

Town of Sunapee  
New Hampshire

# HAZARD MITIGATION PLAN Update 2022



Prepared by:  
Town of Sunapee Hazard Mitigation Committee and  
Upper Valley Lake Sunapee Regional Planning Commission

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# I. INTRODUCTION

## A. BACKGROUND

The New Hampshire Division of Homeland Security and Emergency Management (NH HSEM) has a goal for all communities within the State of New Hampshire to establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. The NH HSEM has provided funding to the Town of Sunapee, to update their local Hazard Mitigation Plan. UVLSRPC wrote the first Sunapee Hazard Mitigation Plan that was approved in 2004, and then 2010 and 2016 updates. The *Sunapee Hazard Mitigation Plan Update 2022* serves as a strategic planning tool for use by the Town of Sunapee in its efforts to reduce future losses from natural and/or man-made hazard events before they occur. This *Plan* does *not* constitute a section of the Master Plan.

The Sunapee Hazard Mitigation Committee updated the *Sunapee Hazard Mitigation Plan* with the assistance and professional services of the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). After a public meeting held in the Sunapee Town Offices, the Sunapee Town Select Board adopted the updated plan on July 11, 2022 as shown in Appendix E.

## B. PURPOSE

The Sunapee Hazard Mitigation Plan Update 2022 is a planning tool for use by the Town of Sunapee in its efforts to reduce future losses from natural and/or man-made hazards. This plan does not constitute a section of the Town Master Plan, nor is it adopted as part of the Zoning Ordinance.

## C. HISTORY

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA 2000). The ultimate purpose of DMA 2000 is to:

- Establish a national disaster mitigation program that will reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from disasters, and
- Provide a source of pre-disaster mitigation funding that will assist States and local governments in accomplishing that purpose.

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section: 322 – Mitigation Planning. This places new emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving any hazard mitigation grants. Local governments must review and if necessary, update the mitigation plan annually to continue program eligibility.

#### *Why develop a Mitigation Plan?*

Planning ahead to lessen or prevent a disaster will reduce the human, economic, and environmental costs. The State of NH is vulnerable to many types of hazards, including floods, hurricanes, winter storms, wildfires, wind events, and earthquakes. All of these types of events can have significant economic, environmental, and social impacts. The full cost of the damage resulting from the impact of natural hazards – personal suffering, loss of lives, disruption of the economy, and loss of tax base – is difficult to quantify and measure.

## **D. SCOPE OF THE PLAN**

The scope of the *Sunapee Hazard Mitigation Plan Update 2022* includes the identification of natural hazards affecting the Town, as identified by the Sunapee Hazard Mitigation Committee. The hazards were reviewed for relevance to the Town including the following categories as outlined in the *State of New Hampshire Multi-Hazard Mitigation Plan Update 2018*:

- Avalanche
- Flooding
- Drought
- Earthquake
- Extreme Temperatures
- High Wind Events
- Infectious Diseases
- Landslide
- Lightning
- Severe Winter Weather
- Solar Storms and Space Weather
- Wildfire

## **E. METHODOLOGY**

The individuals who attended the meetings, the Sunapee Hazard Mitigation Committee and the UVLSRPC staff developed the content of the *Sunapee Hazard Mitigation Plan Update 2022* by tailoring the nine-task process set forth in the *Local Mitigation Planning Handbook by FEMA (2013)* appropriate for the Town of Sunapee. Many FEMA resources and multiple State and Federal websites were also used as well. The Committee held a total of three posted meetings in 2021 and 2022.

Meetings were posted at the post office and town office inviting the general public. Though notices invited the general public to participate, no public attended the meetings. All of these meetings occurred during the COVID-19 pandemic. The Town facilities were open to the public during the time of the meetings providing an opportunity to participate which they did not. In addition, the UVLSRPC

staff email address was on the public notice for questions. Municipal officials from surrounding towns were also invited by UVLSRPC via email to participate or obtain a copy of the draft or final plan. Appendix C provides a list of those in attendance at meetings.

Prior to the Town of Sunapee approving the updated Plan, a public meeting was held at a regular Select Board meeting to gain additional input from the citizens of Sunapee and to raise awareness of the ongoing hazard mitigation planning process.

The following hazard mitigation meetings were vital to the development of this Plan:

December 22, 2021  
February 9, 2022  
April 6, 2022

To complete this updated Plan, the Hazard Mitigation Committee followed the planning tasks below to re-evaluate the plan sections of the existing 2016 plan and to update it to reflect current information and issues:

**Task 1: Determine the Planning Area and Resource (October 2021)**

Sunapee is a rural town and chose to continue their planning process as a single town. The Town chose to work with the Upper Valley Lake Sunapee Regional Planning Commission to provide technical support.

**Task 2: Build the Planning Team (December 2021)**

Members of the Committee included all relevant personnel as well as any interested citizens. This included assistance from a Planning Board member to represent municipal organizations with general and land use planning authority.

**Task 3: Create an Outreach Strategy (December 2021)**

The Committee chose to provide public notices to the public to encourage participation at the public meetings. Notices were also sent to each of the neighboring towns to invite them to participate in the meetings, send comments, or request a final plan. The final plan will also be available for public review prior to adoption.

**Task 4: Review Community Capabilities (December 2021 – February 2022)**

Committee members identified facilities that were considered to be of value to the Town for emergency management purposes, for provision of utilities and services, and for historic, cultural and social value. A GIS-generated map was prepared to show critical facilities identified by the Sunapee Hazard Mitigation Committee. A summary listing of “Critical Facilities” is presented in Chapter IV. Costs were determined for losses for each type of hazard. Using information and activities in the handbook, the Committee and

UVLSRPC staff identified existing mitigation strategies which are already implemented in the Town related to relevant hazards. A summary chart and the results of this activity are presented in Chapter VI.

**Task 5: Conduct a Risk Assessment (December 2021 - February 2022):**

The Committee determined natural and human-made hazards affecting the Town and updated a description, location, and extent of those previous and potential hazards. Existing and future assets were updated to determine vulnerability to potential hazard events. Critical facilities needed during an emergency were identified and given values based on tax data. It was also determined if these facilities are in a hazard zone or not. Other facilities identified are those needed to continue the daily operation of the municipality and those that have dense populations or valued historical structures and vulnerable natural areas.

**Task 6: Develop a Mitigation Strategy (December 2021 - April 2022):**

The Committee evaluated the goals in the previous plan and determined they were still appropriate. They then determined actions that they could take to meet those goals to reduce their risk to hazard events. They discussed existing regulations, ordinances, and the Master Plan and how they could continue to incorporate hazard mitigation strategies into these documents to include hazard mitigation in land use planning. Committee members agreed to pursue this integration with appropriate municipal boards.

**Task 7: Keep the Plan Current:**

The plan will be reviewed after every major event to evaluate the effectiveness of the plan. It will also be updated at least every five years as required.

**Task 8: Review and Adopt the Plan:**

The Committee will incorporate any feedback from Committee members, municipal officials, residents, businesses and institutions, and neighboring communities. The plan will be assessed by using FEMA's Local Mitigation Plan Review Tool prior to sending to NH Homeland Security and Emergency Management for preliminary review. If HSEM considers the plan to meet the requirements, they will forward the draft plan to FEMA for their review. Once FEMA determines the plan meets requirements, the municipality will hold a public meeting to obtain further comments and review the final draft. If there are no major suggested changes, the municipal government will adopt the plan and the adoption form will be sent to HSEM and then to FEMA to receive a final approval of the plan.

**Task 9: Create a Safe and Resilient Community:**

The municipality will implement the plan by committing to task accomplishment as indicated in the plan. The municipality will take advantage of available funding opportunities such as FEMA's mitigation grant programs. The process for monitoring and updating the Plan can be found in Chapter IX.

UVLSRPC staff compiled the results of tasks one through nine in a draft document, as well as helpful and informative materials from the *State of New Hampshire Multi-Natural Hazard Mitigation Plan Update 2018*, which served as a resource for the *Sunapee Hazard Mitigation Plan Update 2022*.

## **F. HAZARD MITIGATION GOALS**

The Sunapee Hazard Mitigation Committee reviewed the hazard mitigation goals set forth in the previous Hazard Mitigation Plan and revised them as follows:

1. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the Town's goals and to raise awareness and acceptance of hazard mitigation opportunities generally.
2. To improve upon the protection of the general population, the citizens, and visitors of the Town of Sunapee from natural and human-made hazards.
3. To reduce the potential impact of natural and human-made disasters to:
  - the Town of Sunapee's Critical Support Services,
  - Critical Facilities in the Town of Sunapee,
  - the Town of Sunapee's infrastructure,
  - private property,
  - the Town's economy,
  - the Town's natural environment, and
  - the Town's specific historic treasures and interests.
4. To improve the Town's Disaster Response and Recovery capability as a hazard mitigation strategy to be prepared for emergencies and reduce their impact.

## **G. ACKNOWLEDGEMENTS**

The following people participated in developing the update of this plan as the Hazard Mitigation Committee:

- David Bailey, Town of Sunapee Water and Sewer Department
- David Cahill, Town of Sunapee Police Chief
- John Galloway, Town of Sunapee Fire Chief
- Scott Hazelton, Town of Sunapee Highway Director
- Shannon Martinez, Town of Sunapee Town Manager
- Howard Sargent, Town of Sunapee Emergency Management Director
  
- Victoria Davis, Planner, Upper Valley Lake Sunapee Regional Planning Commission

The Hazard Mitigation Committee was composed of local officials and a staff representative of the UVLSPRC for meeting facilitation and plan development.

Historical information, relevant data and potential future mitigation strategies were contributed by all parties involved in the planning process. For a record of all meeting topics see Appendix C: Meeting Documentation. The staff representative of the UVLSRPC gathered all information from local officials, agency representatives and public input and compiled the information to develop the Plan.

## II. COMMUNITY PROFILE

### A. INTRODUCTION<sup>1</sup>

The Town of Sunapee is located in Sullivan County as shown in the following map illustration. Interstate 89 cuts across the northeast corner of Sunapee, and the nearest exit is the Sunapee/Springfield town line on Springfield Road (Exit 12A). The State roads through the Town are Routes 11, 103, and 103B. The Town is about 16,500 acres including almost 2,500 acres of water due to the many lakes and ponds.

Lake Sunapee is the largest lake in the town with a total of 4,090 acres with over half in the Town of Sunapee and the remainder of the lake in Newbury and New London. Otter Pond is 185 acres just above Lake Sunapee. Most of this pond is within Sunapee with a portion in New London. Mountain View Lake is just over 100 acres, Perkins Pond is 157 acres, Ledge Pond is 110 acres, and Wendell Pond is 11 acres. There are several other small ponds and wetlands in Sunapee including the Wendell Marsh Wildlife Management Area. Streams include Tucker Creek, Trask Brook, Ledge Pond Brook, and the Sugar River. The Town of Sunapee is entirely within the Sugar River Watershed.

Sunapee Harbor and the Sugar River have played a major role in the town's history and development. Although Sunapee's earliest occupation was agriculture, manufacturing sprang up along the Sugar River falls to harness the water's power. There is also a long history of tourism in the Lake Sunapee area which began in the mid-1800's with the introduction of steamboats and trains. During this time there were many "Grand Hotels" and a few private residences around the lake, catering to the city people who arrived to spend the summer on Lake Sunapee.

Tourism is still a major industry in Sunapee due to the lakes and nearby skiing on Mount Sunapee in the Town of Newbury. Sunapee Harbor features a collection of shops and restaurants. Live music is regularly scheduled on weekends and two cruise boats offer a scenic trip around the lake. For lodging, there are several waterfront cottages, as well as inns and bed and breakfasts.

There is a large base of seasonal residents who occupy cottages and homes along Sunapee's five major lakes. Approximately 6745 acres of the town is in current use as forest land, wetlands, and agricultural use. High points include Blueberry Mountain, Youngs Hill, Tucker Hill, Cemetery Hill, Baisdell Hill, Burkehaven Hill, Keyser Hill, Garnett Hill, Brown Hill, Mica Mine Hill, and Trow Hill.

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<sup>1</sup> Town of Sunapee Master Plan (2010)

Town facilities include the Town Hall at 23 Edgemont Road which houses the Town's administrative offices as well as the Water and Sewer Department. The Highway Department is located at JA Bergeron Drive; the Transfer Station is at 89 Avery Road; the Hydroelectric Department is at 23 Edgemont Road. The Police Department and the Fire Department & Emergency Medical Services are located in the Sunapee Safety Services Building at 91 Sargent Road just off Route 11. The Abbott Library is located at 11 Soonipi Circle. The Sunapee Public School System is comprised of the Elementary School at 22 School Street and the Middle High School on 10 North Road.

There are many miles of mains throughout the Town of Sunapee which transmit sewage to a treatment plant located off Route 11 just south of Wendell Marsh. Pump stations throughout the town accommodate the transport of sewage to the treatment facility. The municipal sewage treatment plant is owned by the Town of Sunapee but shares capacity of the plant with the Town of New London. There are two municipal water systems serving Sunapee Village and Georges Mills. The treatment facilities are located on Harbor Hill and Georges Mills. The hydroelectric station is located on the Sugar River in Sunapee Village. The power generated from this station is sold to the Public Service Company of New Hampshire. About one-half of the homes in Sunapee are hooked up to municipal water and sewer with the remainder using on-site systems.

There are two electric companies serving the Town: Eversource and New Hampshire Electric Co-op. They each have sub-stations located in Sunapee on North Road.

## **B. DEVELOPMENT TRENDS**

Examination of the U.S. Census Data indicates that population grew by 19 % from 1990-2000, and 2000-2010, the population increased by 9.2%. However, it is anticipated that the population change will decrease as shown in the population projections table.

The predominant development in Sunapee is residential. Most of this development is in year-round single-family homes. The greatest density of development occurs in Sunapee Village, Wendell, Georges Mills, Grandliden, and along the lake and pond shores. The remaining development occurs along other road frontage. Commercial development also occurs primarily in the village centers and along the State highways 11 and 103. Several developments are being proposed: the Bell development above Ledge Pond near the Springfield town line (11-12 lots); near Trow Hill (12-14 lots); and Prospect Hills (49 acres) and Muzzy Hill (60 Acres). On Trow Hill there is a subdivision potential for 36 lots. On Brook Road and Route 103 into Newbury there is the potential for multi-family housing growth, as well. These properties are not located in any specific hazard area, although the Ledge Pond area seems to be more susceptible to lightning. The town has extended sewer services to Perkins Pond which increases the potential for development along the extension.

Several factors have played, and will continue to play, an important role in the development of Sunapee. These include the existing development pattern and availability of land for future development; the present road network; physical factors such as steep slopes, soil conditions, wetlands, and aquifers; and, land set aside for conservation. These factors have an impact, both individually and cumulatively, on where and how development occurs.

Large tracts of undeveloped land still exist in the northwest, west central, and southern portions of town. The largest type of existing land use is forest and wetlands, which comprises about three-quarters of the Town's land area. Steep slopes and other development constraints such as lack of road access constrain development in these areas. However, due to growth pressures in the region, the recreational lakes in Sunapee, and Sunapee's proximity to I-89, the Town is a desirable location for future development. Review and amendment of land use regulations will help the Town determine the density and location of future development taking into account many factors including known hazard event areas such as flood zones. It is the intent of the Hazard Mitigation Committee to work with the Planning Board to make sure development is discouraged from hazard areas.

In 2011 the town ordinance began requiring erosion control plans for construction on steep slopes (>15%) and/or where there is in excess of 100,000 sf cleared, this was in addition to the steep slopes ordinance that existed prior to the 2009 plan.

The town did note that there is a 44-parcel subdivision on Trow Hill in the conceptual stages that could increase the vulnerability of erosion due to the steeper terrain in the area. As it currently stands currently, the committee did not feel that the approved subdivisions and buildings have increased the vulnerability of the town. If the conceptual subdivision moves forward and is approved, the vulnerability to erosion would be increased, but the subdivision has not yet been formally applied for or approved.

**Table II-1: DEVELOPMENT ACTIVITY**

Year	Building Permits for New Homes		Subdivisions	Total New Lots	In Flood Zone?
2020	13		1	2	No
2019	9		4	10	No
2018	8		3	3	No
2017	11		3	7	No
2016	10		1	1	No
2015	12		0	0	No
2014	13		3	8	No

**Table II-2: AREA POPULATION TRENDS**

Area	1980	1990	2000	2010	2020
<b>Sunapee</b>	<b>2,312</b>	<b>2,559</b>	<b>3,055</b>	<b>3,365</b>	<b>3,342</b>
Croydon	457	627	661	764	801
Goshen	549	742	741	810	796
New London	2935	3180	4116	4,397	4,400
Newbury	961	1347	1702	2,072	2,172
Newport	6229	6110	6269	6,507	6,299
Springfield	532	788	945	1,311	1,259
<i>Sullivan County</i>	<i>36,063</i>	<i>38,592</i>	<i>40,458</i>	<i>43,742</i>	<i>43,063</i>
<i>New Hampshire</i>	<i>920,610</i>	<i>1,109,252</i>	<i>1,235,786</i>	<i>1,316,472</i>	<i>1,316,4707</i>

*Source: US Census***Table II-3: POPULATION GROWTH IN SUNAPEE**

	1980	1990	2000	2010	2020
Population	<b>2,312</b>	<b>2,559</b>	<b>3,055</b>	<b>3,365</b>	<b>3,342</b>
Decade Change in Population		10%	19.4%	9.2%	-0.68%

*Source: 1980 – 2019 US Censuses***Table II-4: POPULATION PROJECTIONS FOR SUNAPEE**

Area	2015	2020	2025	2030	2035	2040
Sunapee	<b>3,456</b>	<b>3,342</b>	<b>3,655</b>	<b>3,748</b>	<b>3,817</b>	<b>3,858</b>
Change in Population 5 yr.	2.7%	3.1%	9.4%	2.5%	1.8%	1.1%
Change in Population 10 yr.		5.9%		5.2%		2.9%

*Office of Energy and Planning - County Population Projections, 2013; US Census*

### III. HAZARD IDENTIFICATION

The Sunapee Hazard Mitigation Committee reviewed the list of hazards provided in the *State of New Hampshire Multi-Hazard Mitigation Plan Update 2018* and hazard history for the State of New Hampshire and Sullivan County in particular. A list of past hazard events in Sunapee, Sullivan County, and the State of New Hampshire can be found in the following discussion and tables. After reviewing this information and the Emergency Operations Plan, the Committee conducted a Risk Assessment. The resulting risk designations are provided in the heading of each hazard table below as well as a more detailed discussion further into this chapter.

#### A. WHAT ARE THE HAZARDS IN SUNAPEE?

Sunapee is prone to a variety of natural and human-made hazards. The hazards that Sunapee is most vulnerable to were determined through gathering historical knowledge of long-time residents and town officials; research into the CRREL Ice Jam Database, FEMA and NOAA documented disasters, and local land use restrictions; and from the input of representatives from state agencies (NH HSEM). The hazards potentially affecting the Town of Sunapee are shown in the table below. Each of these hazards and the past occurrences of these hazards are described in the following sections.

The Hazard Mitigation Committee evaluated newly defined State natural hazards and the hazards provided in the 2016 Sunapee Hazard Mitigation Plan. They adapted names of hazards to coincide with the State definitions (Hurricanes to Tropical/Post-Tropical Storms and Tornado & Downburst to High Wind Event), added Infectious Disease and Solar Storms and Space Weather. The Committee determined that avalanche and landslide are not relevant to Sunapee as they have never occurred. Although there are steep slopes in Sunapee, they are not to the grade conducive of avalanches or landslides. They retained evaluations of Natural Contaminants, Hazardous Materials Spills, and Terrorism although they are no longer required by the State, and they added Climate Change and Invasive Species. Here are the hazards evaluated in this plan:

- |                                 |                                  |                             |
|---------------------------------|----------------------------------|-----------------------------|
| • Climate Change                | • Thunderstorm/Lightning/Hail    | • Earthquake                |
| • Dam Failure                   | • Drought                        | • Natural Contaminants      |
| • Flooding                      | • Extreme Temperatures           | • Hazardous Materials Spill |
| • Erosion                       | • Wildfire                       | • Terrorism                 |
| • Tropical/Post-Tropical Storms | • Severe Winters                 | • Infectious Disease        |
| • High Wind Events              | • Solar Storms and Space Weather | • Invasive Species          |

## B. DESCRIPTIONS OF HAZARDS

An assessment of each hazard relevant to Sunapee is provided below. An inventory of previous and potential hazards is provided. Past events are shown in the following tables and the potential for future events is then discussed. The “risk” designation for each hazard was determined after evaluations discussed later in this chapter.



### Climate Change

Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 11,700 years ago marking the beginning of the modern climate era — and of human civilization. Most of these climate changes are attributed to very small variations in Earth’s orbit that change the amount of solar energy our planet receives.

#### *Present Climate Change Events:*

According to NASA, the current warming trend is of particular significance because most of it is extremely likely (greater than 95% probability) to be the result of human activity since the mid-20<sup>th</sup> century and proceeding at a rate that is unprecedented over millennia.

The planet's average surface temperature has risen about 2.12° F since the late 19th century, a change driven largely by increased carbon dioxide emissions into the atmosphere and other human activities. Most of the warming occurred in the past 40 years, with the seven most recent years being the warmest. The years 2016 and 2020 are tied for the warmest year on record.

Effects of Climate Change and temperature rise include: Warming Ocean; Shrinking Ice Sheets, Glacial Retreat; Decreased Snow Cover; Sea Level Rise; Extreme Events; and Ocean Acidification.

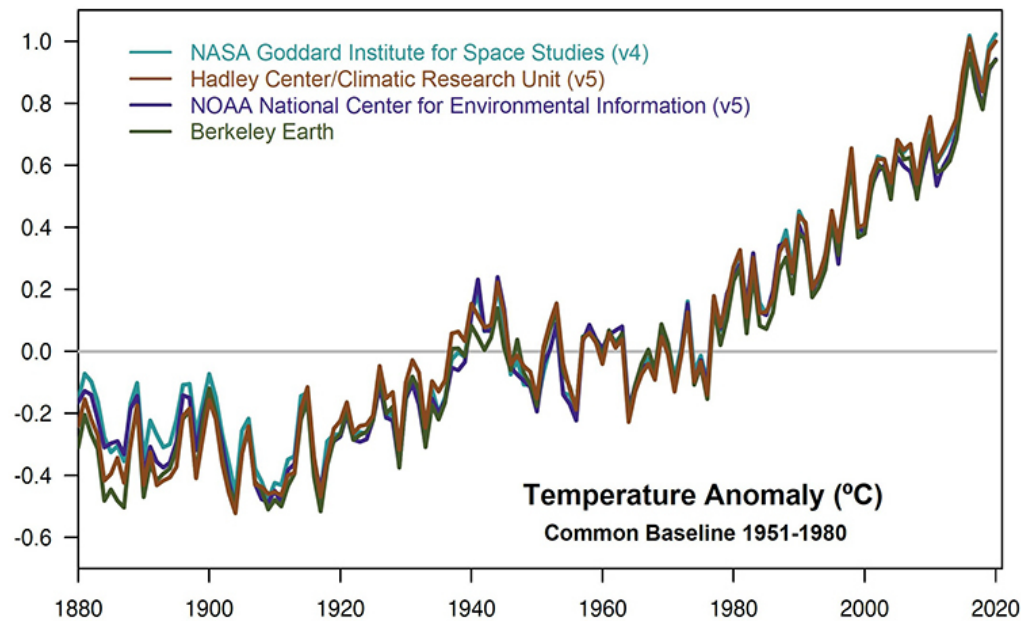
The City has experienced more frequent heat waves of excessive heat for continuous days and more severe storms since the last plan five years ago.

