

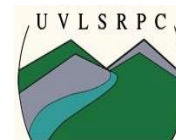


Mountain Road, Goshen

**TOWN OF GOSHEN,
NEW HAMPSHIRE**

HAZARD MITIGATION PLAN

Update 2026



Upper Valley Lake Sunapee
Regional Planning



Town of Goshen
Hazard Mitigation Committee

TABLE OF CONTENTS

I.	INTRODUCTION	1
A.	BACKGROUND	1
B.	PURPOSE.....	1
C.	HISTORY	1
D.	SCOPE OF THE PLAN	2
E.	METHODOLOGY	2
F.	HAZARD MITIGATION GOALS	5
G.	ACKNOWLEDGEMENTS	6
II.	COMMUNITY PROFILE	7
A.	INTRODUCTION	7
B.	DEVELOPMENT TRENDS.....	7
III.	HAZARD IDENTIFICATION	10
A.	WHAT ARE THE HAZARDS IN GOSHEN?	10
B.	DESCRIPTIONS OF HAZARDS.....	11
	<i>Dam Failure.....</i>	<i>13</i>
	<i>Flooding</i>	<i>14</i>
	<i>Erosion</i>	<i>18</i>
	<i>Landslide</i>	<i>20</i>
	<i>Tropical/Post-Tropical Storms</i>	<i>21</i>
	<i>High Wind Event.....</i>	<i>24</i>
	<i>Thunderstorms/Lightning/Hail.....</i>	<i>27</i>
	<i>Drought</i>	<i>29</i>
	<i>Extreme Temperatures</i>	<i>32</i>
	<i>Wildfire.....</i>	<i>36</i>
	<i>Severe Winter Weather</i>	<i>37</i>
	<i>Solar Storms and Space Weather.....</i>	<i>42</i>
	<i>Earthquake</i>	<i>44</i>
	<i>Natural Water & Air Contaminants.....</i>	<i>46</i>
	<i>Hazardous Materials Spills</i>	<i>49</i>
	<i>Terrorism.....</i>	<i>50</i>
	<i>Cybersecurity.....</i>	<i>51</i>
	<i>Infectious Diseases</i>	<i>52</i>
	<i>Invasive Species</i>	<i>56</i>
C.	HAZARD RISK RATINGS.....	58
	<i>Assessing Probability.....</i>	<i>58</i>
	<i>Assessing Vulnerability.....</i>	<i>59</i>

Assessing Risk.....	60
IV. CRITICAL FACILITIES/LOCATIONS.....	62
V. DETERMINING HOW MUCH WILL BE AFFECTED	63
A. IDENTIFYING VULNERABLE FACILITIES	63
B. IDENTIFYING VULNERABLE SPECIAL POPULATIONS	64
C. POTENTIAL LOSS ESTIMATES	64
<i>Dam Failure – High Risk - \$2.8 Million Estimated Cost (not including other town impacts, roads, bridges)</i>	64
<i>Flooding – High Risk - \$1.6 Million Estimated Cost (not including roads, bridges)</i>	65
<i>Erosion – Medium Risk – No Recorded or Estimated Cost</i>	65
<i>Landslide – Low/Medium – No Recorded or Estimated Cost</i>	65
<i>Tropical/Post-Tropical Storms – High Risk – \$830,000 Estimated Cost</i>	65
<i>High Wind Events –Medium Risk – No Recorded or Estimated Cost</i>	66
<i>Thunderstorm/Lightning/Hail –Medium Risk – No Recorded or Estimated Cost</i>	66
<i>Drought – Medium Risk – No Recorded or Estimated Cost</i>	66
<i>Extreme Temperatures – Medium/High Risk – No Recorded or Estimated Cost</i>	66
<i>Wildfire – Medium Risk – \$415,000 Estimated Cost</i>	67
<i>Severe Winter Weather – Medium/High Risk – No Recorded or Estimated Cost</i>	67
<i>Solar Storms and Space Weather - Low Risk – No Recorded or Estimated Costs</i>	67
<i>Earthquake – Low/Medium Risk - \$8,300,000 Estimated Cost if All Buildings Impacted</i>	68
<i>Natural Contaminants – Medium Risk – No Recorded or Estimated Cost</i>	68
<i>Hazardous Material Spills –Low/Medium Risk – No Recorded or Estimated Cost</i>	68
<i>Terrorism – Low/Medium Risk – No Recorded or Estimated Cost</i>	68
<i>Cybersecurity– Low/Medium Risk – No Recorded or Estimated Cost</i>	69
<i>Infectious Disease – High - No Recorded or Estimated Cost</i>	69
<i>Invasive Species – Medium/High – No Recorded or Estimated Cost</i>	69
VI. MITIGATION PROGRAMS AND ACTIONS	70
A. HAZARD MITIGATION ACTION NEEDS ASSESSMENT	70
B. HAZARD MITIGATION PROGRAM ASSESSMENT	73
C. EXISTING AND PROPOSED HAZARD MITIGATION ACTIONS	75
D. CRITICAL EVALUATION FOR IMPROVEMENTS TO EXISTING ACTIONS AND NEW PROGRAMS	80
E. PRIORITIZED IMPLEMENTATION SCHEDULE	83
VII. EMERGENCY PREPAREDNESS ACTIONS.....	85
VIII. ADOPTION & IMPLEMENTATION OF THE PLAN	89
A. IMPLEMENTATION THROUGH EXISTING PROGRAMS	89
B. CONTINUED PUBLIC INVOLVEMENT	91

