N	
Capital Improvements Plan	N	Under development
Economic Development Plan	N	
Local Emergency Operations Plan	Y	
Continuity of Operations Plan	Y	
Transportation Plan	N	
Stormwater Management Plan	N	
Community Wildfire Protection Plan	N	
Other special plans (e.g. brownfields, redevelopment, disaster recovery, coastal zone management, climate change adaptation)		MVP, OSRP

Building Code, Permitting, and Inspections	**Y/N**	**Are codes adequately enforced?**

Building Code	Y	
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	
Fire Department ISO Rating	9/10	
Site plan review requirements	Y	As warranted

Land Use Planning & Ordinances	**Y/N**	**Is the ordinance an effective measure for reducing hazard impacts?** **Is the ordinance adequately administered and enforced?**
Zoning Ordinance	Y	
Subdivision ordinance	Y	Regulations
Floodplain ordinance	N	Under development – expected to go before Town by end of September 2023
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	N	
Flood insurance rate maps	Y	
Acquisition of land use for open space and public recreation uses	?	
Other		

How can these capabilities be expanded and improved to reduce risk?

Administrative & Technical

Identify whether your community has the following administrative and technical capabilities. These include staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level of government that provide technical assistance, indicate so in your comments.

Administration	**Y/N**	**Describe capability** **Is coordination effective?**

Planning Board	Y	
Mitigation Planning Committee	Y	
Maintenance programs to reduce risk (e.g. tree trimming, clearing drainage systems)	Y	Work with National Grid on tree trimming, MLP (for internet) also involved with tree trimming. Annual culvert clearing
Mutual aid agreements	Y	

Staff	**Y/N** **FT/PT**	**Is staffing adequate to enforce regulations?** **Is staff trained on hazards and mitigation?** **Is coordination between agencies and staff effective?**
Chief Building Official	Y	Building inspector
Floodplain Administrator	Y	
Emergency Manager	Y	
Community Planner	N	
Civil Engineer	N	
GIS Coordinator	N	
Other		

Technical	**Y/N**	**Describe capability** **Has capability been used to assess/mitigate risk in the past?**
Warning systems/services (Reverse 911, outdoor warning signals)	Y	CODERED/Reverse 911, Could get more residents signed up
Hazard data and information	N	
Grant writing	Y	
Hazus analysis	N	
Other		

How can these capabilities be expanded and improved to reduce risk?

Financial

Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.

Funding Resource	Access Eligibility Y/N	Has the funding resource been used in the past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital Improvements Project funding	Y	Yes could be
Authority to levy taxes for specific purposes	Y	
Fees for water, sewer, gas or electric services	N	
Impact fees for new development	N	
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Yes
Community development block grants	Y	Yes
Other federal funding programs	Y	ARPA
State funding programs	Y	Yes
Other		

How can these capabilities be expanded and improved to reduce risk?
Grant writer and grant miner (find grants) needed. Limited staff and volunteer capacity.

Education & Outreach

Identify education and outreach programs and methods already in place that could be used to implement mitigation activities and communicate hazard-related information.

Program/Organization	Y/N	Describe program/organization and how it relates to disaster resilience and mitigation
Local citizens groups or non-profit organizations focused on environmental protection, emergency	N	Age friendly certification, COA

preparedness, access and functional needs populations, etc.		
Ongoing public education or information program (e.g. responsible water use, fire safety, household preparedness, environmental education)	Y	SAFE program – education at school and Senior SAFE at senior center
Natural disaster or safety related school programs		Lockdown drills
StormReady certification	N	
Firewise Communities certification	N	
Public-private partnership initiatives addressing disaster-related issues		
Other		

How can these capabilities be expanded and improved to reduce risk?
Increased Staffing capacity