#### *Future Potential Climate Change Events:*

The global nature of this hazard may be outside the realm of what a small town can correct, but it can make its citizens aware of the impact of their actions through their behaviors and purchases as individuals and as a community. The City could make changes through planning and zoning evaluations in local regulation to make obtaining and the use of renewable, clean energy sources easier

and eligible for tax incentives. This plan is not a comprehensive evaluation of this huge topic. It is merely an acknowledgement by the Town of Sunapee Hazard Mitigation Committee that this hazard exists and has consequences to the Town and its residents. Climate Change will continue as long as humans produce the pollution in volumes affecting our atmosphere. The Committee determined the risk for Climate Change is low/medium as the Committee has noted changes within the region such as changes in weather patterns and severity of weather events.

**Figure III-1: TEMPERATURE CHANGES**



Temperature data showing rapid warming in the past few decades, the latest data going up to 2020. The 10 warmest years in the 141-year record have occurred since 2005, with the seven most recent years being the warmest. Credit: NASA's Goddard Institute for Space Studies.



## **Dam Failure**

Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods pose a significant threat to both life and property. Appendix D shows the location of active dams and dam inundation areas in Sunapee.

NH DES assigns a hazard designation to each dam in the state depending upon the potential damage it would cause if the dam failed:

- A “high hazard potential” is indicated if the dam is in a location and of a size that failure or mis-operation of the dam would result in the following: major economic loss to structures or property; structural damage to roads; major environmental; or public health losses; and probable loss of human life.
- A “significant hazard potential” would mean the dam is in a location and of a size that failure or mis-operation of the dam would result in any of the following: major economic loss to structures or property; structural damage to roads; major environmental or public health losses.
- A “low” hazard dam failure could cause some structural damage to buildings and roads.
- A “non-menace” dam failure would not cause any significant damage.

“High” and Significant” hazard potential dam owners must provide NH DES with maps of the potential inundation area if the dam were to fail. It should be noted that there are some exemptions from this requirement such as lagoons.

**Table III-1: NH DAM CLASSIFICATIONS**

**Non-Menace** structure means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property, provided the dam is:

- Less than six feet in height if it has a storage capacity greater than 50 acre-feet; or
- Less than 25 feet in height if it has a storage capacity of 15 to 50 acre-feet.

**Low Hazard** structure means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No possible loss of life.
- Low economic loss to structures or property.
- Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services.
- The release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course.
- Reversible environmental losses to environmentally-sensitive sites.

**Significant Hazard** structure means a dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following:

- No probable loss of lives.
- Major economic loss to structures or property.
- Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services.
- Major environmental or public health losses, including one or more of the following:
  - Damage to a public water system, as defined by RSA 485:1-a, XV, which will take longer than 48 hours to repair.
  - The release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more.
  - Damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.

**High Hazard** means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as a result of:

- Water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure, which is occupied under normal conditions.
- Water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to dam failure is greater than one foot.
- Structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services.
- The release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by NH RSA 147-A:2 VII.
- Any other circumstance that would more likely than not cause one or more deaths.

*Past Dam Failure Events*

There have been no dam failures within the Town of Sunapee or outside the town that would have affected the town.

**Table III-2: DAMS**

<b>Dam ID</b>	<b>Haz Class</b>	<b>Status</b>	<b>Dam Name</b>	<b>Water Body Name</b>	<b>Height</b>	<b>Acres</b>	<b>Owner (Now or Formerly)</b>	<b>Tax Map</b>
D229001	L	Active	Otter Pond Dam	Otter Pond Brook	8	168	Town of Sunapee	13
D229002		Ruins	Otter Pond Brook Dam	Otter Pond Brook	5		Unknown	
D229003		Ruins	Cooper Shop Dam	Otter Pond			Holmes Brothers	
D229004	S	Active	Sunapee Lake Dam	Sugar River	14	4090	NH DES Water Division	
D229005	L	Active	Sunapee Hydro Dam	Sugar River	15	0.5	Town of Sunapee	
D229006		Ruins	Sugar River Woolen Mill Dam	Sugar River	10.5		Town of Sunapee	
D229007	NM	Active	Sugar River	Sugar River	15	0.23	Town of Sunapee	
D229008	NM	Active	Sugar River	Sugar River	7	1	Corliss G Abbott Living Trust	
D229009		Ruins	Sugar River Mill Dam	Sugar River	3	0.5	George E Alexander and Sons	
D229010		Ruins	Sugar River Blacksmith Shop Dam	Sugar River			Unknown	
D229011		Ruins	Sugar River Trow Sawmill Dam	Sugar River	6.5		H A Trow	
D229012		Ruins	Perkins Pond	Perkins Pond		157	Speros Condos	
D229013		Ruins	Sugar River Dam	Sugar River			George E Smith	
D229014		Ruins	Sugar River Dam	Sugar River			George Smith	
D229015	S	Active	Wendall Marsh Dam	Sugar River	15	30	NH Fish and Game Department	
D229016	L	Active	Ledge Pond Dam	Pond Brook	4	120	Town of Sunapee	12
D229017	NM	Active	Whitney Farm Pond Dam	Unnamed Stream	6	0.93	Paul D Whitney	
D229018	NM	Active	Unnamed Brook Dam	Unnamed Brook	8	0.28	Ronald Sullivan	
D229019	NM	Active	McCormack Farm Pond Dam	Tr Lake Sunapee	6.5	0.2	Thomas McCormack	
D229020	NM	Active	Trow Rico Lower Dam	Unnamed Stream	14	1	Paul D Whitney	

Dam ID	Haz Class	Status	Dam Name	Water Body Name	Height	Acres	Owner (Now or Formerly)	Tax Map
D229021	NM	Active	Granliden Wildlife Pond Dam	Tr Lake Sunapee	6	1	Granliden Community Assoc	
D229022	NM	Active	Gazalle Farm Pond Dam	Tr Lake Sunapee	12	0.2	Harry Gazelle	
D229023		Exempt	Flanders Farm Pond Dam	Tr Sugar River	2.5	0.2	Bardon Flanders	
D229024	NM	Active	Franzen Fire Pond Dam	Unnamed Stream	9.5	0.2	Eric Franzen	
D229025	NM	Active	Gouse Farm Pond Dam	Unnamed Stream	6	1	Carola E Gouse	
D229026		Exempt	Recreation Pond Dam	Tr Sugar River	4	0.33	Leon Rollins Jr	
D229027		Exempt	Greenwood Pond Dam	Unnamed Stream	5	1	Nancy Chamberlain	
D229028		Exempt	Stock Basin Dam	Unnamed Stream	3	2	Mark & Diane Goldman	
D229029		Exempt	Indian Caves Structure 20 Det Pond	Runoff	8.5	0.01	Harbor Ridge Properties	
D229030		Exempt	Indian Caves Structure 21 Det Pond	Runoff	8.5	0.01	Harbor Ridge Properties	
D229031		Exempt	Indian Caves Structure 22 Det Pond	Runoff	6.5	0.01	Harbor Ridge Properties	
D229032		Exempt	Indian Caves Structure 23 Det Pond	Runoff	8.5	0.02	Harbor Ridge Properties	
D229033		Exempt	Indian Caves Structure 24 Det Pond	Runoff	6.5	0.01	Harbor Ridge Properties	
D229034		Exempt	Indian Caves Structure 25 Det Pond	Runoff	8.5	0.01	Harbor Ridge Properties	
D229035		Exempt	Indian Caves Structure 26 Det Pond	Runoff	6.5	0.03	Harbor Ridge Properties	
D229036		Exempt	Indian Caves Structure 27 Det Pond	Runoff	4.5	0.03	Harbor Ridge Properties	
D229037		Exempt	Indian Caves Structure 28 Det Pond	Runoff	6.5	0.02	Harbor Ridge Properties	
D229038		Exempt	Indian Caves Structure 29 Det Pond	Runoff	6.5	0.04	Harbor Ridge Properties	
D229039		Exempt	Indian Caves Structure 31 Det Pond	Runoff	6.5	0.04	Harbor Ridge Properties	
D229040		Exempt	Detention Storm Runoff Site 5	Runoff	4	0.01	Environmental Specialists Inc	

Dam ID	Haz Class	Status	Dam Name	Water Body Name	Height	Acres	Owner (Now or Formerly)	Tax Map
D229041		Exempt	Detention Storm Runoff Site 3	Runoff	4	0.1	Environmental Specialists Inc	
D229042		Exempt	Detention Storm Runoff Site 1	Runoff	4	0.1	Environmental Specialists Inc	
D229043		Exempt	Detention Storm Runoff Site 6	Runoff	4	0.05	Environmental Specialists Inc	
D229044		Exempt	Edgemont Detention Pond	Runoff	7.5	0.06	Great Ledges Corp	
D229045		Exempt	Village at Perkins Pond Detention Pond	Runoff	6	0.16	Ronald Burd and Donald Clifford	9/64
D229046	NM	Active	Mountain View Lake	Mountain View Brook	4	116	Mr & Mrs Herbert Smith	

### *Potential Future Dam Failure Damage*

Although there are 46 dams in Sunapee, there are no “high” and only two “significant” hazard dams within town. There are three “low hazard potential” dam. All active dams are shown on a map in Appendix D. The Wendall Marsh Dam was reclassified from a “low hazard potential” to a “significant hazard potential” since the 2016 plan. An Emergency Action Plan and dam inundation area have not been completed.

Outside the Town of Sunapee, there are no dams that would have a direct impact on the town.

The total number of buildings within the dam inundation area for the Lake Sunapee Dam is 57 on 25 parcels. This includes houses, condominiums, mobile homes, and church, municipal, and commercial/industrial buildings. The value of the buildings within the dam inundation area is currently about \$10 million.

The committee determined that the Dam Failure risk in Sunapee to be low/medium.

## Flooding

Flooding is the temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination, and can disrupt travel routes on roads and bridges.



Floods in the Sunapee area are most likely to occur in the spring due to the increase in rainfall and snowmelt; however, floods can occur at any time of the year. A sudden winter thaw or a major summer downpour can cause flooding. Floodplains indicate areas potentially affected by flooding. There are several types of flooding.

1% Annual Chance Floods The term “100-year flood” does not mean that flooding will occur once every 100 years, but is a statement of probability to describe how one flood compares to others that are likely to occur. What it actually means is that there is a one percent chance of a flood in any given year. These areas were mapped for all towns in New Hampshire by FEMA. Appendix D displays the “Special Flood Hazards Areas.”

River Ice Jams Ice forming in riverbeds and against structures presents significant hazardous conditions storm waters encounter these ice formations which may create temporary dams. These dams may create flooding conditions where none previously existed (i.e., as a consequence of elevation in relation to normal floodplains). Additionally, there is the impact of the ice itself on structures such as highway and railroad bridges. Large masses of ice may push on structures laterally and/or may lift structures not designed for such impacts. A search on the Cold Regions Research and Environmental Laboratory (CRREL) did not reveal any historical ice jams.

Rapid Snow Pack Melt Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

Severe Storms Flooding associated with severe storms can inflict heavy damage to property. Heavy rains during severe storms are a common cause of inland flooding.

Beaver Dams and Lodging Flooding associated with beaver dams and lodging can cause road flooding or damage to property.

Bank Erosion and Failure As development increases, changes occur that increase the rate and volume of runoff, and accelerate the natural geologic erosion process. Erosion typically occurs at the outside of river bends and sediment deposits in low velocity areas at

the insides of bends. Resistance to erosion is dependent on the riverbank's protective cover, such as vegetation or rock riprap, or its soils and stability. Roads and bridges are also susceptible to erosion.

### *Past Flooding Events*

The Committee determined there are a few other flood areas in the town other than the FEMA designated flood zones. Appendix D shows the special flood hazard areas of Special Flood Hazard Areas as well as those determined by the Committee. The following tables provide a list of floods in the State, County, and Sunapee. Other flooding issues are listed in the Erosion section—primarily for roads. The Committee does not recall any significant flooding events in Sunapee other than road erosion issues.

**Table III-3: FLOODING**

<b>FLOODING</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Flood	March 11-21, 1936	NH State including Sugar River	Flooding caused by simultaneous heavy snowfall totals, heavy rains and warm weather. Run-off from melting snow with rain overflowed the rivers	Damage to Road Network.
Flood / Severe Storm	April 16, 1987	Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties	FEMA Disaster Declaration # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain.	\$4,888,889 in damage. No damage in Sunapee.
Flood	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties, NH	FEMA Disaster Declaration # 876. Flooding caused by a series of storm events with moderate to heavy rains.	\$2,297,777 in damage. No damage in Sunapee.
Flood	October 29, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties, NH	FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains.	\$2,341,273 in damage. No damage in Sunapee
Flood	July 21 – August 18, 2003	Cheshire and Sullivan Counties, NH	FEMA Disaster Declaration #1489. Flooding from persistent rainfall in July	Almost a million dollars in total assistance; No significant damage in Sunapee
Flood	October 7-18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack, and Sullivan Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding; major devastation in Alstead	\$3,000,000 in damages. No significant damage in Sunapee
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144- NH	Unknown damage totals. No significant damage in Sunapee

<b>FLOODING</b>				
<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Flood	May 2006	Sullivan County, NH area	No FEMA assistance; heavy rain caused washout of Blaisdell Road. Road closed for several weeks.	No significant damages in Sunapee
Flood	April 16, 2007	All counties, NH	FEMA Disaster Declaration # 1695. Severe storms and flooding; 2,005 home owners and renters applied for assistance in NH.	\$27,000,000 in damages. No significant damages in Sunapee.
Storms, Tornado, and Flooding	July 24, 2008	Central and Southern NH; Counties Declared: Belknap, Carroll, Merrimack, Rockingham, and Strafford	FEMA DR 1782	Severe storms, tornado, and flooding. No damage in Sunapee
Flood	August 14, 2008	Central Northern NH; Counties Declared: Belknap, Carroll, Coos, and Grafton	FEMA Disaster Declaration #1787	\$3 million in public assistance; primary damage to roads; no significant damage in Sunapee
Flood	March 14-31, 2010	Statewide	FEMA DR-1913; severe storms & flooding; Declared Counties: Hillsborough and Rockingham Counties	No damage in Sunapee
Flood	May 26-30, 2011	Coos and Grafton Counties	FEMA-4006-DR Federal assistance for Coos and Grafton Counties and hazard mitigation statewide	\$1.8 million in public assistance; primary impact to roads and bridges; no damage in Sunapee
Flood	May 29-31, 2012	Cheshire County	FEMA DR-4065; severe storm and flood event	\$3,070,273 in public assist. No damage in Sunapee.
Flood/ Tropical Storm	August 28 – September 2, 2011	Coos, Grafton, Carroll, Sullivan, Merrimack, Belknap, and Strafford Counties	FEMA DR-4026; Tropical Storm Irene	See Table III-4 – Newport received \$17,028 for DPW debris cleanup; little flooding or road washout; police and fire emergency response during worst part of event.
Flood	June 26-July 3, 2013	Grafton, Sullivan and Cheshire Counties	FEMA DR-4139; severe storms, flooding, and landslides	\$6,252,800 in public assist. Heavy rains from this storm caused erosion on Winn Hill Road, Stage Coach Road and Trow Hill but there was not significant flooding damage.

FLOODING				
Hazard	Date	Location	Description of Areas Impacted	Damages
				The total town-wide damage was \$69,400.
Local Flooding	July 2016	Town of Sunapee	7.25" of rain in 45 minutes washed out four roads;	Cost the Town \$252,000
Flood	Oct 29 – Nov 1, 2017	Several counties including Sullivan	FEMA DR-4355	\$8 million in public assistance; minor damage in Sunapee from erosion and debris deposition
Flood	July 1-2, 2017	Grafton & Coos Counties	FEMA DR-4329; severe flooding and storms	\$5 million in public assistance; no damage in Sunapee
Flood	July 11-12, 2019	Grafton County	FEMA DR-4457	No damage in Sunapee
Flood	July 17-19-2021	Cheshire County	FEMA DR - 4622	No damage in Sunapee
Flood	July 29-August 2, 2021	Cheshire and Sullivan Counties	FEMA DR - 4624	Working with FEMA now to determine impact areas; estimated damage at \$40-50,000; severe erosion affecting several roads and one bridge
Flood	Frequent	Town of Sunapee, Otter Pond outlet	Beaver dam up the outlet causing flooding; the culverts are the responsibility of the State, but it impacts other properties	Unknown

### *National Flood Insurance Program*

Sunapee became a participating member of the National Flood Insurance Program on May 15, 1991. Updated maps for all towns within Sullivan County were finalized in May 2006. In 2021, there are currently 12 policies in the town with \$3 million of insurance: six are single-family homes, two are “all other residential,” and three are non-residential structures. However, flood insurance purchase is not

a reflection of the number of structures within the flood plain. One of the 11 policies is not in the designated flood plain. Three loss claims have been paid. All claims totaled \$43,000. There have been no repetitive loss claims. (Source: NH OSI 2021) All of Sunapee's 1% Annual Chance Special Flood Areas are located within the A Zone, with no base flood elevations determined and the AE Zone where base flood elevations have been determined. See Appendix D for a map showing all Special Flood Hazard Areas.

As an NFIP participant, the Town of Sunapee has a floodplain ordinance which restricts building within the special floodplains to protect the flow of flood waters and not increase the needed land area for those waters. The Town adopted the model ordinance provided by the NH Floodplain Management Office. This ordinance is reflected in the zoning ordinance, subdivision regulations, and site plan review regulations.

### *Potential Future Flooding Events*

Future flooding is likely as noted in the above table based upon local knowledge of past flood events. In 2020, there were 354 principal buildings on 236 parcels of land located within the FEMA determined special flood hazard areas. The total structural value of these properties is about \$200 million. The institutions include the Head Start school program building, two churches, and the sewage treatment plant. The Tax Increment Finance District is also partially within the special flood area. Future development is anticipated there as it is in the downtown area. There are also areas of flooding determined by the committee that are not FEMA designated special flood areas. These have been mapped and information provided about structures within those areas. According to the State's Mitigation Plan, Sullivan County has a high hazard risk for flooding. The Committee determined flooding is a Medium/High risk in Sunapee.

## **Erosion**

Soil erosion, although a natural process, can be greatly accelerated by improper construction practices. Because of the climate in New Hampshire and the general nature of our topography, eroded soils can be quickly transported to a wetland, stream, or lake. The New Hampshire Department of Environmental Services (DES) regulates major construction activities to minimize impacts upon these resources. A properly conducted construction project should not cause significant soil erosion.

Soil becomes vulnerable to erosion when construction activity removes or disturbs the vegetative cover. Vegetative cover and its root system play an extremely important role in preventing erosion by: (1) Shielding the soil surface from the impact of falling rain drops; (2) Reducing the velocity of runoff; (3) Maintaining the soil's capacity to absorb water, and (4) Holding soil particles in place.



Because of the vegetation's ability to minimize erosion, limiting its removal can significantly reduce soil erosion. In addition, decreasing the area and duration of exposure of disturbed soils is also effective in limiting soil erosion. The designer must give special consideration to the phasing of a project so that only those areas actively under construction have exposed soils. Other factors influencing soil erosion are: (1) Soil types, (2) Land slope, (3) Amount of water flowing onto the site from up-slope, and (4) Time of year of disturbance.

#### *Past Erosion Events*

The committee acknowledged areas of erosion along Young Hill Road, Ryder Corner Road, North Road, Sargent Road and Perkins Pond Road, they also acknowledged that with the occurrence of more extreme storms, erosions and landslides may become more common. Stagecoach Road, Trow Hill, Ledge Pond Road and Winn Hill Road have experienced erosion regularly during the extreme storm events. The ditches on these roads do not have the ability to carry the capacity of the storms and the topography of the roads is steep, thus, the water moves very fast in undersized ditches and routinely causes washouts that the town must repair. In July/August 2021 rainstorms several roads, bridges and culverts were washed out.

#### *Potential Erosion Events*

Due to the topography of the town, there is always potential for erosion. As properties are developed there will be less vegetative buffer to protect the town from erosion during rainstorms. The Committee determined there was a low/medium risk for erosion damage.

### **Tropical/Post-Tropical Storms**



A hurricane is an intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. Hurricane winds blow in a large spiral around a relative calm center known as the "eye." The "eye" is generally 20 to 30 miles wide, and the storm may extend outward 400 miles. As a hurricane nears land, it can bring torrential rains, high winds, and storm surges. A single hurricane can last for more than 2 weeks over open waters and can run a path across the entire length of the eastern seaboard. August and September are peak months during the hurricane season that lasts from June 1 through November 30. Damage resulting from winds of this force can be substantial, especially considering the duration of the event, which may last for many hours (*NH Multi-Hazard Mitigation Plan Update 2018*; FEMA website).

The Saffir-Simpson Hurricane Wind Scale provides categories of sustained winds by miles per hour: 1 – 74-95 mph; 2 – 96-110 mph;

3 – 111-129 mph; 4 – 130 – 156 mph; and 5 – 157 mph or higher. Categories 3 -5 are considered to be major wind events that can cause devastating to catastrophic damage.

#### *Past Tropical/Post-Tropical Storms Events*

There have been several hurricanes over the years which have impacted New England and New Hampshire. These are listed below. The 1938 hurricane directly impacted Sunapee according to the Committee member recollections, but no other tropical storm event impacted the town. Since the last hazard mitigation plan update, the Town has not experienced any significant impacts from Tropical Storms.