TABLES

Table II-1: NEW HOME BUILDING PERMITS ISSUED APPROVED BY YEAR	8
Table II-2: AREA POPULATION TRENDS	9
Table II-3: POPULATION GROWTH IN GOSHEN.....	9
Table II-4: POPULATION PROJECTIONS FOR GOSHEN	9
Table III-1: NH DAM CLASSIFICATIONS.....	12
Table III-2: DAMS.....	13
Table III-3: FLOODING	15
Table III-4: HURRICANES & TROPICAL STORMS	22
Table III-5: HIGH WIND EVENTS IN OR NEAR SULLIVAN COUNTY	24
Table III-6: ENHANCED FUJITA SCALE	25
Table III-7: LIGHTNING ACTIVITY LEVEL	28
Table III-8: THUNDERSTORM/LIGHTNING/HAIL	29
Table III-9: DROUGHT.....	31
Table III-10: DROUGHT MEASUREMENT	32
Table III-11: EXTREME TEMPERATURE EVENTS.....	35
Table III-12: SEVERE WINTER WEATHER	39
Table III-13: RICHTER SCALE and MERCALLI INTENSITY.....	44
Table III-14: EARTHQUAKES.....	45
Table III-15: RADON	47
Table III-16: INFECTIOUS DISEASE MEASUREMENT	53
Table III-17: ACTIONS TO REDUCE RISK OF INFECTIOUS DISEASE.....	54
Table III-18: INFECTIOUS DISEASE EVENTS	55
Table III-19: PROBABILITY OF HAZARDS	58
Table III-20: VULNERABILITY OF HAZARD	59
Table III-21: RISK ASSESSMENT.....	61
Table IV-1: EMERGENCY RESPONSE FACILITIES, SERVICES & STRUCTURES	62
Table IV-2: NON-EMERGENCY RESPONSE FACILITIES & STRUCTURES	62
Table IV-3: FACILITIES & POPULATIONS TO PROTECT	62
Table V-1: VULNERABILITY OF EXISTING DEVELOPED AREAS	63
Table V-2: VULNERABILITY OF POTENTIAL DEVELOPMENT	64

Table VI-1: COMMITTEE ASSESSMENT FOR NEW HAZARD MITIGATION ACTIONS	70
Table VI-2: EXISTING HAZARD MITIGATION PROGRAMS	73
Table VI-3: EXISTING AND PROPOSED MITIGATION ACTIONS	75
Table VI-4: PUBLIC EDUCATION AND OUTREACH TOPICS	79
Table VI-5: PRIORITIZING EXISTING & NEW MITIGATION STRATEGY IMPROVEMENTS	81
Table VI-6: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING AND PROPOSED PROGRAM IMPROVEMENTS	83
Table VII-1: EMERGENCY PREPAREDNESS ACTIONS	85