**Table III-4 HURRICANES & TROPICAL STORMS**

<b>Hazard</b>	<b>Date</b>	<b>Location</b>	<b>Description of Areas Impacted</b>	<b>Damages</b>
Hurricane	August, 1635	n/a		Unknown
Hurricane	October 18-19, 1778	n/a	Winds 40-75 mph	Unknown
Hurricane	October 9, 1804	n/a		Unknown
Gale	September 23, 1815	n/a	Winds > 50mph	Unknown
Hurricane	September 8, 1869	n/a		Unknown
Hurricane	September 21, 1938	Southern New England	Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Total storm losses of \$12,337,643 (1938 dollars). 186 mph maximum winds.	Unknown
Hurricane (Carol)	August 31, 1954	Southern New England	Category 3, winds 111-130 mph. Extensive tree and crop damage in NH, localized flooding	Unknown
Hurricane (Edna)	September 11, 1954	Southern New England	Category 3 in Massachusetts. This Hurricane moved off shore but still cost 21 lives and \$40.5 million in damages throughout New England. Following so close to Carol it made recovery difficult for some areas. Heavy rain in NH	Unknown
Hurricane (Donna)	September 12, 1960	Southern and Central NH	Category 3 (Category 1 in NH). Heavy flooding in some parts of the State.	No damage in Sunapee
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast	No damage in Sunapee

Hazard	Date	Location	Description of Areas Impacted	Damages
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds	No damage in Sunapee
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1	No damage in Sunapee
Hurricane (Gloria)	September, 1985	Southern New England	Category 2, winds 96-110 mph. Electric structures damaged; tree damages. This Hurricane fell apart upon striking Long Island with heavy rains, localized flooding, and minor wind damage in NH	No damage in Sunapee
Hurricane (Bob)	August 19, 1991	Southern New England	Structural and electrical damage in region from fallen trees. 3 persons were killed and \$2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR	No damage in Sunapee
Hurricane (Edouard)	September 1, 1996	Southern New England	Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged	No damage in Sunapee
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains	No damage in Sunapee
Hurricane (Katrina)	August 29, 2005 & continuing	East Coast of US and more	FEMA-3258-EM. Heavy rains and flooding devastating SE US	No damage in Sunapee
Tropical Storm (Tammy)	October 5-13, 2005	East Coast of US	Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH.	No damage in Sunapee
Tropical Storm (Irene)	August 26 – September 6, 2011	East Coast of US	FEMA-4026-DR for Coos, Carroll, Grafton, Strafford, Belknap, Merrimack and Sullivan Counties; EM-3333 Hillsboro, Rockingham, and Cheshire Counties; there was little effect in Sunapee	\$2 Million primarily for roads and bridges
Hurricane (Sandy)	October 26 – November 8, 2012	East Coast of US	FEMA-4095-DR-NH for Belknap, Carroll, Coos, Grafton and Sullivan Counties.	\$2 Million in public assistance primarily for emergency protective services; no damage in Sunapee

Hazard	Date	Location	Description of Areas Impacted	Damages
Hurricane (Hermine)	September 6, 2016	Coastal NH	Closed Hampton Beach	No damage in Sunapee

### *Potential Future Tropical/Post-Tropical Storm Damage*

Tropical Storm events will affect the entire town. It is impossible to predict into the future what damage will occur in the town. The State Plan determined tropical storm events are a medium risk for Sullivan County. The Committee determined the hurricane risk to be medium in Sunapee.

### **High Wind Event**



Significantly high wind events occur especially during tornadoes, hurricanes, winter storms, and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during severe wind occurrences. A downburst is a severe, localized wind blasting down from a thunderstorm. These “straight line” winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories: 1. Microburst, which covers an area less than 2.5 miles in diameter, and 2. Macroburst, which covers an area at least 2.5 miles in diameter. Most downbursts occur with thunderstorms, but they can be associated with showers too weak to produce thunder.

“A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. These events are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction.” (*NH Multi-Hazard Mitigation Plan Update 2018*). The Enhanced Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. Most tornadoes are in the EF0 to EF2 Class (an older scale was the Fujita Scale). Building structures to modern wind standards provides significant property protection from these hazard events. New Hampshire is located within Zone 2 for Design Wind Speed for Community Shelters, which suggests that buildings should be built to withstand 160 mph winds.

### *Past High Wind Events*

The following table displays tornadoes occurring in Sullivan County between 1950 and 1995 as provided by the “Tornado Project” ([www.tornadoproject.com](http://www.tornadoproject.com)) and the *NH Multi-Hazard Mitigation Plan Update 2018*. The Committee does not recall any high wind event damage in Sunapee.

**Table III-5: HIGH WIND EVENTS IN OR NEAR SULLIVAN COUNTY**

Hazard	Date	Fujita/Enhanced Fujita Scale	Damages
Tornado	September 9, 1821	Most intense in NH	Killed 6 people; crossed Lake Sunapee
Tornado	July 14, 1963	F1	No deaths or injuries; costs unknown
Tornado	June 27, 1964	F0	No deaths or injuries; costs unknown
Tornado	August 11, 1966	F2	No deaths or injuries; costs unknown
Tornado	August 25, 1969	F1	No deaths or injuries; costs unknown
Tornado	May 31, 1972	F1	No deaths or injuries; costs unknown (Merrimack County); no damage reported in Sunapee
Tornado	July 21, 1972	F1	No deaths or injuries; costs unknown; no damage reported in Sunapee
Tornado	May 11, 1973	F2	No deaths or injuries; costs unknown; no damage reported in Sunapee
Tornado	June 11, 1973	F0	No deaths or injuries; costs unknown; no damage reported in Sunapee
Tornado	August 15, 1976	F1	No deaths; 5 injuries; costs unknown (Merrimack County); no damage reported in Sunapee
Tornado	August 13, 1999	F1	No deaths or injuries; costs unknown; Sullivan County; no damage reported in Sunapee
Tornado	July 6, 1999	F2	No deaths or injuries; costs unknown (Merrimack County); in New London two roofs blown off structures; power outages; downed trees, utility pole, and wires; no damage reported in Sunapee
Downburst	Around 2005-2006	NA	Severe microburst knocked down stand of trees in nearby towns; no damage reported in Sunapee
Tornado	Summer 2006	NA	Began in Barnet, VT and moved to Monroe, NH; trees knocked down in Sunapee
Tornado	April 15, 2007	NA	Numerous trees were knocked down in Enfield, NH
Tornado	July 24, 2008	(EF 2)	DR 1799: Trees, utility poles, houses down near Concord; 1 fatality and 2 injuries; \$2.5 million FEMA funds; no damage reported in Sunapee
Downburst	July 19, 2015	NA	Heavy rains and powerful winds knocked down trees and power lines; electricity out for several days in place; damaged cars and houses; took over 3 weeks of cleanup; one person killed in Claremont; damage also in Newbury; no damage in Sunapee
Tornado	May 4, 2018	EF 1	Sullivan/Merrimack Counties; no damage in Sunapee

Source: [www.tornadoproject.com](http://www.tornadoproject.com)

**Table III-6: ENHANCED FUJITA SCALE**

Scale	Wind Strength (MPH)	Typical Damage
EF0	65-85	<b>Light damage (Gale):</b> Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-110	<b>Moderate damage (Weak Winds):</b> Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135	<b>Considerable damage (Strong Winds):</b> Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	<b>Severe damage:</b> Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown
EF4	166-200	<b>Devastating damage:</b> Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
EF5	Over 200	<b>Incredible damage:</b> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

Source: <https://www.weather.gov/oun/efscale>

### *Potential Future High Wind Event Damage*

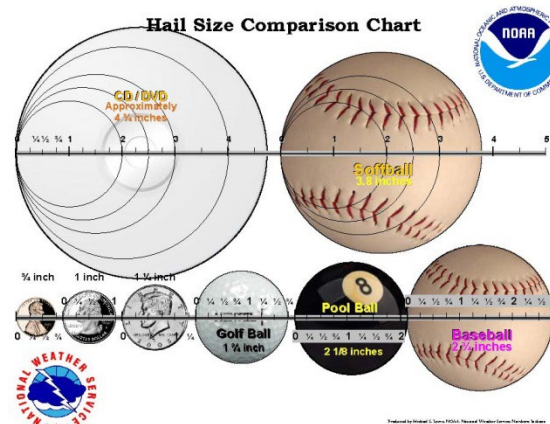
It is impossible to predict where a tornado or downburst will occur or what damage it will inflict. If a high wind event occurred it could affect a specific location or the entire town depending upon the size and power of the event. The Sunapee Committee does not recall tornadoes although a microburst around 2005-2006 occurred in Sunapee. The FEMA website places the State of NH in the Zone II Wind Zone which provides that a community shelter should be built to a 160 mph “design wind speed.” According to the State’s mitigation plan, Sullivan County has a high risk for tornadoes. The Committee determined there is a medium risk for tornadoes and downbursts in Sunapee.

## Thunderstorms/Lightning/Hail



A thunderstorm is a rain shower during which you hear thunder. Since thunder comes from lightning, all thunderstorms have lightning. A thunderstorm is classified as "severe" when it contains one or more of the following: hail three-quarter inch or greater, winds gusting in excess of 50 knots (57.5 mph), tornado. Hail is a form of precipitation that occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. When the hail particle becomes heavy enough to resist the updraft, it falls to the ground. The resulting wind and hail can cause death, injury, and property damage. Below is a comparison chart for the various sizes of hail.

Figure III-2: HAIL SIZE COMPARISON CHART



An average thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Winter thunderstorms are rare because the air is more stable, strong updrafts cannot form because the surface temperatures during the winter are colder.

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through the air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Fires are a likely result of lightning strikes, and lightning strikes can cause death, injury, and property damage. It is impossible to predict where lightning will strike.

A lightning activity level has been developed by the National Weather Service and is shown below:

**Table III-7: LIGHTNING ACTIVITY LEVEL**

<b>Lightning Activity Level</b>	<b>Description</b>
1	No thunderstorms
2	Isolated thunderstorms: Light rain will occasionally reach the ground. Lightning is very infrequent, 1 to 5 cloud to ground strikes in a five minute period.
3	Widely scattered thunderstorms. Light to moderate rain will reach the ground. Lightning is infrequent, 6 to 10 cloud to ground strikes in a 5 minute period.
4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5 minute period.
5	Numerous thunderstorms. Rainfall is moderate to heavy. Lightning is frequent and intense, greater than 15 cloud to ground strikes in a 5 minute period.
6	Dry lightning (same as LAL3, but without rain). This type of lightning has the potential for extreme fire activity and is normally highlighted in fire weather forecasts with a Red Flag Warning.

Source: <http://graphical.weather.gov/definitions/defineLAL.html>

#### *Past Thunderstorm Events*

There have been lightning strikes in Sunapee. The Committee identified an area to the north and South of Ledge Pond that has been prone to lightning strikes in the past. The damage from these lightning strikes has not been significant, but the committee understands this area is more susceptible to strikes. A thunderstorm with lightning or hail could impact the entire town, although lightning is more likely in isolated areas.

#### *Potential Future Thunderstorm Damage*

It is inevitable that thunderstorms will occur in Sunapee's future. Lightning, hail, or wind from a thunderstorm could impact anywhere in town. It is not possible to estimate potential damage. The risk for future thunderstorm damage was determined by the Committee to be low risk in Sunapee. See table below.

**Table III-8: THUNDERSTORM/LIGHTNING/HAIL**

Hazard	Date	Location	Description of Areas Impacted	Damages
Hail	June 16, 2007	Sunapee	A severe thunderstorm produced large hail (.75 in) in southwestern NH.	unknown
Hail	August 3, 2007	Sunapee	An isolated thunderstorm produced large hail in Sullivan County with ¾-inch hail in Sunapee.	unknown

## Drought



Droughts or abnormally low precipitation leading to a shortage of water are generally not as damaging or disruptive as floods, but are more difficult to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years or only a few months. Fortunately, droughts are rare in New Hampshire. The severity of the water deficit is gauged by the degree of moisture deficiency, its duration, and the size of the area affected. The effects of drought are indicated through measurements of soil moisture, groundwater levels and stream flow; however, not all of these indicators will be low during a drought. Not all of these indicators will be minimal during a particular drought. For example, frequent minor rainstorms can replenish the soil moisture without raising ground water levels or increasing stream flow.

Low stream flow correlates with low ground water level because it is ground water discharge to streams and rivers that maintain stream flow during extended dry periods. Low stream flow and low ground water levels commonly cause diminished water supply.

New Hampshire breaks the State into five Drought Management Areas, with one in the north, one across the central region, and three along the southern portion of the State. The National Oceanic and Atmospheric Administration (NOAA) and the US government use the Palmer Drought Survey Index for conditions of the nation. The Palmer Drought Management areas divide the State into two areas and use the Palmer Drought Severity Index which is based on rainfall, temperature, and historic data. The Town of Sunapee is in Area 2. The NH Drought Management Team, coordinated by the NH Department of Environmental Services Dam Bureau, uses these maps to help determine which areas are hardest hit.

Figure III-3: DROUGHT MAPS

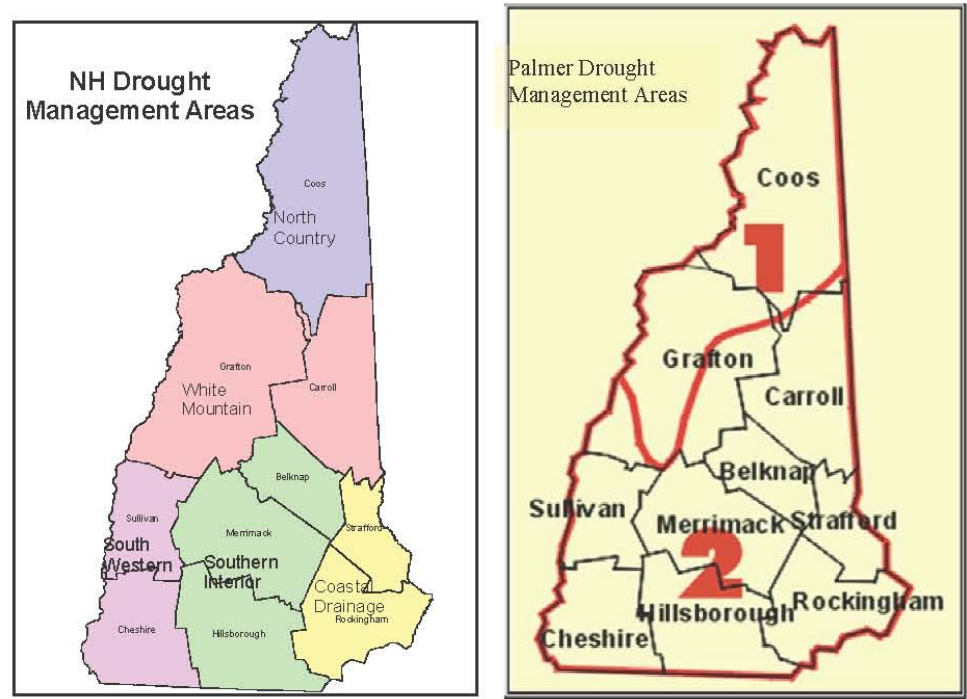







Figure III-4: PALMER DROUGHT INDEX

	<b>D0 - Abnormally Dry</b> <ul style="list-style-type: none"><li>• Short-term dryness slowing planting, growth of crops</li><li>• Some lingering water deficits</li><li>• Pastures or crops not fully recovered</li></ul>	<b>60.0%</b> of State	<b>60.0%</b> D0-D4
	<b>D1 - Moderate Drought</b> <ul style="list-style-type: none"><li>• Some damage to crops, pastures</li><li>• Some water shortages developing</li><li>• Voluntary water-use restrictions requested</li></ul>	<b>0.0%</b> of State	<b>0.0%</b> D1-D4
	<b>D2 - Severe Drought</b> <ul style="list-style-type: none"><li>• Crop or pasture loss likely</li><li>• Water shortages common</li><li>• Water restrictions imposed</li></ul>	<b>0.0%</b> of State	<b>0.0%</b> D2-D4
	<b>D3 - Extreme Drought</b> <ul style="list-style-type: none"><li>• Major crop/pasture losses</li><li>• Widespread water shortages or restrictions</li></ul>	<b>0.0%</b> of State	<b>0.0%</b> D3-D4
	<b>D4 - Exceptional Drought</b> <ul style="list-style-type: none"><li>• Exceptional and widespread crop/pasture losses</li><li>• Shortages of water creating water emergencies</li></ul>	<b>0.0%</b> of State	

Past Drought Events

Around 2001-2002, Sunapee and other nearby towns had drought issues. This occurred again in 2010 and has not occurred since.

**Table III-9: DROUGHT**

Date	Location	Description	Damages
1929-1936	Statewide	Regional. Recurrence Interval 10 to > 25 years	Unknown
1939-1944	Statewide	Severe in SE and moderate elsewhere. Recurrence Interval 10 to > 25 years	Unknown
1947-1950	Statewide	Moderate. Recurrence Interval 10 to > 25 years	Unknown
1960-1969	Statewide	Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years	Unknown
2001-2002	Statewide	Affected residential wells and agricultural water sources; third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942; recurrence level not determined yet	Unknown
2010	Most southerly counties	Affected dug well and those in hillsides	Unknown
2016-2017	Statewide	Water systems and private wells were adversely impacted. Impact to agricultural crops; Hundreds of private wells failed.	Extreme drought declared
2020-2021	Sullivan County	Abnormally dry conditions, moderate drought, and severe drought sporadically occurring over this time period	Unknown: no impact in Sunapee

Source: NH DES through 2002; Concord Monitor August 22, 2010; NH Multi-Hazard Mitigation Plan 2018

### *Potential Future Drought Damage*

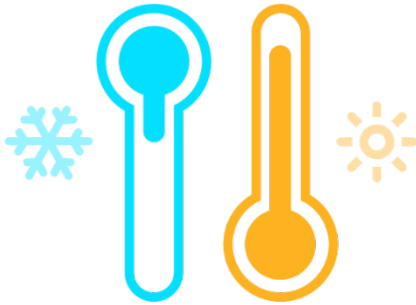
Drought may affect the entire town. The damage will depend upon the crops being grown at the time of the drought. No cost has been assigned to residential wells going dry though new wells may have to be dug or drilled. According to the State's mitigation plan, Sullivan County has a low risk for drought. The Committee determined that drought is a low risk in Sunapee.

**Table III-10: DROUGHT MEASUREMENT**

D0	Short-term dryness that is typical with the onset of drought; can slow crop growth and elevate fire risk to above average. Scientists may consider D) level areas to be dry, and not necessarily experiencing drought conditions.
D1	An area where damage to crops and pastures can be expected and where fire risk is high, while stream, reservoir, or well levels are low. (Moderate)
D2	An area where crop or pasture losses are likely, fire risk is very high, water shortages are common, and water restrictions are typically voluntary or mandated. (Severe)
D3	An area where major crop and pasture losses are common, fire risk is extreme, and widespread water shortages can be expected requiring restrictions. (Extreme)
D4	An area experiencing exceptional and widespread crop and pasture losses, fire risk, and water shortages that result in water emergencies. (Exceptional)

Source: [ncdc.noaa.gov/news/drought-degrees-drought-reveal-true-picture](https://ncdc.noaa.gov/news/drought-degrees-drought-reveal-true-picture)

## Extreme Temperatures



Extreme temperatures are characterized by abnormally high and low temperatures and/or longer than average time periods of high or low temperatures. Events can damage or kill crops and animals (wild, farm, or domesticated), potentially presenting a risk to the economy.

Extreme cold events occur during meteorological cold waves, also known as cold snaps caused by the southern transport of arctic air masses to the Northeast. The effect is exacerbated when there are winds present (wind chill) that effectively lower the temperature and reduce core body temperature. Frostbite occurs when uncovered skin is exposed to extreme cold and the body tissue is either injured or killed. Hypothermia is when the body is unable to heat itself at the rate it is being cooled to maintain adequate body temperature.

Extreme heat events occur as a result of above normal temperatures, which often coincide with high relative humidity increasing the likelihood of heat disorders. Heat related disorders include heat cramps, heat exhaustion, and heat stroke.

Figure III-5: HEAT INDEX

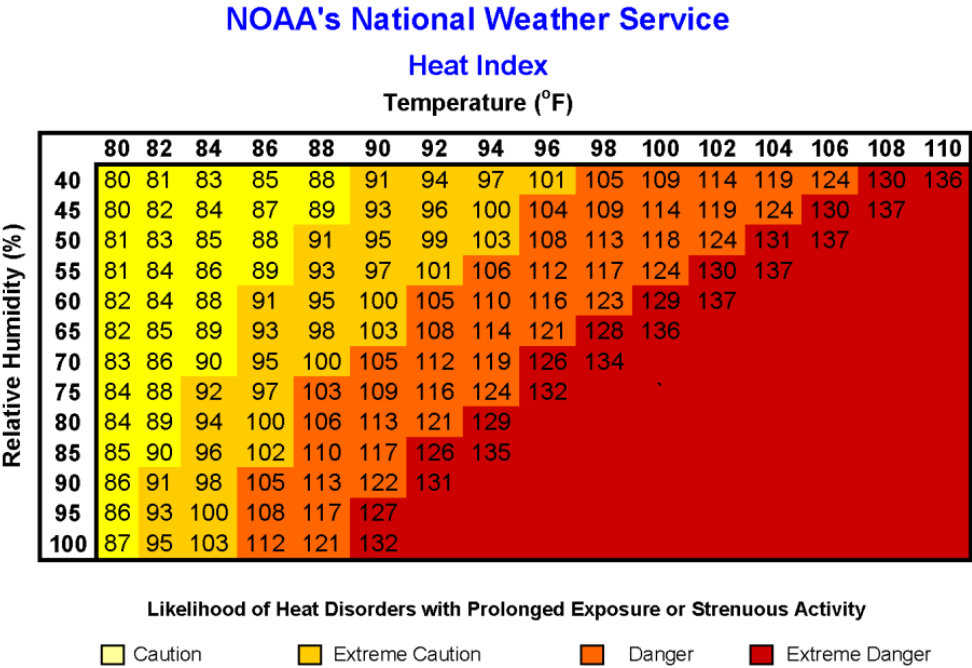
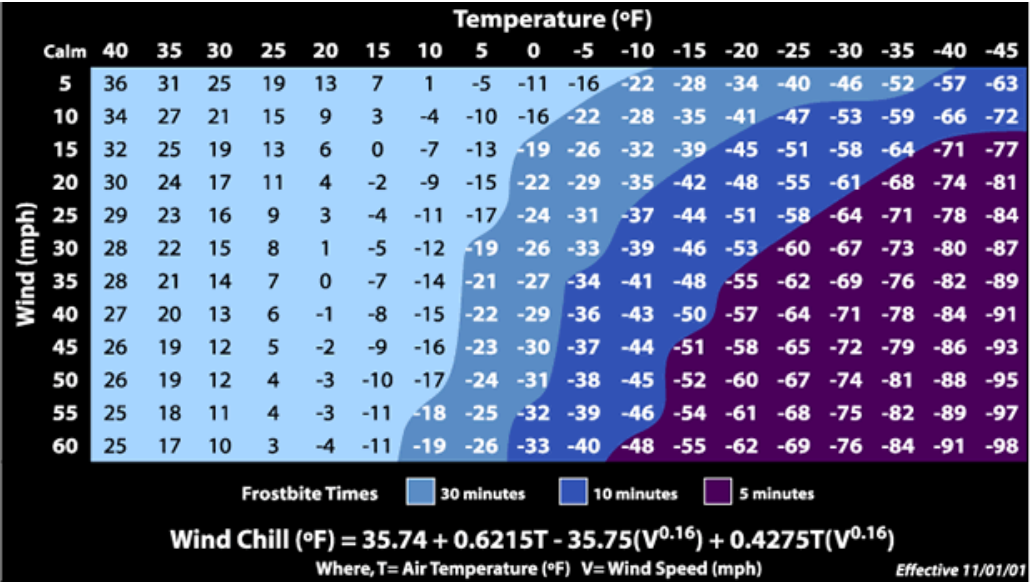
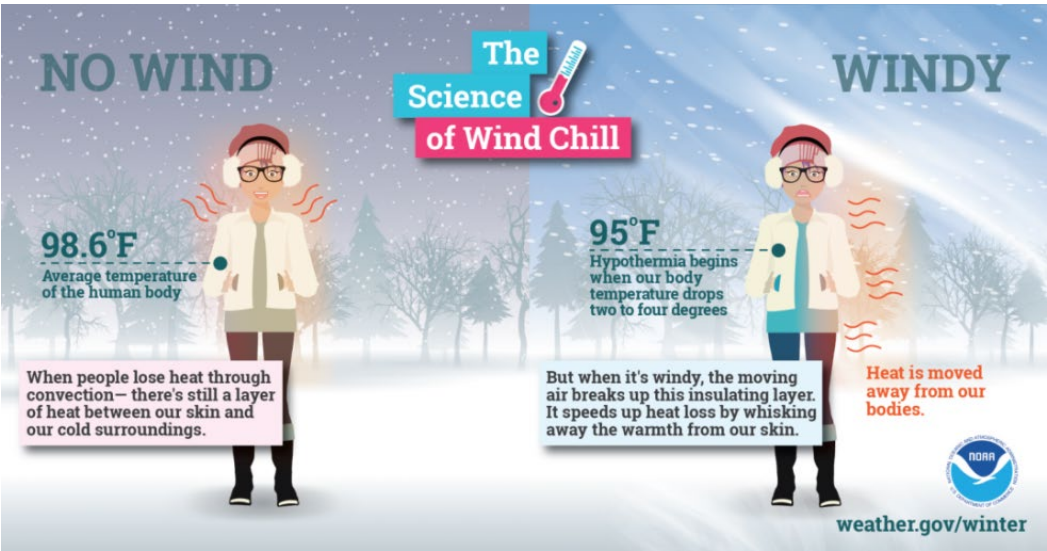


Figure III-6: WIND CHILL



*Past Extreme Temperature Events*

The following table lists the extreme heat events in the past which included the Northeast and New Hampshire. The Committee recalls heat waves and winter cold waves impacting the Town, especially more heat waves in recent years since the last plan update including the 2017 event and the 2018 event. These were not extensive enough to open cooling stations, however.

**Table III-11: EXTREME TEMPERATURE EVENTS**

<b>Date</b>	<b>Event</b>	<b>Location</b>	<b>Additional Information</b>
July 1911	Heat Wave	New England	11-day heat wave in New Hampshire
Late June to September, 1936	Heat Wave	North America	Temps to mid 90s in the northeast
June - August, 1999	Heat Wave	Northeast	Mean temperatures well above long-term average
Early August, 2001	Heat Wave	New Hampshire	Mid 90s and high humidity
August 2-4, 2006	Heat Wave	New Hampshire	Regional heat wave and severe storms
July 2010	Heat Wave	Northeast	Regional heat wave
September 2017	Heat Wave	New Hampshire	High temperature records
December 2017	Cold Wave	New Hampshire	Record low temperatures; wind chill warnings
February 2018	One Day Heat Wave	New Hampshire	Record high winter temperatures; Sunapee closed gravel roads due to thawing

*Potential Future Extreme Temperature Events*

Extreme temperature events would impact the entire town though those with air conditioning and adequate heat in their homes would have less impact. The costs of extreme temperatures are most likely to be in human life. The elderly are especially susceptible to extreme temperatures. The State Plan determined that extreme temperature risk is low in Sullivan County. The Committee determined extreme temperatures to be a low risk in Sunapee.

## Wildfire



Wildfire is defined as any unwanted and unplanned fire burning in the forest, shrub or grass. Wildfires are frequently referred to as forest fires, shrub fires or grass fires, depending on their location. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. The threat of wildfires is greatest where vegetation patterns have been altered by past unsafe land-use practices, fire suppression and fire exclusion. Vegetation buildup can lead to more severe wildfires.

Increased severity over recent years has decreased capability to extinguish wildfires. Wildfires are unpredictable and usually destructive, causing both personal property damage and damage to community infrastructure, cultural and economic resources. Negative short-term effects of wildfires include destruction of timber, forage, wildlife habitats, scenic vistas and watersheds. Some long-term effects include erosion and lowered water quality.

There are many types and causes of fires. Wildfires, arson, accidental fires, and others all pose a unique danger to communities and individuals. Since 1985, approximately 9,000 homes have been lost to urban/wild land interface fires across the United States (Northeast States Emergency Consortium: [www.nesec.org](http://www.nesec.org)). The majority of wildfires usually occur in April and May, when homeowners are cleaning up from the winter months, and when the majority of vegetation is void of any appreciable moisture making them highly flammable.

The threat of wildfires for people living near wildland areas or using recreational facilities in wilderness areas is real. Dry conditions at various times of the year and in various parts of the United States greatly increase the potential for wildfires. Advance planning and knowing how to protect buildings in these areas can lessen the devastation of a wildfire. To reduce the risk to wildfire, it is necessary to consider the fire resistance of structures, the topography of property and the nature of the vegetation in the area.

According to the National Wildfire Coordination Group, there are categories of wildfire based upon size: Class A - one-fourth acre or less; Class B - more than one-fourth acre, but less than 10 acres; Class C - 10 acres or more, but less than 100 acres; Class D - 100 acres or more, but less than 300 acres; Class E - 300 acres or more, but less than 1,000 acres; Class F - 1,000 acres or more, but less than 5,000 acres; Class G - 5,000 acres or more.

### *Past Wildfire Events*

There have not been any significant wildfires in Sunapee to note; however, there have certainly been small brush fires on occasion. A fire in the spring of 2020 burned seven acres on Browns Hill off of Route 11. The cause is unknown.

### *Potential Future Wildfire Events*

There are many large, contiguous forest tracts in Sunapee. Where development interfaces with the forested areas is called the “urban interface.” These are the areas where structures could be impacted by a wildfire; these areas are scattered throughout the town. The most likely areas for wildfire are where ice storm impact downs trees and branches providing fuel for a fire. According to the State’s mitigation plan, Sullivan County has substantial debris to fuel a wildfire remaining from the ice storm of 1998 and 2008 and heavy forest cover. The plan gives the county a high risk of wildfire. The Committee determined that the risk of wild and structure fire risk in Sunapee is low.

### **Severe Winter Weather**



Ice and snow events typically occur during the winter months and can cause loss of life, property damage, and tree damage.

Heavy Snow Storms A heavy snowstorm is generally considered to be one which deposits four or more inches of snow in a twelve-hour period. A blizzard is a sustained wind or frequent gusts greater than or equal to 35 miles per hour accompanied by falling and/or blowing snow, frequently reducing visibility to less than ¼ mile for three hours or more (NOAA National Weather Service). Therefore, intense Nor’easters, which occur in the winter months, are often referred to as blizzards. The definition includes the conditions under which dry snow, which has previously fallen, is whipped into the air and diminishes visual range. Such conditions, when extreme enough, are called “white outs.”

Ice Storms Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. When these liquid water drops fall through another thin layer of freezing air just above the surface, they don't have enough time to refreeze before reaching the ground. Because they are "supercooled," they instantly refreeze upon contact with anything that is at or below 0 degrees C, creating a glaze of ice on the ground, trees, power lines, or other objects. A significant accumulation of freezing rain lasting several hours or more is called an ice storm. This condition may strain branches of trees, power lines and even transmission towers to the breaking point and often creates treacherous conditions for highway travel and aviation. Debris impacted roads make emergency access, repair and cleanup extremely difficult.

The National Weather Service has developed a Scaled Predictive Ice Storm Aftermath (SPIA) Index. The potential impacts are scaled from 0 to 5 and suggest potential electrical outage coverage and duration. Current ice storm warnings are based on forecast of ice accumulation only. SPIA reports on the combined effects of the predicted ice and wind. Below is a chart of the SPIA index levels.

**Figure III-7: SCALED PREDICTIVE ICE STORM AFTERMATH INDEX**

<b>Ice &amp; Wind: Average Ice in Inches and Wind in Miles per hour</b>	<b>&lt;15 mph</b>	<b>15-25 mph</b>	<b>25-35 mph</b>	<b>≥35 mph</b>
0.10 – 0.25 inches	0	1	2	3
0.25 – 0.50 inches	1	2	3	4
0.50 – 0.75 inches	2	3	4	5
0.75 – 1.00 inches	3	4	5	5
1.00 – 1.50 inches	4	5	5	5
>1.50 inches	5	5	5	5

“Nor’easters” Nor'easters can occur in the eastern United States any time between October and April, when moisture and cold air are plentiful. They are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surfs that cause severe beach erosion and coastal flooding. A Nor'easter is named for the winds that blow in from the northeast and drive the storm up the east coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast.

There are two main components to a Nor'easter: Gulf Stream low-pressure system (counter-clockwise winds) generate off the coast of Florida. The air above the Gulf Stream warms and spawns a low-pressure system. This low circulates off the southeastern U.S. coast, gathering warm air and moisture from the Atlantic. Strong northeasterly winds at the leading edge of the storm pull it up the east coast. As the strong northeasterly winds pull the storm up the east coast, it meets with cold Arctic high-pressure system (clockwise winds) blowing down from Canada. When the two systems collide, the moisture and cold air produce a mix of precipitation.

Winter conditions make Nor'easters a normal occurrence, but only a handful actually gather the force and power to cause problems inland. The resulting precipitation depends on how close you are to the converging point of the two storms. Nor'easter events which occur toward the end of a winter season may exacerbate the spring flooding conditions by depositing significant snow pack at a time of the season when spring rains are poised to initiate rapid snow pack melting.

#### *Past Extreme Winter Weather Events*

The following table provides a list of past extreme winter weather events in New Hampshire and Sunapee. The Committee recalls several severe winter weather events every year with long cold snaps. Although snowfall has decreased over the years, there are still times when heavy snowfall has impacted the community with treacherous road conditions.

**Table III-12: SEVERE WINTER WEATHER**

Hazard	Date	Location	Description of Areas Impacted	Damages
Ice Storm	December 17-20, 1929	New Hampshire	Unprecedented disruption and damage to telephone, telegraph and power system. Comparable to 1998 Ice Storm (see below)	Unknown
Blizzard	February 14-17, 1958	New Hampshire	20-30 inches of snow in parts of New Hampshire	Unknown
Snow Storm	March 18-21, 1958	New Hampshire	Up to 22 inches of snow in south central NH	Unknown
Snow Storm	December 10-13, 1960	New Hampshire	Up to 17 inches of snow in southern NH	Unknown
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH	Unknown
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH	Unknown
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH	Unknown
Blizzard	January 29-31, 1966	New Hampshire	Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH	Unknown
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH	Unknown
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH	Unknown
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH	Unknown
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH	Unknown
Snow Storm	February, 1979	New Hampshire	President's Day storm	Unknown
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation	Unknown
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH	Unknown
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 years in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London NH	No damage in Sunapee

Hazard	Date	Location	Description of Areas Impacted	Damages
Extreme Cold	November-December, 1988	New Hampshire	Temperature was below 0 degrees F for a month	No damage in Sunapee
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH	No damage in Sunapee
Snow Storm	1996	Regional	Two major storms with five feet of snow in a week	No damage in Sunapee
Snow Storm	1997	New Hampshire	Power outages throughout region due to heavy snowfall	No damage in Sunapee
Ice Storm	January 15, 1998	New Hampshire; Substantial power outages in Sunapee	Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, \$17+ million in damages to Public Service of NH alone	No damage in Sunapee
Snow Storm	2000	Regional	Heavy snow	No damage in Sunapee
Snow Storm	March 5-7, 2001	New Hampshire	Heavy snow.	No damage in Sunapee
Snow Storm	December 6-7, 2003	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3193-NH	No damage in Sunapee
Snow Storm	February 10-12, 2005	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3208-NH	No damage in Sunapee
Ice Storm	December 2008	New Hampshire	Debris removal. FEMA DR-1812; power outages in Sunapee for up to 10 days; downed trees blocked roads and damaged utility lines	\$15 Million; no damage in Sunapee
Wind Storm	February 23 – March 3, 2010	New Hampshire	FEMA DR-1892; Federal funding to Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan Counties; power loss	\$2 Million; no damage in Sunapee
Snow Storm	October 29-30, 2011	Statewide	EM-3344; FEMA-4049 Hillsborough & Rockingham Counties	No damage in Sunapee
Ice Storm	January 27, 2012	Region	Isolated power outages in Sunapee; several limbs down	No damage in Sunapee
Snow Storm	February 8-10, 2013	New Hampshire	Heavy Snow. FEMA DR-4105	Unknown; No Damage in Sunapee, however, they received \$15,000 for plowing and labor from FEMA

Hazard	Date	Location	Description of Areas Impacted	Damages
Heavy Snow	January 2 – 3, 2014	New Hampshire	6-14 inches of snow across much of the state	No damage in Sunapee
Heavy Snow	February 5, 2014	New Hampshire	Low pressure moving off the mid-Atlantic coast intensified as it moved over Nantucket.	No damage in Sunapee
Heavy Snow	January 26-29, 2015	New Hampshire	6-14 inches with lower amounts in the Connecticut River Valley; storm resulted in DR-4209	No damage in Sunapee
Heavy Snow	February 14, 2015	New Hampshire	6-12 inches	No damage in Sunapee
Heavy Snow	December 29, 2016	New Hampshire	6-16 inches with lesser amounts in the Connecticut River Valley. More than 11,000 homes and businesses saw outages due to this storm	No damage in Sunapee
Heavy Snow	February 9, 2017	New Hampshire	Several to 15 inches	No damage in Sunapee
Heavy Snow	March 14, 2017	New Hampshire	High winds and/or heavy snow downed trees and created power outages; 12-20 inches. This storm resulted in DR-4316	No damage in Sunapee
Heavy Snow	January 4, 2018	New Hampshire	10-15 inches with lesser amounts in the Connecticut River Valley	No damage in Sunapee
Snow	March 1-9, 2018	New Hampshire	This storm resulted in DR-4370.	No damage in Sunapee
Heavy Snow	March 13, 2018	New Hampshire	15-29 inches; this storm resulted in DR-4371	No damage in Sunapee
Heavy Snow	December 17, 2020	New Hampshire	44-46" snow; low visibility; three days later it rained causing flooding on Lake Avenue	No damage in Sunapee

#### *Potential Future Severe Winter Damage:*

There is the potential for severe winter damage every year. An event would affect the entire town. According to the State's mitigation plan, Sullivan County has a high risk for severe winter weather. The Committee determined severe winter weather to be a medium risk in Sunapee.

## Solar Storms and Space Weather



Activity on the sun's surface creates "space weather" and solar storms. Although the sun is 93 million miles from the earth, this space weather can affect our planet. As we become increasingly reliant on electronics and technology, our lives can become disrupted by solar storms and space weather: disrupt communications, damage or destroy electronic components, corrode gas and oil pipelines, and cause significant damage to spacecraft and satellites outside the Earth's protective atmosphere. Radio signals can be partially or completely blocked. In NH there is the potential for loss of communications, power, and GPS. In March 1989, Quebec, Canada experienced a 9-hour blackout when solar winds caused a fluctuation in the Earth's magnetic field and caused Hydro-Quebec's transmission to go down. Since communication systems can be affected by space weather, this would have a potentially town wide impact.

The National Oceanic and Atmospheric Association (NOAA) Space Weather Scales were introduced as a way to communicate to the general public the current and future space weather conditions and their possible effects on people and systems. Many of the Space Weather Prediction Center products describe the space environment, but few have described the effects that can be experienced as the result of environmental disturbances. These scales are useful to users of our products and those who are interested in space weather effects. The scales describe the environmental disturbances for three event types: geomagnetic storms, solar radiation storms, and radio blackouts. The scales have numbered levels, analogous to hurricanes, tornadoes, and earthquakes that convey severity. They list possible effects at each level. They also show how often such events happen, and give a measure of the intensity of the physical causes. The following table shows the NOAA scale for radio blackouts.

### *Past Solar Storm and Space Weather Events:*

The Committee does not recall solar flares or sunspots causing poor emergency communication reception.

### *Future Solar Storm and Space Weather Events:*

It is unpredictable but inevitable that the communications and electrical infrastructure will be impacted in the future. The Committee felt it is important to raise awareness about this potential hazard. The State plan determined that Sullivan County is at low risk for solar storm and space weather events. The Committee determined solar storm and space weather events to be a low risk in Sunapee.

**Figure III-8: RADIO BLACKOUTS SCALE**

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
<b>R 5</b>	<b>Extreme</b>	<b>HF Radio:</b> Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. <b>Navigation:</b> Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	X20 ( $2 \times 10^{-3}$ )	Less than 1 per cycle
<b>R 4</b>	<b>Severe</b>	<b>HF Radio:</b> HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. <b>Navigation:</b> Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	X10 ( $10^{-3}$ )	8 per cycle (8 days per cycle)
<b>R 3</b>	<b>Strong</b>	<b>HF Radio:</b> Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. <b>Navigation:</b> Low-frequency navigation signals degraded for about an hour.	X1 ( $10^{-4}$ )	175 per cycle (140 days per cycle)
<b>R 2</b>	<b>Moderate</b>	<b>HF Radio:</b> Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes. <b>Navigation:</b> Degradation of low-frequency navigation signals for tens of minutes.	M5 ( $5 \times 10^{-5}$ )	350 per cycle (300 days per cycle)
<b>R 1</b>	<b>Minor</b>	<b>HF Radio:</b> Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact. <b>Navigation:</b> Low-frequency navigation signals degraded for brief intervals.	M1 ( $10^{-5}$ )	2000 per cycle (950 days per cycle)



## Earthquake

An earthquake is any sudden shaking of the ground caused by the passage of seismic waves through Earth's rocks. Seismic waves are produced when some form of energy stored in Earth's crust is suddenly released, usually when masses of rock straining against one another suddenly fracture and "slip." Earthquakes occur most often along geologic faults, narrow zones where rock masses move in relation to one another. The major fault lines of the world are located at the fringes of the huge tectonic plates that make up Earth's crust.

**Table III-13: RICHTER SCALE and MERCALLI INTENSITY**

Richter Scale	Modified Mercalli Intensity	Average Earthquake Effects
1.0-3.0	I	<b>I</b> – Not felt except by a very few under especially favorable conditions.
3.0-3.9	II-III	<b>II</b> – Felt only by a few persons at rest, especially on upper floors of buildings. <b>III</b> – Felt quite noticeably by persons indoors. Standing motor cars may rock slightly.
4.0-4.9	IV-V	<b>IV</b> – Felt indoors by many, outdoors by few during the day. Dishes, windows, doors disturbed; walls make cracking sound. <b>V</b> – Felt by nearly everyone; many awakened. Some dishes, windows broken.
5.0-5.9	VI-VII	<b>VI</b> – Felt by all. Some heavy furniture moved; a few instances of fallen plaster. <b>VII</b> – Damage negligible in buildings of good design and construction, considerable damage in poorly built or badly designed structures; some chimneys broken.
6.0-6.9	VII-IX	<b>IX</b> – Damage considerable in specially designed structures; damage great in substantial buildings, with partial collapse.
7.0 and higher	VIII or higher	<b>VIII</b> and higher: damage slight in specially designed structures. Fall of chimneys, factory stacks, columns, monuments, walls. <b>X</b> – Some well-built wooden structures destroyed, most masonry and frame structures destroyed with foundations. <b>XI</b> – Few if any masonry structures remain standing. Bridges destroyed. <b>XII</b> – Total damage. Lines of sight and level are distorted. Objects thrown in air.

*Past Earthquake Damage:*

Below is a table of past earthquakes in the region. The Committee does not recall any impact by an earthquake in Sunapee.

**Table III-14: EARTHQUAKES**

Date	Location	Magnitude	Damage
1638	Central NH	6.5-7	
October 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown
December 29, 1727	Off NH/MA coast	NA	Widespread damage Massachusetts to Maine: cost unknown
November 18, 1755	Cape Ann, MA	6.0	Much damage: cost unknown
1800s	Statewide	83 felt earthquake in NH	Unknown
1900s	Statewide	200 felt earthquake in NH	Unknown
March 18, 1926	Manchester, NH	Felt in Hillsborough Co	Unknown
Dec 20, 1940	Ossipee, NH	Both earthquakes 5.5	Damage to homes, water main rupture: cost unknown.
December 24, 1940	Ossipee, NH	NA	Unknown
December 28, 1947	Dover-Foxcroft, ME	4.5	Unknown
June 10, 1951	Kingston, RI	4.6	Unknown
April 26, 1957	Portland, ME	4.7	Unknown
April 10, 1962	Middlebury, VT	4.2	Unknown
June 15, 1973	Near Quebec Border	4.8	Unknown
Summer 1977-1978*	Centered in Franklin	NA	Committee recalls feeling earthquake in Sunapee
January 19, 1982	West of Laconia	4.5	Structure damage 15 miles away in Concord: cost unknown
October 20, 1988	Near Berlin, NH	4	Unknown
September 26, 2010	New Hampshire	3.4	Centered in Boscawen, NH
August 23, 2011	Central Virginia, E Coast	5.8	Felt in Sunapee
September 18, 2012	Concord, NH	1.2	Epicenter was Concord, NH and the quake was felt in the capital region of NH; no damages in Sunapee
October 16, 2012	Southern Maine	4.0	The earthquake was located southern Maine and felt throughout the area and into southern NH; no damages in Sunapee
August 11, 2021	Concord, NH	Tremor felt in Sunapee	Unknown; no damage in Sunapee

Source: [earthquake.usgs.gov/earthquakes/states/new\\_hampshire/history.php](https://earthquake.usgs.gov/earthquakes/states/new_hampshire/history.php) for earthquakes through 1964. NH Multi-Hazard Mitigation Plan, 2010 for 1973-1982; [earthquake.usgs.gov/earthquakes](https://earthquake.usgs.gov/earthquakes) (12/13/11)

\*Committee recollection

### *Potential Future Earthquake Damage:*

A United States Geographic Survey mapping tool on the web ([geohazards.cr.usgs.gov/projects](http://geohazards.cr.usgs.gov/projects)) projects a 5 – 6 peak ground acceleration (pga) with 10% probability of exceedance in 50 years for the Town of Sunapee. This pga rating is equivalent to a Modified Mercalli Intensity of “V” with moderate perceived shaking and very light potential damage. An earthquake event would impact the entire town. According to the State’s mitigation plan, Sullivan County has a low risk for earthquakes. The Committee determined the risk to be low in Sunapee.



### **Natural Water & Air Contaminants**

Radium, radon and uranium are grouped together because they are radionuclides, unstable elements that emit ionizing radiation. These three particular substances are a health risk only if taken into the body by ingestion or inhalation. They occur naturally in the environment, uranium and radium as solids in rock while radon exists as a gas. Radionuclides are undetectable by taste, odor, or color, so only analytical testing can determine if they are present in water. Because they are associated with rock, wells drilled into bedrock are more likely to contain elevated levels of radionuclides than shallow or dug wells.

Radon gas can also be found in the soil. Openings between the soil and buildings, such as foundation cracks and where pipes enter, provide conduits for radon to move into structures. The difference in air pressure, caused by heated indoor air moving up and out of buildings, results in a flow of soil gas toward the indoors, allowing radon to potentially accumulate in structures. Air quality in a home can also be tested for radon. Following is a map of New Hampshire by the U.S. EPA to show radon zones.

There are many other natural contaminants which can render drinking water unsafe such as arsenic. The Drinking Water and Groundwater Bureau of the NH Department of Environmental Services has several fact sheets available to address these natural materials and suggests which materials to be included in testing. See their list of fact sheets at <https://www.des.nh.gov/organization/commissioner/pip/factsheets/dwgb/index.htm>.

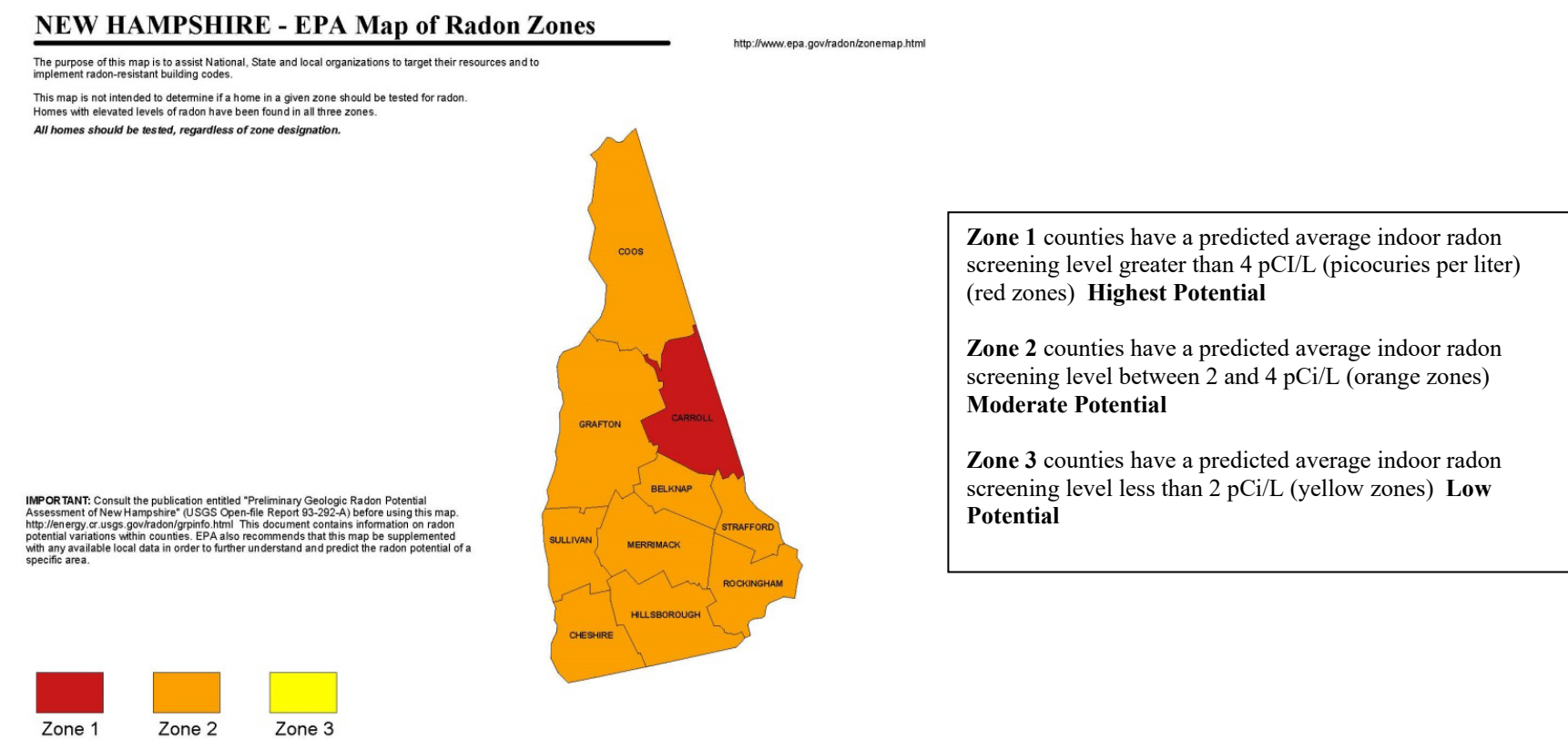
### *Past Natural Water & Air Contaminant Events*

There have been no known events related to natural water and air contamination in Sunapee although uranium is a known water contaminant in neighboring towns. Uranium was found when constructing I-89 to the east and northeast of Sunapee. It is also anticipated

that although no one is aware of any radon contamination, given that we are in the “Granite State,” it is likely that some homes are affected by radon.

**Table III-15: RADON**

<b>Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)</b>					
<b>County</b>	<b># Tests</b>	<b>G. Mean</b>	<b>Maximum</b>	<b>% &gt; 4.0 pCi/l</b>	<b>% &gt; 12.0 pCi/l</b>
Belknap	744	1.3	22.3	14.4	1.3
Carroll	1042	3.5	478.9	45.4	18
Cheshire	964	1.3	131.2	15.6	2.3
Coos	1072	3.2	261.5	41	17
Grafton	1286	2.0	174.3	23.2	5.2
Hillsborough	2741	2.1	202.3	29.6	6.8
Merrimack	1961	2.0	152.8	25.2	6
Rockingham	3909	3.0	155.3	40	9.5
Strafford	1645	3.4	122.8	44	13
<b>Sullivan</b>	<b>466</b>	<b>1.4</b>	<b>29.4</b>	<b>15.7</b>	<b>2.1</b>
<b>STATEWIDE</b>	<b>15860</b>	<b>2.4 pCi/L</b>	<b>478.9 pCi/L</b>	<b>32.4</b>	<b>8.6</b>

**Figure III-9: MAP OF RADON ZONES***Potential Future Natural Air & Water Contaminant Damage:*

Although there are no known records of illness that can be attributed to radium, radon, or uranium or other contaminants in Sunapee, residents should be aware that they are present. Houses with granite and dirt cellars are at increased risk to radon gas infiltration. According to the table above, Sullivan County radon levels are below average for the State. According to the State's mitigation plan, Sullivan County has a low probability of a radon related hazard.

In addition, radium, radon, and uranium as well as other natural materials can be present in drinking water. Residents, especially with bedrock wells, should be aware of the possibility of water contamination and the availability of testing and remediation. The Committee determined that the risk of natural contaminants is low.

## Hazardous Materials Spills



Hazardous materials spills or releases can cause loss of life and damage to property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident. The spills may occur on-site at hazardous waste generators or in transport through town.

In Sunapee, there are 20 potential hazardous waste generators listed on the NH Department of Environmental Services (DES) “one-stop” list (April 2021): two are listed as “declassified;” 14 are listed as “inactive;” and only four are listed as currently active. The active sites include Chuck Pierce Restoration, Fulton Construction, Sunapee Wind, and East Sunapee Garage (Tri-State Crushing).

### *Past Hazardous Waste Spill Events*

The Committee did not note any HazMat spills in the past in the town. The committee did note that the Town’s location on major state roads, discussed below, increases their risk, but that to date they have not had a hazardous material spill occur that caused significant damage or impacted the town. The Town’s transfer station has contaminated groundwater from a closed unlined landfill.

### *Potential Future Hazardous Waste Spill Damage*

Although there have not been any significant spills in Sunapee, hazardous materials spills could occur along the NH Route 11 or NH Route 103 or Interstate 89. In addition, heating fuel is delivered to homes on many of the town’s roads: spills could occur at storage tanks during the filling of the tanks. Sunapee also has a significant number of properties and marinas with fuel tanks in close proximity to the lakes, notably Lake Sunapee. There conceivably could be spills near any home in Sunapee due to home heating fuel delivery. The property owner is responsible for clean-up. The State oversees these reported spills.

The Committee determined a hazardous waste spill is a medium risk.

## Terrorism



Terrorism has been defined in many ways. The word terrorism is derived from the Latin term “terrere” which means to frighten. Section 802 of the USA Patriot Act expanded the definition of terrorism to cover “domestic,” as opposed to international terrorism. A person engages in domestic terrorism if they do an act “dangerous to human life” that is a violation of the criminal laws of a state or the United States, if the act appears to be intended to: (i) to intimidate or coerce a civilian population; (ii) to influence the policy of a government by intimidation or coercion; or (iii) to affect the conduct of a government by mass destruction, assassination, or kidnapping; and (C) occur primarily within the territorial jurisdiction of the United States.”

### *Past Terrorism Events*

There have been no terrorism events within Sunapee in the past.

### *Future Terrorism Events*

Terrorism is not considered a major risk. The committee felt they were not able to determine a particular area of town that was at a greater risk of terrorism although the school and water supplies are potential targets. The nature of terrorism includes many unknowns and predicting a more vulnerable area cannot be done. The Committee determined that the risk of terrorism is a low/medium risk in Sunapee.

## Infectious Diseases



Infectious diseases are disorders caused by organisms — such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They're normally harmless or even helpful. But under certain conditions, some organisms may cause disease.

Some infectious diseases can be passed from person to person. Some are transmitted by insects or other animals. And you may get others by consuming contaminated food or water or being exposed to organisms in the environment.

According to the US National Institutes of Health (NIH; Bethesda, MD; pre-pandemic), 16 new infectious diseases have been identified in the past two decades (NIH 2008; Fauci et al, 2005); five others have been identified as re-emerging. The word 'new' refers to the recent discovery of the disease; many of these agents might have long existed as non-pathogenic organisms, but have only just mutated into a pathogenic form. In fact, we are witnessing a slow realization among public-health experts and the general public that infectious diseases are back with a vengeance. With the discovery of antibiotics in the early twentieth century and the successful eradication of smallpox in 1979, it seemed that humanity was about to finally rid itself of infectious diseases. During the past couple of decades, however, microbes have shown a tenacious ability to adapt, re-adapt, survive and challenge human ingenuity.

#### *Past Infectious Disease Events*

The Committee does not recall any past major outbreaks. There have been 369 cases of COVID-19 cases reported in Sunapee as of December 2021. (Source: WMUR9)

#### *Future Infectious Disease Events*

Although there have been no serious outbreaks other than COVID-19 in Sunapee in the past several years, the potential is there with the several schools, large employer facilities, and churches. The Town works with the Greater Sullivan Health Network and the Nh Department of Health and Human Services to keep abreast of changes in infectious diseases. The State plan determined that Sullivan County is at low risk for infectious disease events. The Committee determined infectious disease events to be a medium/high risk in Sunapee.

**Table III-16: LARGE EMPLOYERS**

<b>Employer</b>	<b>Product</b>	<b>Employees</b>
Sunapee School District	Education	95
Micro-Precision, Inc.	Machining	40

*NH Employment Services 2021*

**Table III-17: SCHOOLS**

School	Grades	Staff	Enrollment
Sunapee Central Elementary School	Pre-K - 5	42	182
Sunapee Middle School	6 - 8	47	94
Sunapee Sr. High School	9 - 12		134
Mount Royal Academy (private)	Pre-K - 12	31	210

*Town of Sunapee phone survey, December 2021*

**Table III-18: INFECTIOUS DISEASE MEASUREMENT**

<b>Endemic</b>	Constant presence and/or unusual prevalence of a disease or infection agent in a population within a geographic area
<b>Hyper-endemic</b>	The persistent, high levels of disease occurrence
<b>Cluster</b>	Aggregation of cases grouped in place and time that are suspected to be greater than the number expected even though the expected number may not be known
<b>Epidemic</b>	An increase, usually sudden, in the number of cases of a disease above what is normally expected
<b>Outbreak</b>	The same as epidemic, but over a much smaller geographical area
<b>Pandemic</b>	Epidemic that has spread over several countries or continents, usually affecting many people

**Table III-19: ACTIONS TO REDUCE RISK OF INFECTIOUS DISEASE****Hand washing**

Always wash hands before, during and after preparing food, before eating, after using the bathroom or changing nappies, and after handling animals or animal waste. Simple hand washing has been found to reduce the bacterial load by up to 50%. Lather hands and scrub for 20 seconds.

**Masks and social distancing**

Wear a mask over the nose and mouth and stay 6' away from others especially in indoor areas around people who don't live with you.

**Routinely cleaning and disinfecting surfaces**

Cleaning with soap and water removes dirt and most germs. A disinfectant like hydrogen peroxide or white vinegar kills additional germs, however, the Center for Disease Control should be consulted for particular outbreaks. It is important to thoroughly clean areas where germs are likely to be transmitted, such as the kitchen and bathroom.

**Handling and preparing food safely**

Buy and refrigerate perishable foods quickly. Store food correctly. Do not allow juices from meat, seafood, poultry or eggs to drip onto other rarely eaten foods. Wash hands, kitchen surfaces and utensils after preparing food. Wash raw fruits and vegetables. Do not eat raw eggs. Use different plates for raw foods and cooked foods. Keep cold foods cold and hot foods hot. Do not leave leftovers out for more than 2 hours.

**Immunization**

Children, adolescents and adults need immunizations. Make sure family members get the correct vaccines at the correct times. Keep immunization records for the whole family to ensure appropriate follow-up.

**Correct use of antibiotics**

Unnecessary use of antibiotics can be harmful and causes bacteria to become resistant. Antibiotics do not work against viral diseases such as colds or influenza. Use antibiotics exactly as prescribed—the correct dosage, time, duration—respecting all necessary accompanying dietetic and hygienic regulations

**Animal safety**

Keep pets healthy by following veterinary recommendations. Clean litter boxes daily and do not let children play where animals urinate or defecate. Cover sandboxes. Use insect repellent during outdoor activities. Avoid contact with wild animals.

**Safe sexual habits**

The best ways of preventing the transmission of sexually transmitted diseases, in descending order of efficacy, are abstinence, fidelity to an uninfected partner and the use of condoms.

**Safe blood transfusion**

Blood transfusions should be used only for cases that absolutely require it as a live-saving measure. Even then, blood should be systematically screened for commonly known and frequent blood-transmitted infectious diseases.

**Table III-20: INFECTIOUS DISEASE EVENTS**

Date	Description	Impacts	Location	Additional Information
2005	Hepatitis A	82 cases	Statewide	30% higher than previous four years
2009	H1N1 Influenza	754 Hospitalizations and 10 Deaths	Statewide	WHO Level 1 Pandemic “swine flu” Division of Public Health Services processed 4,192 specimens and 786 cases
2014	Enterovirus D-68	>40 children in NH: some with paralysis	Statewide	A rare strain of enterovirus resulted in debilitating infections in children nationwide
2014-2015	Ebola virus disease	>100 people in NH monitored for potential Ebola virus symptoms	Statewide	Travel to West Africa during unprecedented outbreak of Ebola virus. No actual cases occurred in NH
2016	Gonorrhea	465 people infected	Statewide	250% higher than previous years
2017-2018	Seasonal influenza outbreak	As of April 2018, 63 adult influenza related deaths in NH	Statewide	A particularly virulent flu season. The overall effectiveness of the flu vaccine estimated at 36%.
Annually	Foodborne outbreaks	Ill individuals	Statewide	5-10 outbreaks per year
Annually	Influenza and other respiratory virus outbreaks	Ill individuals	Statewide	25-50 outbreaks per year primarily occurring in long-term care facilities and schools
Annually	Norovirus and other gastrointestinal virus outbreaks	Ill individuals	Statewide	60-80 outbreaks per year primarily occurring in long-term care facilities and schools
2019 & continuing	COVID-19 coronavirus Pandemic	As of December 7 2021, only a few, small island countries of the 195 countries worldwide have not reported COVID-19 cases.	Worldwide	Center for Disease Control (CDC) is responding to an outbreak of respiratory disease caused by a novel (new) coronavirus that was first detected in Wuhan City, Hubei Province, China and which has now been detected in most countries around the world. On January 30, 2020, the International Health Regulations Emergency Committee of the World Health Organization declared the outbreak a public health emergency of international concern. This disease causes respiratory disease.  NH DR-4516: Incident period January 20, 2020 and continuing; Major Disaster Declaration declared on April 3, 2020.

Source: NH Multi-Hazard Mitigation Plan 2018 and 03/27/20 Newsweek regarding COVID-19.

## Invasive Species



According to NH Fish and Game, invasive species are among the leading threats to native wildlife. Approximately 42 percent of threatened or endangered species are at risk due to invasive species. Human health and economies are also at risk from invasive species. The impacts of invasive species on our natural ecosystems and economy cost billions of dollars each year. Many of our commercial, agricultural, and recreational activities depend on healthy native ecosystems.

An invasive species can be any kind of living organism—an amphibian (like the cane toad), plant, insect, fish, fungus, bacteria, or even an organism’s seeds or eggs—that is not native to an ecosystem and causes harm. They can harm the environment, the economy, or even human health. Species that grow and reproduce quickly, and spread aggressively, with potential to cause harm, are given the label “invasive.” An invasive species does not have to come from another country.

Invasive species are primarily spread by human activities, often unintentionally. People, and the goods we use, travel around the world very quickly, and they often carry uninvited species with them. Ships can carry aquatic organisms in their ballast water, while smaller boats may carry them on their propellers. Insects can get into wood, shipping pallets, and crates that are shipped around the world. Some ornamental plants can escape into the wild and become invasive. And some invasive species are intentionally or accidentally released pets.

According to NH Fish and Game, many invasive species are currently limited by temperature, and are likely to expand northward into New Hampshire as a result of warmer temperatures caused by climate change. Climate-related disruptions such as large storm events and drought may also introduce species and create conditions that allow invasive species to proliferate.

### *Past Invasive Species Events*

There are several invasive plant species in the Town of Sunapee such as Japanese knotweed along the roads and streams. Japanese knotweed has a shallow root system and grows along stream banks and roadways. Along the streams, it does not hold the bank soil and erosion occurs taking the Japanese knotweed with it to propagate downstream spreading this invasive plant. The Emerald Ash Borer is an example of an exotic invasive insect impacting Sunapee by killing native ash trees. The ash trees in Sunapee have also been diagnosed as being infected with “ash yellows.” The Hemlock Woolly Adelgid is killing Sunapee hemlock trees. There are also a non-native phragmites growing near the wastewater treatment plant and along the Sugar River. The Town is trying to reduce this plant by spraying with an herbicide.

Lake Sunapee is the drinking water source for the Town of Sunapee and home to several invasive species. The lake is home to the invasive Variable milfoil and cyanobacteria (*Gloeotrichia echinulata*) as well as an invasive fish, the Rock Bass. The Lake Sunapee Protective Association works to reduce the risks of invasives by controlling them before they become overly abundant.

Some homes have become infested with bed bugs in Sunapee as in many towns in New England. This is most likely to occur in the homes where transients come in Sunapee for vacations.

#### *Future Invasive Species Events*

It is anticipated that invasive species will continue to thrive and expand within Sunapee as they have been in the past. The State plan does not address invasive species, but the Committee felt it should be addressed in this plan. The Committee determined invasive species infestation to be a low-medium risk in Sunapee.

**Figure III-10: PREVENTING THE SPREAD OF INVASIVE SPECIES**

## **WAYS YOU CAN PREVENT THE SPREAD OF INVASIVE SPECIES**

### **Plant Native Plants**

Plant native plants and remove any invasive plants in your garden. There are many good native plant alternatives to common exotic ornamental plants.

### **Identify and Report Invasive Species**

Learn to identify invasive species in your area, and report any sightings to your county extension agent or local land manager. The NH Department of Agriculture, the NH Fish & Game Department, and UNH Extension all provide information about invasive species. Have a look on-line.

### **Don't Unintentionally Transport Invasive Species**

Regularly clean your boots, gear, boat, tires, and any other equipment you use outdoors to remove insects and plant parts that may spread invasive species to new places. Clean your pet's paws when they have been with you on travels so they don't bring seeds back with them.

### **Use Local Firewood**

Buy firewood near you (within 30 miles) instead of bringing from your own from home to a campsite, and leave any extra for the next campers. Invertebrates and plants can easily hitch a ride on firewood you haul to or from a campsite—you could inadvertently introduce an invasive to a new area.

### **Fish with Native Bait**

When you go to your local stream, river or lake to fish, bait can often take the form of an invasive species like a worm or fish. If possible, seek out native bait. When finished fishing, do not dump your bait into the water.

## C. HAZARD RISK RATINGS

The Town of Sunapee Hazard Mitigation Committee reviewed each potential hazard and rated the probability of occurrence and vulnerability (cost if the hazard actually occurs) to come up with an overall risk rating. These ratings were reevaluated and changed in 2021. The ratings were based on past occurrences of hazards affecting the State of New Hampshire, Sullivan County, and the Town of Sunapee. The two highest risks in Sunapee were determined to be Dam Failure and Flooding.

### Assessing Probability

The process involved assigning a number to each hazard type based on its potential of occurring determined using the committee's knowledge of past events:

- 1 – Low: may occur after 25 years
- 2 – Medium: may occur within 10-25 years
- 3 – High: may occur within 10 years

An n/a score was given if there was insufficient evidence to make a decision. To ensure some balance with a more scientific measurement, the plan also identifies the probability of occurrence from the State Hazard Plan as shown in Table III-10. For comparative purposes the Low rating was given a designation of “1,” the Medium rating a designation of “2,” and the High rating a designation of “3.” These figures are shown in Table III-17 and III-18.

**Table III-21: RISK AND PROBABILITY OF HAZARD IN SULLIVAN COUNTY - 2018 NH NATURAL HAZARDS MITIGATION PLAN**

	Natural Hazard												
	Avalanche	Flooding	Drought	Earthquake	Extreme Temps	High Wind	Infectious Diseases	Landslide	Lightning	Severe Winter Weather	Solar Storm and Space Weather	Tropical Storms	Wildfires
<b>Risk</b>	L	H	L	L	L	H	L	L	L	H	L	M	L
<b>Probability</b>	M	H	M	M	H	H	M	H	H	H	L	M	M
<b>Sullivan County listed at risk?</b>	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

## Assessing Vulnerability

A relative scale of 1 to 3 was used to determine the impact and cost for human death and injury, property losses and damages, and business/agricultural impact: 1 – limited damage and cost; 2 - moderate amount of damage and cost, and 3 – high damage and cost.

**Table III-22: VULNERABILITY OF EXISTING DEVELOPED AREAS**

Committee Assessment of Vulnerability	Human Impact	Property Impact	Economic Impact	Vulnerability
	Probability of death or injury	Physical losses and damages	Cottage businesses & agriculture	Avg. of human/ property/ business impact
Climate Change	1	2	2	1.67
Dam Failure	3	3	3	3.00
Flooding	2	2	2	2.00
Erosion	1	2	1	1.37
Tropical Storms	2	3	3	2.66
High Wind	2	3	3	2.66
Thunderstorm/Lightning/Hail	1	1	1	1.00
Drought	1	1	1	1.00
Extreme Temperatures	1	1	1	1.00
Wildfire	1	2	2	1.66
Severe Winter/Ice Storms	2	2	2	2.00
Solar Storms and Space Weather	1	1	1	1.00
Earthquake	1	1	1	1.00
Natural Contaminants	1	1	1	1.00
HazMat Spills	3	2	2	2.33
Terrorism	3	3	3	3.00
Infectious Disease	3	3	3	3.00
Invasive Species	1	2	2	1.67

## **Assessing Risk**

The averages of each vulnerability and probability were multiplied to arrive at the overall risk the hazard has on the community. The overall risk or threat posed by a hazard over the next 25 years was determined to be high, medium, or low.

**HIGH:** There is strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town's emergency management training and exercise program.

**MEDIUM:** There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate this hazard. This hazard should be included in the town's emergency management training and exercise program.

**LOW:** There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate this hazard. This hazard need not be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

**Table III-23: RISK ASSESSMENT**

Risk Assessment				
0-1.9 Low    2-3.9 Low/Med    4-5.9 Med    6-7.9 Med-High    8-9 High				
Hazards	Probability based on Committee Review	Vulnerability based on Committee Review	Risk Rating (Probability x Vulnerability)	Risk
Climate Change	2	1.67	3.34	Low/Medium
Dam Failure	1	2.00	2.00	Low/Medium
<b>Flooding</b>	<b>3</b>	<b>2.00</b>	<b>6.00</b>	<b>Medium/High</b>
Erosion	2	1.37	2.74	Low/Medium
Tropical Storms	2	2.66	5.32	Medium
High Wind Events	2	2.66	5.32	Medium
Thunderstorm/Lightning/Hail	1	1.00	1.00	Low
Drought	1	1.00	1.00	Low
Extreme Temperatures	1	1.00	1.00	Low
Wildfire	1	1.66	1.66	Low
Severe Winter	2	2.00	4.00	Medium
Solar Storms and Space Weather	1	1.00	1.00	Low
Earthquake	1	1.00	1.00	Low
Natural Contaminants	1	1.00	1.00	Low
HazMat	2	2.33	4.66	Medium
Terrorism	1	3.00	3.00	Low/Medium
<b>Infectious Disease</b>	<b>2</b>	<b>3.00</b>	<b>6.00</b>	<b>Medium/High</b>
Invasive Species	2	1.67	3.34	Low/Medium

## IV. CRITICAL FACILITIES/LOCATIONS

The Critical Facilities list, identified by the Sunapee Hazard Mitigation Committee, is divided into three categories. The first category contains facilities needed for emergency response in the event of a disaster. The second category contains non-emergency response facilities that are not required in an event, but that are considered essential for the everyday operation of the Town of Sunapee. The third category contains facilities/populations that the Committee wishes to protect in the event of a disaster. Values for all properties in this document were obtained from town tax records for 2021. The equalization to current values is 97.3%. This is for land and improvements such as buildings.

**Table IV-1: EMERGENCY RESPONSE FACILITIES, SERVICES & STRUCTURES**

Critical Facility	Hazard Vulnerability	Tax Map/Lot	Replacement Value
Safety Services Building (Emergency Operations Center) (Fire, EMS, Police)	Town-wide events & HazMat spills	0129-0036	\$2.8 million
Georges Mills Fire Station	Town-wide events & HazMat spills	0106-0064	\$195,200
Sunapee Middle-High School (Emergency Shelter)	Town-wide events	0130-0034	\$6.2 million
Sherburne Gym (Emergency Shelter, if get generator)	Town-wide events & HazMat spills	0129-0025	\$2.7 million
Sunapee Water & Sewer Facilities (treatment plant and pump stations)	Flooding, Dam Failure, Lightning, and Town-wide events	0225-0086	\$8.2 million
Sunapee Highway Garage	Town-wide events	0218-0082	\$856,400
Roads & Bridges (evacuation and emergency access)	Town-wide events, Flooding, Dam Failure	NA	Unknown

**Table IV-2: NON-EMERGENCY RESPONSE FACILITIES & STRUCTURES**

Critical Facility	Hazard Vulnerability	Tax Map/Lot	Replacement Value
Sunapee Town Offices	Dam failure, Flooding, Lightning, Town-wide events	0132-0001	\$469,300
Lake Sunapee United Methodist Church (potential shelter)	Town-wide events, Flooding, Dam Failure; HazMat spills	0129-0001	\$642,000
St. Joachim's Catholic Church (potential shelter)	Town-wide events; HazMat spills	0129-0044	\$614,600
Sunapee Elementary School	Town-wide events	0129-0025	\$2.7 million
Sunapee Hydroelectric Facility/Welcome Center	Dam Failure; Flooding; Town-wide events; HazMat spills	0132-0049	\$1.8 million
Sunapee Transfer Station	Town-wide Events	0218-0074	\$332,400
Abbott Library (potential shelter/warming or cooling station)	Town-wide Events; HazMat spills	0129-0043-0012	\$1.9 million

**Table IV-3: FACILITIES & POPULATIONS TO PROTECT**

Critical Facility	Hazard Vulnerability	Tax Map/Lot	Replacement Value
Sunapee Cove Assisted Living	Town-wide Events; HazMat spills	0106-0021	\$7.8 million
Dewey Beach & Ballfield structures	Town-wide Events	0123-0021	\$258,700
Lake Sunapee Protective Association	Town-wide Events	0133-0025	\$1.5 million
Mount Royal Academy	Town-wide Events	0123-0002	\$3.4 million
All commercial/industrial buildings	All hazards-site specific	NA	Unknown
All homes	All hazards-site specific	NA	Unknown

## V. DETERMINING HOW MUCH WILL BE AFFECTED

### A. IDENTIFYING VULNERABLE FACILITIES

It is important to determine which critical facilities and other structures are the most vulnerable and to estimate potential losses. The first step is to identify the facilities most likely to be damaged in a hazard event. To do this, the locations of critical facilities were compared to the location of past and potential hazard events. Facilities and structures located in federally and locally determined flood areas, dam inundation areas, etc. were identified and included in the analysis. There is neither large land areas slated for potential development nor large development projects in the works, so vulnerability of undeveloped land was not analyzed except to note logical future development areas.

**Table V-1: VULNERABILITY OF EXISTING DEVELOPED AREAS**

Area	Hazard	Critical Facilities	Buildings (residential & non-residential)	Infrastructure	Natural Resources	Total Known Building Value
Flood Zones	Flooding	None	\$1,336,700	Unknown	Unknown	\$1,336,700
Dam Inundation Areas						

**Table V-2: VULNERABILITY OF POTENTIAL DEVELOPMENT**

Area	Hazard	Critical Facilities	Projected Buildings	Projected Infrastructure	Projected Value
None Known	All Hazards	None	N/A	N/A	N/A

### B. IDENTIFYING VULNERABLE SPECIAL POPULATIONS

There are few centers of special populations in town including such as the regional elementary school, the town offices, the town hall during special meetings, and the library. The elderly and physically or mentally impaired residents are also residing throughout the town in their homes.

## C. POTENTIAL LOSS ESTIMATES

This section identifies areas in town that are most vulnerable to hazard events and estimates potential losses from these events. It is difficult to ascertain the amount of damage caused by a natural hazard because the damage will depend on the hazard's extent and severity, making each hazard event quite unique. In addition, human loss of life was not included in the potential loss estimates, but could be expected to occur. FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Losses* (August 2001) was used in estimating loss evaluations. The value of structures was determined by using 2019 town records. The Town's tax maps were used to determine number of units within each hazard area. The land damage cost, structure content loss costs, and function loss cost were not determined.

### **Climate Change – Low/Medium Risk – Cost Unknown**

This is a global issue that will exacerbate many of the other hazards within this plan.

### **Dam Failure – Low/Medium Risk - Cost Unknown (at least \$2.8 Million)**

There are no high hazard dams in Sunapee. There are two significant hazard potential dams: Wendall Marsh Dam and Sunapee Lake Dam. No Emergency Action Plan or inundation area mapping has been done for the Wendall Marsh Dam to determine the impact of a potential dam failure. This is in process since the dam was recently redesignated to "significant." The number of principal buildings in the Sunapee Lake Dam inundation area is 57 on 25 parcels at a current value of about \$2.8 million. Assuming a 28% structural damage to the buildings, the damage would be

### **Flooding – Medium/High Risk - \$33.6 Million Estimated Cost (not including roads, bridges)**

There are about 354 buildings on 236 parcels of land within the FEMA designated 1% flood zone. The value of these buildings is about \$120 million. Assuming a 28% structural damage to the buildings, the damage would total close to \$33.6 million.

### **Erosion – Low/Medium Risk – No Recorded or Estimated Cost**

Development on steep slopes can cause substantial erosion in the adjacent area. This can impact the adjacent roads in the area by making them more susceptible to erosion and washout. Construction itself can cause erosion if best management practices are not used to control run-off from disturbed soils, and the rooftops of buildings displace water which would have gone into the ground. This is then exacerbated by the steep slopes where the run-off moves more quickly and can cause more damage.

**Tropical/Post-Tropical Storms – Medium Risk – \$7.9 Million Estimated Cost**

Damage caused by hurricanes can be severe and expensive. Sunapee has been impacted in the past by both wind and flooding damage as a result of hurricanes. The total 2020 assessed value of all structures within Sunapee is approximately \$788 million. It is random which structures would be impacted and how much. There is no standard loss estimation available and no record of past costs. If 10% of the buildings received 10% damage, the damage cost would be about \$7.9 Million.

**High Wind Events –Medium Risk – No Recorded or Estimated Cost**

Tornadoes, downbursts, and microbursts are relatively uncommon natural hazards in New Hampshire, although microbursts in 2007 caused substantial damage. On average, about six tornado events strike each year. In the State of NH, the average annual cost of tornadoes between 1950 and 1995 was \$197,000 (The Disaster Center). These wind events occur in specific areas, so calculating potential town-wide losses is difficult. There is no standard loss estimation model available for tornadoes due to their random nature.

**Thunderstorm/Lightning/Hail –Low Risk – No Recorded or Estimated Cost**

According to the Federal Alliance for Safe Homes, in an average year, hail causes more than \$1.6 billion worth of damage to residential roofs in the United States, making it, year in and year out, one of the most costly natural disasters. Lightning is one of the most underrated severe weather hazards, yet it ranks as the second-leading weather killer in the United States. More deadly than hurricanes or tornadoes, lightning strikes in America each year killing an average of 73 people and injuring 300 others, according to the National Weather Service. There is no cost estimation model for thunderstorms due to their random nature.

**Drought – Low Risk – No Recorded or Estimated Cost**

A long drought would cause damage to crops and dry up wells. There is no cost estimate for this hazard in Sunapee.

**Extreme Temperatures – Low Risk – No Recorded or Estimated Cost**

Excessive temperatures kills more people in the U.S. than tornadoes, hurricanes, floods, and lightning combined. The elderly, very young, obese and those who work outdoors or have substance abuse problems are most at risk from succumbing to extreme temperatures. Additionally, people in urban areas are more susceptible as asphalt and cement tend to hold in heat throughout the night (Federal Alliance of Safe Homes website). The costs for this hazard are in terms of human suffering. It is not anticipated that there would be any structural or infrastructure costs.

**Wildfire – Low Risk – \$4 Million Estimated Cost**

The risk of fire is difficult to predict based on location. Forest fires are more likely to occur during drought years. In addition, areas and structures that are surrounded by dry vegetation that has not been suitably cleared are at high risk. Fire danger is generally universal,

however, and can occur practically at any time. Dollar damage would depend on the extent of the fire and the number and type of buildings burned. Since the entire developed area of Sunapee interfaces with forest, all structures are potentially vulnerable to wildfire. The estimated 2020 value of all structures in the Town is approximately \$788 million. If 1% of the structures received 50% damage, the total estimated cost would be about \$4 million.

According to the Sullivan County Forester, big wildfires are uncommon in Sullivan County as the weather here is generally not favorable for a high probability of ignition and rapid spread. Additionally, there are enough roads and people in the county that fires are generally spotted and addressed before they are too large. Occasionally weather conditions are more favorable as was seen in the 1950s on Croydon Mountain.

### **Severe Winter Weather – Medium Risk – No Recorded or Estimated Cost**

Ice storms often cause widespread power outages by downing power lines, and these storms can also cause severe damage to trees. New England usually experiences at least one or two severe snowstorms, with varying degrees of severity, each year. All of these impacts are a risk to the community and put all residents, especially the elderly, at risk.

According to a study done for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business and Home Safety (U.S.), the 1998 Ice Storm inflicted \$1.2 billion (U.S.) worth of damage in the U.S. and Canada. In New Hampshire alone, over 67,000 people were without power ([http://www.meteo.mcgill.ca/extreme/Research\\_Paper\\_No\\_1.pdf](http://www.meteo.mcgill.ca/extreme/Research_Paper_No_1.pdf)). U.S. average insurance claim was \$1,325 for personal property, \$1,980 for commercial property, and \$1,371 for automobiles.

### **Solar Storms and Space Weather - Low Risk - No Recorded or Estimated Costs**

The daily U.S. economic cost from solar storm-induced electricity blackouts could be in the tens of billions of dollars, with more than half the loss from indirect costs outside the blackout zone. Previous studies have focused on direct economic costs within the blackout zone, failing to take account of indirect domestic and international supply chain loss from extreme space weather.

On average the direct economic cost incurred from disruption to electricity represents only 49% of the total potential macroeconomic costs reported in a paper published in *Space Weather*, a journal of the American Geophysical Union. Under the study's most extreme blackout scenario, affecting 66 per cent of the U.S. population, the daily domestic economic loss could total \$41.5 billion plus an additional \$7 billion loss through the international supply chain.

### **Earthquake – Low Risk - \$7.9 million Estimated Cost if All Buildings Impacted**

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and precipitate landslide and flash flood events. Four earthquakes in NH between 1924 and 1989 had a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of

Laconia, and one near the Quebec border. Buildings have not been subject to any seismic design level requirement for construction and would be susceptible to structural damage. The dams, bridges, and roads would be vulnerable to a sizable earthquake event.

FEMA's *Understanding Your Risks: Identifying Hazards and Estimating Costs*, August 2001 provides that an earthquake with a 5% peak ground acceleration (as determined by the US Geologic Survey for the area) could cause damage to single family residences by around 10% of the structural value. If 10% of buildings in Sunapee valued at \$788 million were impacted by an earthquake, the estimated damage could be around \$7.9 million.

### **Natural Contaminants – Low Risk – No Recorded or Estimated Cost**

The cost of a radon hazard would be the health of individuals exposed to radon. No cost estimate is provided for this hazard.

### **Hazardous Material Spills –Medium Risk – No Recorded or Estimated Cost**

The cost of a hazardous material spill would depend upon the extent of the spill, the location of the spill in relation to population, structures, infrastructure, and natural resources, as well as the type of hazardous material. The cost of any clean-up would be imposed upon the owner of the material. However, other less tangible costs such as loss of water quality might be borne by the community. No cost estimate has been provided for this possible hazard.

### **Terrorism – Low/Medium Risk – No Recorded or Estimated Cost**

The cost of any terrorism event is unpredictable and not estimated in this document. The Committee does not feel that terrorism is a substantial threat in Sunapee.

### **Infectious Disease – Medium/High - No Recorded or Estimated Cost**

The cost of infectious disease is unpredictable and difficult to define. The impact of these diseases is immense and is felt across the world. In addition to affecting the health of individuals directly, infectious diseases are also having an impact on whole societies, economies and political systems. In the developing world in particular, crucial sectors for sustained development such as health and education, have seen a marked loss of qualified personnel, most notably to human immunodeficiency virus (HIV)/acquired immune deficiency syndrome (AIDS), tuberculosis (TB) and malaria. These and other infectious agents not only take an enormous physical toll on humanity, but also cause significant economic losses both directly in the developing world and less directly in the developed world.

The COVID-19 virus of 2020 shows us that everyday businesses like restaurants and banks close due to potential spread of disease. This impacts the owners as well as the workers. The potential for infectious disease is ever present in any community. The Town of Sunapee's public facilities are potential sources for an outbreak.

## **Invasive Species – Low/Medium– No Recorded or Estimated Cost**

There can be severe economic impacts from invasive species especially noted by the invasive plants that can take over from native plants and increase erosion and insects that kill select species of trees such as the ash and hemlock affecting our forest ecosystems and wood supply.

## VI. MITIGATION PROGRAMS AND ACTIONS

### A. HAZARD MITIGATION ACTION NEEDS ASSESSMENT

The Sunapee Hazard Mitigation Committee evaluated each potential hazard that could affect the Town in terms of how the Town has could mitigate or eliminate those hazards. This was done first so the Committee could determine the success of achieving hazard mitigation in existing programs (on-going formalized activities) to see where improvements can be made; and also determine what actions could be taken within the next five years to complement existing programs and achieve better hazard mitigation. Items in red are proposed new actions. The following table displays discussions with new proposals indicated in red text.

**Table VI-1: COMMITTEE ASSESSMENT FOR NEW HAZARD MITIGATION ACTIONS**

Hazard	Committee Ideas and Assessment
All Hazards	Community education: <b>use Town website as educational forum</b> . Get more people to sign up for Code Red phone program; it has been very successful so far
Climate Change	Educate the community about wise behaviors and purchases and increase energy efficiencies in the Town facilities. Installed LED lighting in facilities and streetlights throughout the Town. Will continue to work with department heads and Sunapee Energy Committee for further energy efficiency improvements. Minimal changes required for building efficiencies according to recent energy audits. <b>Investigate at least one vehicle charging station possibly near Sunapee Harbor.</b>
Dam Failure	The Town will assess the dam failure impact once an Emergency Action Plan for the Wendall Marsh Dam is completed by the State later this year; <b>the Town will modernize the Otter Pond Dam with a more efficient release system. The current dam requires three people to adjust the water flow. The Sunapee Hydro Dam and penstocks will be inspected by FERC and any suggested changes will be evaluated. New information will be incorporated into emergency action plans for these dams.</b>
Flood	The Town is an NFIP member and has adopted a floodplain ordinance; the highway department will continue to evaluate culverts and bridges for flooding impacts. No serious problem with beaver activity at this time.
Erosion	Road maintenance and upgrades; Site Plan Review Regulations address stormwater; Driveway Regulations assure proper culvert size. Steep slopes restrictions in the zoning ordinance.
Earthquake & Severe Wind	For earthquake and major wind events, the Town already has building codes which take these events into account. The Committee did not feel they could adopt more stringent requirements since these events are

Hazard	Committee Ideas and Assessment
	rare and the available actions to take were outside the capacity and resources of the Town. The Town does plan to continue its tree trimming by the highway department to reduce damage by severe wind.
Thunderstorms, Lightning and Hail	The Committee felt the top of North Road and Trow Hill is more prone to lightning strikes, and there are no feasible mitigation strategies at this point to reduce impact. There is minimal housing in that area.
Drought	The Committee determined that the water ordinance for those on the hydrant system where they are metered could be made more clear. Water Superintendent has ability to impose water restrictions during a declared drought.
Extreme Temperatures	The town offers cooling and warming stations and water to the public at the Safety Services Building and the Abbott Library.
Wildfire	The Town requires fire permits to reduce unsafe fire practices. The Committee did not feel there were other strategies they should adopt. Fire Chief goes on radio for education; pass out educational materials.
Severe Winter Weather	The Town does its best to maintain the roads in the winter to keep them clear of snow and ice. The Town already adopted the State's Building Codes which are enforced by the Building Inspector (weight of snow). The Town provides shelter during major storms and power outages.
Solar Storms and Space Weather	Communications is critical for emergency management. Communication can be impacted by solar weather. The Town has repeater towers in town and in all police cars.
Natural Contaminants	The Committee discussed the different natural contaminants and noted that radon is always a risk living in a region on granite bedrock. They did not feel it appropriate for the town to take action other than educating its residents about the danger and how to test for radon.
Hazardous Materials	The Committee felt the most suitable strategies for hazardous materials are to continue their mutual aid agreements (Upper Valley Haz Mat) regarding HazMat spills. They recognize this is considered a preparedness item, but the committee feels it is the best action for the town to take and did not feel they could take on any other measures at this time.
Terrorism	Since the Town is quite rural and terrorism is a low risk, the Committee did not feel they needed to develop strategies for this hazard. The Town does have three schools. The Police Department has a memorandum of understanding with the schools addressing the Safe School Act. Police constantly monitor terrorism and demonstrations around the State.
Infectious Disease	Sunapee is part of the Greater Sullivan County Public Health Network where local communities can come together to identify health problems, galvanize a community response, and devise appropriate solutions based on available resources.

Hazard	Committee Ideas and Assessment
Invasive Species	Increase awareness in residents to combat invasive species on private property; learn more about invasive plants to properly address them along Town roadways and waterways. Conservation Commission doing education and invasive plant removal along river and in public spaces. Other invasive species such as Rock Bass and insects being addresses.

## B. HAZARD MITIGATION PROGRAM ASSESSMENT

The Committee evaluated the hazard mitigation needs as shown in Table VI-1. Programs are on-going practices of the Town formalized into procedures and sometimes with regulations and ordinances. Table VI-2 provides an evaluation of actions to be taken to improve or complement these programs,

**Table VI-2: EXISTING MITIGATION PROGRAMS**

Existing Mitigation Program & Description	Hazard Type/Service Area	Responsible Local Agent	Effective-ness (Low, Average, High)	Update/Future Proposed Improvements
<b>Road Design &amp; Road/Bridge Maintenance</b> – Repair and upgrading of roadways, culverts, and bridges	Flood; Erosion/Town-wide	Highway Dept	High	None
<b>Emergency Back-Up Power</b> – Provide emergency back-up power to critical facilities in case of event	Multi-Hazard/Town-wide	Fire, Water & Sewer, EMD	Average	Acquire generator for town offices, highway garage and Sherburne Gymnasium; include in Sunapee Emergency Operations Plan
<b>Town Master Plan</b> - Goals/objectives to plan for growth	Multi-Hazard/Town-wide	Planning Bd	Average	None
<b>Fire Safety Inspections</b> - Checks oil burners, daycares, places of public assembly, etc.	Wildfire/Town-wide	Fire Chief	Average	None
<b>Greater Sullivan County Regional Public Health Network</b> - Plan to deal with emergencies; provide education by website, literature, and workshops	Multi-Hazard/Town-wide	Emergency Management Director	High	None
<b>Safety Awareness Program</b> - Fire Prevention and Safety Training	Wildfire/Town-wide	EMD/Fire Dept/EMS	High	None

Existing Mitigation Program & Description	Hazard Type/Service Area	Responsible Local Agent	Effective-ness (Low, Average, High)	Update/Future Proposed Improvements
<b>Planning and Land Use Regulations</b>	Flooding/Erosion / Entire Town	Planning Board	Average	Clarify Steep Slopes Ordinance to include the building of residential and commercial development
<b>Public Education &amp; Outreach</b> – Distribute HazMit brochure from State and HHW brochures	Multi-Hazard/Town-wide	Town Offices/ Highway	High	Add link to Town web site to “A Citizen’s Guide to Hazard Mitigation and Emergency Preparedness” and NFIP information as well as emergency shelter locations
<b>Tree Maintenance Program</b> – Trimming and removal of branches along roadways.	Multi-Hazard/Town-wide	Highway Dept	Average	None
<b>Storm Drain Maintenance</b> – Inspect and maintain culverts	Flood/Town-wide	Highway Dept	High	Pursue grant opportunities for stormwater contaminant removal
<b>NFIP</b> – Continue compliance and membership in the NFIP	Flood / Entire Town	Select Board	High	Participate in NFIP training with the State and/or FEMA (or in other training) that addresses flood hazard planning and management

## C. EXISTING AND PROPOSED HAZARD MITIGATION ACTIONS

The following table provides a list and evaluation of the proposed mitigation actions for Goshen. The first column lists mitigation actions. The second column indicates if those recommendations were proposed in the previous hazard mitigation plan and if they were put into action or not and if not, why. The final column provides either an update of the mitigation action or proposed improvements that are currently being recommended for the future. The latter are provided in red and they will be evaluated further in upcoming chapters of this plan.

**Table VI-3: EXISTING AND PROPOSED MITIGATION ACTIONS**

Proposed Mitigation Action & Description	Proposed in 2016 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
<b>Road Design &amp; Road/Bridge Maintenance</b> – Repair and upgrading of roadways, culverts, and bridges	DELETED – These were listed as Actions in the 2016 plan, but they are actually Programs.	NA
<b>Emergency Back-Up Power</b> – Provide emergency back-up power to critical facilities in case of event		
<b>Town Master Plan</b> - Goals/objectives to plan for growth		
<b>Fire Safety Inspections</b> - Checks oils burners, daycares, places of public assembly, etc.		
<b>Greater Sullivan County All Health Hazard Plan</b> - Plan to deal with emergencies; provide education by website (GSCP NH@SullivanCountyNH.gov), literature, and workshops		
<b>Safety Awareness Program</b> - Fire Prevention and Safety Training		
<b>Public Education &amp; Outreach</b> – Distribute HazMit brochure from State and HHW brochures		
<b>NFIP</b> –Insurance program for property owners		
<b>Map and Assess Areas Vulnerable to Erosion</b>		

Proposed Mitigation Action & Description	Proposed in 2016 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
<b>Purchase Generators</b> – Need permanent generators in town offices building, highway garage, and Sherburne Gymnasium	DEFERRED due to lack of resources	Obtain three generators for town offices, highway garage, and Sherburne Gymnasium
<b>Planning and Land Use Regulations</b> - Expand Steep Slopes Ordinance to include the building of residential and commercial development	DEFERRED until this year for public hearing	This is a language clarification to the regulations to clearly state no building on steep slopes.
<b>Expand Public Education &amp; Outreach</b> - Add link to Town web site to “A Citizen’s Guide to Hazard Mitigation and Emergency Preparedness” and add information about NFIP and emergency shelters	DEFERRED due to lack of resources	Add information to Town web site
<b>Stormwater Drain Maintenance</b> – Ensure water pollution protection	PARTIALLY COMPLETED	Pursue grant opportunities for stormwater contaminant removal
<b>NFIP Training</b> - Participate in NFIP training with the State and/or FEMA (or in other training) that addresses flood hazard planning and management.	DEFERRED due to lack of resources	Encourage Town Manager and Highway Director to take training
<b>George’s Mills Well Site</b> - Construct a fence around site	COMPLETED	
<b>Ledge Pond Road</b> – Address drainage & erosion issues Ledge Pond Road	PARTIALLY COMPLETED: built on ledge causing drainage issues	Continue repairs—to be completed in 2022
<b>Winn Hill</b> – Address drainage & erosion issues	COMPLETED	
<b>Trow Hill</b> – Address drainage & erosion issues	COMPLETED	
<b>Lake Sunapee Drinking Water</b> -	PARTIALLY COMPLETED: started in a couple locations	Remediate and mitigate the transfer of sediment into Otter Pond and Lake Sunapee through culverts.
<b>Stagecoach Road</b> - Repair Bank Erosion along roads and ditches	COMPLETED	Completed in 2021
<b>Sleeper Bridge</b> - Bank stabilization above bridge	COMPLETED by State	
<b>Map and Assess Erosion Areas</b>	DELETE	Sites are assessed during annual road and bridge inspections

Proposed Mitigation Action & Description	Proposed in 2016 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
<b>Investigate Charging Station</b> – Ask Energy Committee to investigate charging station potentially near Sunapee Harbor	NEW	Begin project
<b>Otter Pond Dam</b> – Modernize release system for safety and efficiency	NEW	Begin project
<b>Sunapee Hydro Dam</b> – Evaluate upcoming FERC inspection safety suggestions/requirements	NEW	Begin project

The Town of Sunapee will provide a public education and outreach program by using brochures and the town website to reach their citizens. A link on the web site is provided for a Citizen's Guide to Hazard Mitigation and Emergency Preparedness: <https://uvlsrpc.org/resources/citizens-guide-hazard-mitigation-emergency-management/>. There will also be one-on-one outreach as appropriate. Below is a table showing the potential topics and outreach methods. Dam failure is not included as this is performed by the State Dam Bureau in their assessment of all dams in the State.

**Table VI-4: PUBLIC EDUCATION AND OUTREACH TOPICS**

Natural Hazard	Educational Topics	Outreach Methods
Multi-Hazard	Shelters; evacuation routes; proper evacuation procedures; emergency kits and family plans; emergency alerts; mitigation techniques for all hazards	Town web site Town meeting display Brochures
Flooding	National Flood Insurance Program participation; building in a floodplain; stormwater runoff; driving on flooded roads; protecting natural systems which provide flood mitigation; securing property items such as propane tanks prior to a flood	Town web site Brochures
Erosion	High risk areas; stormwater management; bank stabilization; water body buffers	Town web site
Tropical/Post-Tropical Cyclones	Construction of safe rooms	Town web site
High Wind Events (Hurricane)	Wind retrofits such as shutters, hurricane clips; school and town official sheltering basics; resident and business sheltering basics; window coverings	Town web site
Thunderstorms/Lightning/Hail	Taking cover; staying inside when it thunders; lightning protection systems	Town web site
Drought	Water-saving measures; crop insurance; soil and water conservation practices by farmers	Town web site
Extreme Temperatures	Preparing for extreme temperatures; air conditioning; cooling and warming shelters	Town web site
Wildfire	Most vulnerable areas; reducing fuel for fires such as dry brush	Town web site; Fire Department and Fire Warden interactions

Natural Hazard	Educational Topics	Outreach Methods
Severe Winter Weather	Installation of carbon monoxide monitor and alarms; ventilation of fuel-burning equipment; protecting water pipes	Town web site
Solar Storms and Space Weather	What are they and how they can affect us	Town web site
Earthquake	Structural and non-structural home retrofitting; securing furnishings	Town web site
Natural Contaminants	Testing for contaminants in air and water	Town web site
Hazardous Materials Spills	What to do if there's a fuel delivery spill	Town web site
Terrorism	What to do if there is a terrorist act	Town web site
Infectious Disease	Prevention	Town web site

## D. CRITICAL EVALUATION FOR IMPROVEMENTS TO EXISTING PROGRAMS AND NEW PROGRAMS

The Sunapee Hazard Mitigation Committee reviewed each of the proposed improvements to existing programs and proposed new programs identified for existing mitigation programs using the following factors:

- Does it reduce disaster damage?
- Does it contribute to community objectives?
- Does it meet existing regulations?
- Can it be quickly implemented?
- Is it socially acceptable?
- Is it technically feasible?
- Is it administratively possible?
- Does the action offer reasonable benefits compared to cost of implementation?

Each mitigation strategy was evaluated and assigned a score (High – 3; Average – 2; and Low – 1) based on the criteria.

The Sunapee Hazard Mitigation Committee assigned the following scores to each strategy for its effectiveness related to the critical evaluation factors listed above, and actions had the following scores, with the highest scores suggesting the highest priority. These scores are re-evaluated during each update process for new and existing strategies.

**Table VI-5: PRIORITIZING EXISTING & NEW MITIGATION STRATEGY IMPROVEMENTS**

Rank	Strategy Improvement	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administratively Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
1	<b>Ledge Pond Road</b> – Address drainage & erosion issues Ledge Pond Road	3	3	3	3	3	3	3	3	24	BOTH
2	<b>Investigate Charging Station</b> – Ask Energy Committee to investigate charging station potentially near Sunapee Harbor	3	2	3	3	3	3	3	3	23	BOTH
2	<b>Otter Pond Dam</b> – Modernize release system for safety and efficiency	2	3	3	3	3	3	3	3	23	BOTH
2	<b>Lake Sunapee Drinking Water</b> - Remediate and mitigate the transfer of sediment into Otter Pond and Lake Sunapee through culverts into the lake.	3	3	3	2	3	3	3	3	23	BOTH
3	<b>Sunapee Hydro Dam</b> – Evaluate upcoming FERC inspection safety suggestions/requirements	3	3	3	2	2	3	3	3	22	BOTH
4	<b>NFIP Training</b> - Participate in NFIP training the State and/or FEMA (or in other training) that addresses flood hazard planning and management.	2	3	3	3	2	3	2	2	20	BOTH
4	<b>Expand Public Education &amp; Outreach</b> - Add link to Town web site to “A Citizen’s Guide to Hazard Mitigation and Emergency Preparedness” and add information about NFIP and emergency shelters	1	2	3	3	3	2	3	3	20	BOTH
5	<b>Purchase Generators</b> – Acquire permanent generators for town office building, highway garage, and Sherburne Gym	1	2	3	2	3	3	3	2	19	BOTH
6	<b>Planning and Land Use Regulations</b> - Expand Steep Slopes Ordinance to include the building of residential and commercial development	3	3	1	1	1	3	3	3	18	NEW
6	<b>Storm Drain Maintenance</b> – Pursue grant opportunities for stormwater contaminant removal	3	3	1	1	2	3	3	2	18	BOTH

## E. PRIORITIZED IMPLEMENTATION PLAN

The Sunapee Hazard Mitigation Committee created the following action plan for implementation of priority mitigation strategies.

**Table VI-6: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING AND NEW PROGRAMS**

Mitigation Action	Who (Leadership)	When (Start)	How (Funding Sources)	Cost (Estimated)
<b>Ledge Pond Road</b> – Address drainage & erosion issues Ledge Pond Road (dirt section of North Road, section also known as Ledge Pond Road)	Highway Director	2022	Taxes	Unknown; Staff Time
<b>Lake Sunapee Drinking Water</b> - Remediate and mitigate the transfer of sediment into Otter Pond and Lake Sunapee through culverts into the lake.	Highway Director	2022-2023	EPA/ NH DES Grants/Taxes	\$25,000/yr
<b>Investigate Charging Station</b> – Ask Energy Committee to investigate charging station potentially in Sunapee Harbor	Town Manager/Energy Committee	2022	Volunteer Energy Committee	Volunteer Time (\$0)
<b>Otter Pond Dam</b> – Modernize release system for safety and efficiency	Highway Director	2024-2025	NH DES Grants/Taxes	Estimated \$125,000
<b>Sunapee Hydro Dam</b> – Evaluate upcoming FERC inspection safety suggestions/requirements	Town Manager/Hydro Supervisor	2022-2023	Hydro Revenue Fund	\$25,000
<b>NFIP Training</b> - Participate in NFIP training the State and/or FEMA (or in other training) that addresses flood hazard planning and management.	Select Board/ Highway Director	2023	Taxes	Staff Time (\$0)
<b>Expand Public Education &amp; Outreach</b> - Add link to Town web site to “A Citizen’s Guide to Hazard Mitigation and Emergency Preparedness” and add information about NFIP and emergency shelters	Town Manager	2022	Taxes	Staff Time (\$0)
<b>Purchase Generators</b> – Acquire permanent generators for town office building, highway garage, and Sherburne Gym	Town Manager	2023	HMGP/PDM	\$30,000
<b>Planning and Land Use Regulations</b> - Expand Steep Slopes Ordinance to include the building of residential and commercial development	Planning Board	2022	Volunteers	Staff Time (\$0)
<b>Storm Drain Maintenance</b> – Pursue grant opportunities for stormwater contaminant removal	Highway Director	2022	NH DES Grants/Taxes	Varies annually

## VII. EMERGENCY PREPAREDNESS ACTIONS & IMPROVEMENTS

Although this is a hazard mitigation plan, the Committee felt it was important to address new and proposed emergency preparedness actions. It is sometimes difficult to distinguish between hazard mitigation and emergency preparedness. Essentially, emergency preparedness is the preparation to act once a hazard has occurred. And as has been discussed previously, hazard mitigation includes actions to eliminate or reduce hazards before they happen. Table VI-1 below is a list of the emergency preparedness actions that the Committee felt should be addressed and included in this plan. Although emergency power could be considered emergency preparedness, it has been addressed as a hazard mitigation strategy. Any changes to emergency power as a result of this hazard mitigation plan will be also be addressed in the emergency operations plan.

**Table VII-1: EMERGENCY PREPAREDNESS ACTIONS & PROPOSED IMPROVMENTS**

Existing Action	Type/Service Area	Responsible Local Agent	Effective-ness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/Actions Taken to Meet Recommendations or Why Not Met	Update/Future Proposed Improvements
<b>Household Hazardous Waste Collections</b> - Free drop off of hazardous waste to residents and by fee for commercial entities	HazMat/Town-wide	Road Agent	High	Free drop off of hazardous waste to residents and by fee for commercial entities / COMPLETE have participated annually	Continue to participate in annual HHW collections.
<b>Town Warning System</b> – Siren in Georges Mills Village (inactive)	Multi-hazard/ Georges Mills	Fire	Low	Look into Reverse 911 / DELETE as switched to CodeRed	N/A
<b>CodeRed</b> – Warning system for mass notification	All Hazards/Entire Town	Selectboard and EMD	High	Not addressed in previous plan	Continue use and update of service
<b>School Evacuation Plan</b> - Plan for evacuation/lock down/etc...	Multi-Hazard/Elementary and Middle High Schools	Police Chief, Fire Chief & EMD	High	None; continual revisions and adjustments	Continue to revise and adjust as needed.
<b>Town Radio</b> - Communication for Fire, Police, Highway; school buses, Water & Sewer; Town Manager	Multi-Hazard/Town-wide	Town emergency services	High	Relocate repeater on town channel / DEFERRED due to lack of resources	Locate repeater for municipal channel

Existing Action	Type/Service Area	Responsible Local Agent	Effective-ness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/ <i>Actions Taken to Meet Recommendations or Why Not Met</i>	Update/Future Proposed Improvements
<b>Emergency Operations Plan</b> - Plan to deal with emergencies	Multi-Hazard/Town-wide	Emergency Management Director	High	None; Updating in process / update LEOP plan	Update LEOP 2022
<b>HazMat Spill Program</b> - Midwest Regional HazMat Team	HazMat/Town-wide	Fire Dept	High	Need more equipment and more certified members / COMPLETED	Continue to recruit new members
<b>Sewage Overflow Program</b> – Notifications of residences around Lake Sunapee of sewage spills	HazMat/around Lake Sunapee	Water & Sewer	Low	Develop list of properties which use water from the lake for drinking / Utilize CodeRed to target properties.	No further action required
<b>Fire Hydrant System</b> - Fire protection in Georges Mills and Sunapee	Fire, HazMat/Town-wide	Water & Sewer	Average	Expand service area; on-going upgrades / ongoing maintenance, replace approx.. 3 hydrants per year.	Continue to replace hydrants
<b>911 Mapping</b> - Provide correct address for each structure	All Hazards/Entire Town	Fire Chief	High	Updating in process / Complete	No further action required

## VIII. ADOPTION & IMPLEMENTATION OF THE PLAN

A good plan needs to provide for periodic monitoring and evaluation of its successes and challenges, and to allow for updates of the Plan where necessary. In order to track progress and update the Mitigation Strategies identified in the Plan, the Town of Sunapee will revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Sunapee Emergency Management Director will initiate this review and should consult with the Hazard Mitigation Committee. Changes will be made to the plan to accommodate for projects that have failed, or that are not considered feasible after a review for their consistency with the evaluation criteria, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked highest, but that were identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of this plan, to determine feasibility for future implementation. The plan will be updated and submitted for FEMA approval at a minimum every five years as required by the Disaster Mitigation Act 2000.

Many municipalities have web sites where they can share information about hazard mitigation and emergency management. The use of the web site by its citizens is often dictated by the availability of broadband service to easily access the web. The Town of Sunapee has provided a link to the Regional Planning Commission's web page, "A Citizen's Guide to Hazard Mitigation and Emergency Management" as well as other more Town-specific information.

Municipalities have documents to convey town goals and objectives that are used to guide future programs. They can be used to promote and implement hazard mitigation. A Municipal Master Plan outlines how the community wants to grow and develop. It includes overall goals and objectives of the community and recommendations for ordinances and regulations to accomplish those goals. A zoning ordinance is a common vehicle to implement goals of the master plan and regulates land use. It can be used to restrict development in flood zones, steep sloped areas, buffer zones around wetlands and water bodies, drinking water recharge areas, hillsides, and ridgelines. These areas may be "overlay districts" mapped out for protection. A zoning ordinance can also require best management practices in forestry and timber harvesting and stormwater management to prevent erosion. A floodplain management plan is part of the zoning ordinance and has typically followed a format recommended by the NH Flood Management Program.

Other municipal documents include regulations such as Curb Cut or Driveway Regulations, Excavation Regulations, Subdivision Regulations and Site Plan Review Regulations. Curb Cut Regulations are used to make sure the culverts at the intersection of driveways and roads are adequate to handle runoff water or stream flow. Excavation Regulations are used to restrict the removal of earth including distance to seasonal high water table and the requirements to restore the site once the excavation is completed. This is essential to make sure the area is graded and re-vegetated to reduce the chances of erosion. Subdivision Regulations determine how lots are to be laid out in a subdivision. This might include requirements for fire protection, stormwater runoff management, vegetated

buffers, and reference back to the zoning ordinance. Site Plan Review Regulations are for multi-family housing and commercial development. Again, these regulations refer back to the zoning ordinance. The regulations can determine site specific development requirements such as parking, open space, vegetated buffers, and traffic flow.

Subdivision Regulations and Site Plan Review Regulations typically refer back to the Zoning Ordinance, so it may be more effective to amend the zoning ordinance to address hazard mitigation through specific restrictions though this can vary by municipality.

Another important municipal document is the Capital Improvements Program which is a “budget of the future” to consider potential capital expenditures such as new roads, major road improvements, equipment, schools, parks. This allows a systematic evaluation of potential projects. Any capital expenditures related to hazard mitigation will be incorporated into this document.

There are other regulations and ordinances that municipalities may adopt such as to regulate water use during a drought or restrict development in areas around drinking water sources. This all varies by municipality.

It should also be noted that many municipalities do not update these documents very often, and some towns do not have them at all. However, where they exist, they offer the potential to include hazard mitigation and emergency management topics.

## **A. CONTINUED PUBLIC INVOLVEMENT**

The public will continue to be invited to participate in the hazard mitigation planning process. In future years, a public meeting will be held (separate from the adoption hearing) to inform and educate members of the public. It is hoped that a separate meeting discussing hazard mitigation and emergency management will create more interest in the process. Additionally, a press release to local newspapers (to be published at their discretion) will be distributed and information will be posted on the Town website as well as the town office, library, and post office.

Copies of the Hazard Mitigation Plan have been or will be shared with to the following parties for review for reference:

- Select Board Offices in neighboring towns
- NH Homeland Security & Emergency Management
- Sunapee Select Board, Conservation Commission, and Planning Board
- Upper Valley Lake Sunapee Regional Planning Commission

## **RESOURCES USED IN THE PREPARATION OF THIS PLAN**

FEMA 386-1 *Getting Started: Building Support for Mitigation Planning*, September 2002

FEMA 386-2 *Understanding Your Risks: Identifying Hazards and Estimating Costs*, August 2001

FEMA 386-3 *Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies*, April 2003

FEMA *Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards*, June 2017

FEMA *Local Mitigation Planning Handbook*, March 2013

*Ice Storm '98* by Eugene L. Lecomte et al for the Institute for Catastrophic Loss Reduction (Canada) and the Institute for Business & Home Safety (U.S.), December 1998

*Town of Sunapee Emergency Operations Plan*, 2016

*Town of Sunapee Master Plan*, 2019 Draft

NH HSEM's *State of New Hampshire Multi-Hazard Mitigation Plan Update 2018*

## **APPENDICES**

<b>Appendix A:</b>	<b>Technical Resources</b>
<b>Appendix B:</b>	<b>Hazard Mitigation Assistance Grants</b>
<b>Appendix C:</b>	<b>Meeting Documentation</b>
<b>Appendix D:</b>	<b>Map of Hazard Areas and Critical Facilities</b>
<b>Appendix E:</b>	<b>Town Adoption &amp; FEMA Approvals of Hazard Mitigation Plan</b>



## **APPENDIX A:**

### **Technical Resources**

## APPENDIX A: TECHNICAL RESOURCES

### 1) Agencies

New Hampshire Homeland Security and Emergency Management	
Hazard Mitigation Section .....	271-2231
Federal Emergency Management Agency .....	(617) 223-4175
NH Regional Planning Commissions:	
Upper Valley Lake Sunapee Regional Planning Commission .....	448-1680
NH Executive Department:	
Governor's Office of Energy and Community Services .....	271-2611
New Hampshire Office of State Planning .....	271-2155
NH Department of Cultural Affairs: .....	271-2540
Division of Historical Resources .....	271-3483
NH Department of Environmental Services: .....	271-3503
Air Resources .....	271-1370
Waste Management .....	271-2900
Water Resources .....	271-3406
Water Supply and Pollution Control .....	271-3504
Rivers Management and Protection Program .....	271-1152
NH Office of Energy and Planning .....	271-2155
NH Municipal Association .....	224-7447
NH Fish and Game Department .....	271-3421
NH Department of Resources and Economic Development: .....	271-2411
Natural Heritage Inventory .....	271-3623
Division of Forests and Lands .....	271-2214
Division of Parks and Recreation .....	271-3255
NH Department of Transportation .....	271-3734
Northeast States Emergency Consortium, Inc. (NESEC) .....	(781) 224-9876
US Department of Commerce:	
National Oceanic and Atmospheric Administration:	
National Weather Service; Gray, Maine .....	207-688-3216

US Department of the Interior:	
US Fish and Wildlife Service .....	225-1411
US Geological Survey .....	225-4681
US Army Corps of Engineers.....	(978) 318-8087
US Department of Agriculture:	
Natural Resource Conservation Service .....	868-7581

## 2) Mitigation Funding Resources

404 Hazard Mitigation Grant Program (HMGP) .....	NH Homeland Security and Emergency Management
406 Public Assistance and Hazard Mitigation .....	NH Homeland Security and Emergency Management
Community Development Block Grant (CDBG) .....	NH HSEM, NH OEP, also refer to RPC
Dam Safety Program .....	NH Department of Environmental Services
Disaster Preparedness Improvement Grant (DPIG) .....	NH Homeland Security and Emergency Management
Emergency Generators Program by NESEC† .....	NH Homeland Security and Emergency Management
Emergency Watershed Protection (EWP) Program .....	USDA, Natural Resources Conservation Service
Flood Mitigation Assistance Program (FMAP) .....	NH Homeland Security and Emergency Management
Flood Plain Management Services (FPMS) .....	US Army Corps of Engineers
Mitigation Assistance Planning (MAP) .....	NH Homeland Security and Emergency Management
Mutual Aid for Public Works .....	NH Municipal Association
National Flood Insurance Program (NFIP) † .....	NH Office of Energy and Planning
Power of Prevention Grant by NESEC† .....	NH Homeland Security and Emergency Management
Project Impact.....	NH Homeland Security and Emergency Management
Roadway Repair & Maintenance Program(s) .....	NH Department of Transportation
Section 14 Emergency Stream Bank Erosion & Shoreline Protection.....	US Army Corps of Engineers
Section 103 Beach Erosion.....	US Army Corps of Engineers
Section 205 Flood Damage Reduction.....	US Army Corps of Engineers
Section 208 Snagging and Clearing .....	US Army Corps of Engineers
Shoreland Protection Program.....	NH Department of Environmental Services
Various Forest and Lands Program(s).....	NH Department of Resources and Economic Development
Wetlands Programs.....	NH Department of Environmental Services

‡NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH OEM for more information.

† Note regarding National Flood Insurance Program (NFIP) and Community Rating System (CRS):

The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community's floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. The NH Office of State Planning can provide additional information regarding participation in the NFIP-CRS Program.

### 3) Websites

Sponsor	Internet Address	Summary of Contents
Natural Hazards Research Center, U. of Colorado	<a href="http://www.colorado.edu/litbase/hazards/">http://www.colorado.edu/litbase/hazards/</a>	Searchable database of references and links to many disaster-related websites.
Atlantic Hurricane Tracking Data by Year	<a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>	Hurricane track maps for each year, 1886 – 1996
National Emergency Management Association	<a href="http://nemaweb.org">http://nemaweb.org</a>	Association of state emergency management directors; list of mitigation projects.
NASA – Goddard Space Flight Center “Disaster Finder:	<a href="http://www.gsfc.nasa.gov/ndrd/disaster/">http://www.gsfc.nasa.gov/ndrd/disaster/</a>	Searchable database of sites that encompass a wide range of natural disasters.
NASA Natural Disaster Reference Database	<a href="http://ltpwww.gsfc.nasa.gov/ndrd/main/html">http://ltpwww.gsfc.nasa.gov/ndrd/main/html</a>	Searchable database of worldwide natural disasters.
U.S. State & Local Gateway	<a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>	General information through the federal-state partnership.
National Weather Service	<a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>	Central page for National Weather Warnings, updated every 60 seconds.
USGS Real Time Hydrologic Data	<a href="http://h20.usgs.gov/public/realtime.html">http://h20.usgs.gov/public/realtime.html</a>	Provisional hydrological data
Dartmouth Flood Observatory	<a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>	Observations of flooding situations.
FEMA, National Flood Insurance Program, Community Status Book	<a href="http://www.fema.gov/fema/csb.htm">http://www.fema.gov/fema/csb.htm</a>	Searchable site for access of Community Status Books
Florida State University Atlantic Hurricane Site	<a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a>	Tracking and NWS warnings for Atlantic Hurricanes and other links

Sponsor	Internet Address	Summary of Contents
National Lightning Safety Institute	<a href="http://lightningsafety.com/">http://lightningsafety.com/</a>	Information and listing of appropriate publications regarding lightning safety.
NASA Optical Transient Detector	<a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>	Space-based sensor of lightning strikes
LLNL Geologic & Atmospheric Hazards	<a href="http://www.wep.es.llnl.gov/wwwep/ghp.html">http://www.wep.es.llnl.gov/wwwep/ghp.html</a>	General hazard information developed for the Dept. of Energy.
The Tornado Project Online	<a href="http://www.tornadoobject.com/">http://www.tornadoobject.com/</a>	Information on tornadoes, including details of recent impacts.
National Severe Storms Laboratory	<a href="http://www.nssl.uoknor.edu/">http://www.nssl.uoknor.edu/</a>	Information about and tracking of severe storms.
Independent Insurance Agents of America IIAA Natural Disaster Risk Map	<a href="http://www.iaa.iix.com/ndcmap.htm">http://www.iaa.iix.com/ndcmap.htm</a>	A multi-disaster risk map.
Earth Satellite Corporation	<a href="http://www.earthsat.com/">http://www.earthsat.com/</a>	Flood risk maps searchable by state.
USDA Forest Service Web	<a href="http://www.fs.fed.us/land">http://www.fs.fed.us/land</a>	Information on forest fires and land management.

**APPENDIX B:**  
**Hazard Mitigation Assistance Grants**

## **APPENDIX B: HAZARD MITIGATION ASSISTANCE GRANTS**

Hazard Mitigation Assistance (HMA) grant programs of the Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA), present a critical opportunity for Sunapee to protect individuals and property from natural hazards while simultaneously reducing reliance on Federal disaster funds. The HMA programs provide pre-disaster mitigation grants annually to local communities. The statutory origins of the programs differ, but all share the common goal of reducing the loss of life and property due to natural hazards. Eligible applicants include State-level agencies including State institutions; Federally recognized Indian Tribal governments; Public or Tribal colleges or universities (PDM only); and Local jurisdictions.

All subapplicants for Flood Mitigation Assistance Program (FMA) must currently be participating in the National Flood Insurance Program (NFIP) to be eligible to apply for this grant. Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) mitigation project subapplications for projects sited within a special flood hazard area are eligible only if the jurisdiction in which the project is located is participating in the NFIP. There is no NFIP participation requirement for HMGP and PDM project subapplications located outside the special flood hazard area. Properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained at least through completion of the mitigation activity.

The HMA grant assistance includes three programs:

1. *Hazard Mitigation Grant Program (HMGP)*: This program assists in the implementation of long-term hazard mitigation measures following a major disaster.
2. *The Pre-Disaster Mitigation (PDM) program*: This provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are awarded on a competitive basis.
3. *The Flood Mitigation Assistance (FMA) program*: This provides funds so that cost-effective measures can be taken to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insured under the NFIP. The long-term goal of FMA is to reduce or eliminate claims under the NFIP through mitigation activities.

Potential eligible projects are shown in the following table by grant program. For further information on these programs visit the following FEMA websites:

HMGP - <http://www.fema.gov/hazard-mitigation-grant-program>

PDM – [www.fema.gov/government/grant/pdm/](http://www.fema.gov/government/grant/pdm/)

FMA – [www.fema.gov/government/grant/fma](http://www.fema.gov/government/grant/fma)

Mitigation Project:	HMPG	PDM	FMA
<b>1. Mitigation Projects</b>	<b>X</b>	<b>X</b>	<b>X</b>
Property Acquisition and Structure Demolition	<b>X</b>	<b>X</b>	<b>X</b>
Property Acquisition and Structure Relocation	<b>X</b>	<b>X</b>	<b>X</b>
Structure Elevation	<b>X</b>	<b>X</b>	<b>X</b>
Mitigation Reconstruction			<b>X</b>
Dry Floodproofing of Historic Residential Structures	<b>X</b>	<b>X</b>	<b>X</b>
Dry Floodproofing of Non-residential Structures	<b>X</b>	<b>X</b>	<b>X</b>
Minor Localized Flood Reduction Projects	<b>X</b>	<b>X</b>	<b>X</b>
Structural Retrofitting of Existing Buildings	<b>X</b>	<b>X</b>	
Non-structural Retrofitting of Existing Buildings and Facilities	<b>X</b>	<b>X</b>	<b>X</b>
Safe Room Construction	<b>X</b>	<b>X</b>	
Wind Retrofit for One- and Two-Family Residences	<b>X</b>	<b>X</b>	
Infrastructure Retrofit	<b>X</b>	<b>X</b>	<b>X</b>
Soil Stabilization	<b>X</b>	<b>X</b>	<b>X</b>
Wildfire Mitigation	<b>X</b>	<b>X</b>	
Post-Disaster Code Enforcement	<b>X</b>		
Generators	<b>X</b>	<b>X</b>	
5% Initiative Projects	<b>X</b>		
Advance Assistance	<b>X</b>		
<b>2. Hazard Mitigation Planning</b>	<b>X</b>	<b>X</b>	<b>X</b>
<b>3. Management Costs</b>	<b>X</b>	<b>X</b>	<b>X</b>

## OTHER HAZARD MITIGATION ASSISTANCE FUNDING

### Environmental Protection Agency

The EPA makes available funds for water management and wetlands protection programs that help mitigate against future costs associated with hazard damage.

Mitigation Funding Sources Program	Details	Notes
Clean Water Act Section 319 Grants	Grants for water source management programs including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and regulation. <a href="http://www.epa.gov/OWOW/NPS/cwact.html">http://www.epa.gov/OWOW/NPS/cwact.html</a>	Funds are provided only to designated state and tribal agencies
Clean Water State Revolving Funds	State grants to capitalize loan funds. States make loans to communities, individuals, and others for high-priority water-quality activities. <a href="http://www.epa.gov/owow/wetlands/initiative/srf.html">http://www.epa.gov/owow/wetlands/initiative/srf.html</a>	States and Puerto Rico
Wetland Program Development Grants	Funds for projects that promote research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. <a href="http://www.epa.gov/owow/wetlands/initiative/#financial">http://www.epa.gov/owow/wetlands/initiative/#financial</a>	See website

### National Oceanic and Atmosphere Administration (NOAA)

NOAA is the major source for mitigation funding related to coastal zone management and other coastal protection projects.

Mitigation Funding Sources Program	Details	Notes
Coastal Services Center Cooperative Agreements	Funds for coastal wetlands management and protection, natural hazards management, public access improvement, reduction of marine debris, special area management planning, and ocean resource planning. <a href="http://www.csc.noaa.gov/funding/">http://www.csc.noaa.gov/funding/</a>	May only be used to implement and enhance the states' approved Coastal Zone Management programs
Coastal Services Center Grant Opportunities	Formula and program enhancement grants for implementing and enhancing Coastal Zone Management programs that have been approved by the Secretary of Commerce. <a href="http://www.csc.noaa.gov/funding/">http://www.csc.noaa.gov/funding/</a>	Formula grants require non-federal match
Coastal Zone Management Program	The Office of Ocean and Coastal Resource Management (OCRM) provides federal funding and technical assistance to better manage our coastal resources. <a href="http://coastalmanagement.noaa.gov/funding/welcome.html">http://coastalmanagement.noaa.gov/funding/welcome.html</a>	Funding is reserved for the nation's 34 state and territory Coastal Zone Management Programs
Marine and Coastal Habitat Restoration	Funding for habitat restoration, including wetland restoration and dam removal. <a href="http://www.nmfs.noaa.gov/habitat/recovery/">http://www.nmfs.noaa.gov/habitat/recovery/</a>	Funding available for state, local and tribal governments and for- and non-profit organizations.

## Floodplain, Wetland and Watershed Protection Programs

USACE and the U.S. Fish and Wildlife Service offer funding and technical support for programs designed to protect floodplains, wetlands, and watersheds.

Funding and Technical Assistance for Wetlands and Floodplains Program	Details	Notes
USACE Planning Assistance to States (PAS)	Fund plans for the development and conservation of water resources, dam safety, flood damage reduction and floodplain management. <a href="http://www.lre.usace.army.mil/planning/assist.html">http://www.lre.usace.army.mil/planning/assist.html</a>	50 percent non-federal match
USACE Flood Plain Management Services (FPMS)	Technical support for effective floodplain management. <a href="http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&amp;MyCategory=126">http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&amp;MyCategory=126</a>	See website
USACE Environmental Laboratory	Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials. <a href="http://el.erdc.usace.army.mil/index.cfm">http://el.erdc.usace.army.mil/index.cfm</a>	See website
U.S. Fish & Wildlife Service Coastal Wetlands Conservation Grant Program	Matching grants to states for acquisition, restoration, management or enhancement of coastal wetlands. <a href="http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home">http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home</a>	States only. 50 percent federal share
U.S. Fish & Wildlife Service Partners for Fish and Wildlife Program	Program that provides financial and technical assistance to private landowners interested in restoring degraded wildlife habitat. <a href="http://ecos.fws.gov/partners/viewContent.do?viewPage=home">http://ecos.fws.gov/partners/viewContent.do?viewPage=home</a>	Funding for volunteer-based programs

## Housing and Urban Development

The Community Development Block Grants (CDBG) administered by HUD can be used to fund hazard mitigation projects.

Mitigation Funding Sources Program	Details	Notes
Community Development Block Grants (CDBG)	Grants to develop viable communities, principally for low and moderate income persons. CDBG funds available through Disaster Recovery Initiative. <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/">http://www.hud.gov/offices/cpd/communitydevelopment/programs/</a>	Disaster funds contingent upon Presidential disaster declaration
Disaster Recovery Assistance	Disaster relief and recovery assistance in the form of special mortgage financing for rehabilitation of impacted homes. <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm">http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm</a>	Individuals
Neighborhood Stabilization Program	Funding for the purchase and rehabilitation of foreclosed and vacant property in order to renew neighborhoods devastated by the economic crisis. <a href="http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/">http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/</a>	State and local governments and non-profits

## Bureau of Land Management

The Bureau of Land Management (BLM) has two technical assistance programs focused on fire mitigation strategies at the community level.

Mitigation Funding Sources Program	Details	Notes
Community Assistance and Protection Program	Focuses on mitigation/prevention, education, and outreach. National Fire Prevention and Education teams are sent to areas across the country at-risk for wildland fire to work with local residents. <a href="http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html">http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html</a>	See website
Firewise Communities Program	Effort to involve homeowners, community leaders, planners, developers, and others in the effort to protect people, property, and natural resources from the risk of wildland fire before a fire starts. <a href="http://www.firewise.org/">http://www.firewise.org/</a>	See website

## U.S. Department of Agriculture

There are multiple mitigation funding and technical assistance opportunities available from the USDA and its various sub-agencies: the Farm Service Agency, Forest Service, and Natural Resources Conservation Service.

Mitigation Funding Sources Agency Program	Details	Notes
USDA Smith-Lever Special Needs Funding	Grants to State Extension Services at 1862 Land-Grant Institutions to support education-based approaches to addressing emergency preparedness and disasters. <a href="http://www.csrees.usda.gov/funding/rfas/smith_lever.html">http://www.csrees.usda.gov/funding/rfas/smith_lever.html</a>	Population under 20,000
USDA Community Facilities Guaranteed Loan Program	This program provides an incentive for commercial lending that will develop essential community facilities, such as fire stations, police stations, and other public buildings. <a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>	Population under 20,000
USDA Community Facilities Direct Loans	Loans for essential community facilities. <a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>	Population of less than 20,000
USDA Community Facilities Direct Grants	Grants to develop essential community facilities. <a href="http://www.rurdev.usda.gov/rhs/cf/cp.htm">http://www.rurdev.usda.gov/rhs/cf/cp.htm</a>	Population of less than 20,000
USDA Farm Service Agency Disaster Assistance Programs	Emergency funding and technical assistance for farmers and ranchers to rehabilitate farmland and livestock damaged by natural disasters. <a href="http://www.fsa.usda.gov/">http://www.fsa.usda.gov/</a>	Farmers and ranchers
USDA Forest Service National Fire Plan	Funding for organizing, training, and equipping fire districts through Volunteer, State and Rural Fire Assistance programs. Technical assistance for fire related mitigation. <a href="http://www.forestsandrangelands.gov/">http://www.forestsandrangelands.gov/</a>	See website
USDA Forest Service Economic Action Program	Funds for preparation of Fire Safe plans to reduce fire hazards and utilize byproducts of fuels management activities in a value-added fashion. <a href="http://www.fs.fed.us/spf/coop/programs/eap/">http://www.fs.fed.us/spf/coop/programs/eap/</a>	80% of total cost of project may be covered
USDA Natural Resources Conservation Service Emergency Watershed Protection Support Services	Funds for implementing emergency measures in watersheds in order to relieve imminent hazards to life and property created by a natural disaster. <a href="http://www.nrcs.usda.gov/programs/ewp/">http://www.nrcs.usda.gov/programs/ewp/</a>	See website

Mitigation Funding Sources Agency Program	Details	Notes
USDA Natural Resources Conservation Service Watershed Protection and Flood Prevention	Funds for soil conservation; flood prevention; conservation, development, utilization and disposal of water; and conservation and proper utilization of land. <a href="http://www.nrcs.usda.gov/programs/watershed/index.html">http://www.nrcs.usda.gov/programs/watershed/index.html</a>	See website

### Health and Economic Agencies

Alternative mitigation programs can be found through health and economic agencies that provide loans and grants aimed primarily at disaster relief.

Federal Loans and Grants for Disaster Relief Agency Program	Details	Notes
Department of Health & Human Services Disaster Assistance for State Units on Aging (SUAs)	Provide disaster relief funds to those SUAs and tribal organizations who are currently receiving a grant under Title VI of the Older Americans Act. <a href="http://www.aoa.gov/doingbus/fundopp/fundopp.asp">http://www.aoa.gov/doingbus/fundopp/fundopp.asp</a>	Areas designated in a Disaster Declaration issued by the President
Economic Development Administration (EDA) Economic Development Administration Investment Programs	Grants that support public works, economic adjustment assistance, and planning. Certain funds allocated for locations recently hit by major disasters. <a href="http://www.eda.gov/AboutEDA/Programs.xml">http://www.eda.gov/AboutEDA/Programs.xml</a>	The maximum investment rate shall not exceed 50 percent of the project cost
U.S. Small Business Administration Small Business Administration Loan Program	Low-interest, fixed rate loans to small businesses for the purpose of implementing mitigation measures. Also available for disaster damaged property. <a href="http://www.sba.gov/services/financialassistance/index.html">http://www.sba.gov/services/financialassistance/index.html</a>	Must meet SBA approved credit rating

### Research Agencies

The United States Geological Survey (USGS) and the National Science Foundation (NSF) provide grant money for hazard mitigation-related research efforts.

Hazard Mitigation Research Grants Agency Program	Details	Notes
National Science Foundation (NSF) Decision, Risk, and Management Sciences Program (DRMS)	Grants for small-scale, exploratory, high-risk research having a severe urgency with regard to natural or anthropogenic disasters and similar unanticipated events. <a href="http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&amp;org=SES">http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&amp;org=SES</a>	See website
U.S. Geological Survey (USGS) National Earthquake Hazards Reduction Program	The purpose of NEHRP is to provide products for earthquake loss reduction to the public and private sectors by carrying out research on earthquake occurrence and effects. <a href="http://www.usgs.gov/contracts/nehrrp/">http://www.usgs.gov/contracts/nehrrp/</a>	Community with a population under 20,000

**APPENDIX C:**  
**Meeting Documentation**



## **Work Plan**

### **Meeting #1: Wednesday, December 22, 2021 9:00 AM-Noon**

- General discussion of requirements and in-kind match process
- Review goals of hazard mitigation plan and revise (hand-out)
- Review hazards (hand-out)
- Identify and map past/potential hazards (update map & lists in Chapter 2)
- Flooding – Are there any non-FEMA flood areas?
- Specific past and potential events of hazards not in 2016 plan (recent events)
- Potential development areas in town (compare with list in 2016 plan)
- Identify critical facilities (update map and list)
- Review Critical Facilities & hazard vulnerability
- Determine Vulnerability to Hazards for Town
- Determine Probability of Hazards for Town
- Discuss future meetings, public notice, stakeholders to be notified, notices to abutting towns

### **Meeting #2: Wednesday, February 9, 2022 9:00 AM - Noon**

- Review previously determined potential mitigation efforts (were they implemented? If not, why not and are they still on the table to be implemented?)
- Brainstorm improvements to existing mitigation efforts
- Brainstorm potential new mitigation efforts

### **Meeting #3: Wednesday, April 6, 2022 8:00 – 9:30 AM**

- Evaluate the past and potential mitigation efforts
- Develop a prioritized implementation schedule and discuss the adoption and monitoring of the plan

### **Meeting #4 Review by email**

- Review and revise draft plan

## **Sunapee Hazard Mitigation Plan Update 2022 Meeting Attendance List**

### **December 22, 2021**

Dave Bailey, Town of Sunapee Water & Sewer Superintendent  
David Cahill, Town of Sunapee Police Chief  
John Galloway, Town of Sunapee Fire Chief  
Scott Hazelton, Town of Sunapee Department of Public Works Director  
Shannon Martinez, Town of Sunapee Town Manager  
Howard Sargent, Town of Sunapee Emergency Management Director  
Victoria Davis, UVLSRPC Planner

### **February 9, 2022**

Dave Bailey, Town of Sunapee Water & Sewer Superintendent  
David Cahill, Town of Sunapee Police Chief  
John Galloway, Town of Sunapee Fire Chief  
Scott Hazelton, Town of Sunapee Department of Public Works Director  
Shannon Martinez, Town of Sunapee Town Manager  
Howard Sargent, Town of Sunapee Emergency Management Director  
Victoria Davis, UVLSRPC Planner

### **April 6, 2022**

Scott Hazelton, Town of Sunapee Department of Public Works Director  
Shannon Martinez, Town of Sunapee Town Manager  
Victoria Davis, UVLSRPC Planner

**APPENDIX D:**  
**Map of Hazard Areas and Critical Facilities**



# Hazard Mitigation 2022



**APPENDIX E:**  
**FEMA Approvals and Town Adoption of Hazard Mitigation Plan**

**Town of Sunapee, New Hampshire**  
**Board of Selectmen**  
**A Resolution Adopting the Sunapee Hazard Mitigation Plan Update 2022**

WHEREAS, the Town of Sunapee received assistance from the Upper Valley Lake Sunapee Regional Planning Commission through funding from the NH Homeland Security and Emergency Management to prepare a hazard mitigation updated plan; and

WHEREAS, several planning meetings to develop the hazard mitigation plan update were held in May through June 2019 and then presented to the Board of Selectmen for review and discussion on July 11, 2022; and

WHEREAS, the Sunapee Hazard Mitigation Plan contains several potential future projects to mitigate the hazard damage in the Town of Sunapee; and

WHEREAS, the Board of Selectmen held a public meeting on July 11, 2022 to formally approve and adopt the Sunapee Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Sunapee Board of Selectmen adopt the Sunapee Hazard Mitigation Plan Update 2022.

APPROVED and SIGNED this 11 day of July, 2022.

TOWN OF SUNAPEE  
BOARD OF SELECTMEN

Vice Chair Suzanne Goulet

(seal)

ATTEST:

Member Richard C. Gallup

CP Wallace  
Member



U.S. Department of Homeland Security  
FEMA Region I  
99 High Street, Sixth Floor  
Boston, MA 02110-2132

**FEMA**

July 22, 2022

John Marcel, State Hazard Mitigation Planner  
New Hampshire Department of Safety, Homeland Security and Emergency Management  
33 Hazen Drive  
Concord, New Hampshire 03303

Dear John Marcel:

As outlined in the FEMA-State Agreement for FEMA-DR-4457, your office has been delegated the authority to review and approve local mitigation plans under the Program Administration by States Pilot Program. Our Agency has been notified that your office completed its review of the Town of Sunapee, New Hampshire Hazard Mitigation Plan Update 2022 and approved it effective **July 22, 2022** through **July 21, 2027** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

With this plan approval, the jurisdiction is eligible to apply to New Hampshire Homeland Security and Emergency Management for mitigation grants administered by FEMA. Requests for funding will be evaluated according to the eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in this community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

The plan must be updated and resubmitted to the FEMA Region I Mitigation Division for approval every five years to remain eligible for FEMA mitigation grant funding.

Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Jay Neiderbach at (617) 832-4926 or [Josiah.Neiderbach@fema.dhs.gov](mailto:Josiah.Neiderbach@fema.dhs.gov).

Sincerely,

Paul F. Ford  
Deputy Regional Administrator  
DHS, FEMA Region I

PFF:jn

cc: Vanesa Urango, Chief of Mitigation and Planning Section, New Hampshire  
Brian Eaton, Assistant Chief of Mitigation, New Hampshire