FIGURES

Figure III-1: HAIL SIZE COMPARISON CHART	27
Figure III-2: DROUGHT MAPS Figure III-3: PALMER DROUGHT INDEX.....	30
Figure III-4: HEAT INDEX.....	33
Figure III-5: WIND CHILL	34
Figure III-6: SCALED PREDICTIVE ICE STORM AFTERMATH INDEX.....	38
Figure III-7: RADIO BLACKOUTS SCALE.....	43
Figure III-8: MAP OF RADON ZONES	48
Figure III-9: PREVENTING THE SPREAD OF INVASIVE SPECIES.....	55

APPENDICES

Appendix A:	Technical Resources
Appendix B:	Hazard Mitigation Assistance Grants
Appendix C:	Meeting Documentation
Appendix D:	Map of Hazard Areas and Critical Facilities and Gunnison Dam Emergency Operations Plan
Appendix E:	Public Opinion Survey Results
Appendix F:	Gunnison Dam and Sugar River Dam Assessments
Appendix G:	Town Adoption & FEMA Approvals of Hazard Mitigation Plan

I. INTRODUCTION

A. BACKGROUND

The New Hampshire 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 Goshen, to update their local Hazard Mitigation Plan. UVLSRPC wrote the first Goshen Hazard Mitigation Plan that was approved in 2008 and an update that was approved in 2016 and again in 2021. The *Goshen Hazard Mitigation Plan Update 2026* serves as a strategic planning tool for use by the Town of Goshen in its efforts to reduce future losses from natural and/or man-made hazard events before they occur.

The Goshen Hazard Mitigation Committee updated the *Goshen 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 Goshen Town Offices, the Goshen Town Select Board adopted the updated plan as shown in Appendix G.

B. PURPOSE

The Goshen Hazard Mitigation Plan Update 2026 is a planning tool for use by the Town of Goshen 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 *Goshen Hazard Mitigation Plan Update 2026* includes the identification of natural hazards affecting the Town, as identified by the Goshen 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 2023*:

- Cybersecurity
- Dam Failure
- Flooding
- Erosion
- High Wind Events
- Thunderstorm/Lightning/Hail
- Drought
- Extreme Temperatures
- Earthquake
- Natural Contaminants
- Hazardous Materials Spill
- Terrorism

E. METHODOLOGY

Neighboring town officials were invited to participate or contribute to the planning process. The individuals who attended the meetings, the Goshen Hazard Mitigation Committee, UVLSRPC staff, and the Field Representative from NH HSEM developed the content of the *Goshen Hazard Mitigation Plan Update 2026* by tailoring the nine-task process set forth in the *Local Mitigation Planning Handbook by FEMA (2025)* appropriate for the Town of Goshen. Many FEMA resources and multiple State and Federal websites were also used as well. The Committee held a total of four posted meetings in 2026. All meetings were posted inviting the general public, businesses, and academia members. Though notices invited those parties to participate, no members of the public, businesses, or academia attended the meetings.

This provided the public with the opportunity to participate, which they did not. In an effort to gain public participation, a paper copy of a hazard opinion survey was left in the Town Offices, along with a flyer for an online version. This survey was open for all members of the Town to fill out. Only one person submitted their opinion to the online survey. The results are in Appendix E. In addition, the UVLSRPC staff email address was on the public notice for questions. Appendix C provides a list of those in attendance at the meetings.

Municipal officials from surrounding towns were also invited to participate or obtain a copy of the draft or final plan.

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

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

April 22, 2026

May 20, 2026

June 17, 2026

July 22, 2026

To complete this updated Plan, the Hazard Mitigation Committee followed the following planning tasks to re-evaluate the plan sections of the existing 2021 plan and to update it to reflect current information and issues:

Task 1: Determine the Planning Area and Resource (February 2026)

Goshen 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 (March 2026)

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

Task 3: Create an Outreach Strategy (April-July 2026)

The Committee chose to provide public notices to the public to encourage participation at the public meetings. They also put a notice on the town website. 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 (May 2026)

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 Goshen 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 (June 2026):

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 (July 2026):

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 changes suggested, 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 2023*, which served as a resource for the *Goshen Hazard Mitigation Plan Update 2026*.

F. HAZARD MITIGATION GOALS

The Goshen 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 Goshen from natural and human-made hazards.
3. To reduce the potential impact of natural and human-made disasters to:
 - the Town of Goshen's Critical Support Services,
 - Critical Facilities in the Town of Goshen,
 - the Town of Goshen'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:

- Daniel Scott, Town of Goshen Emergency Management Director
- Dianne Craig, Town of Goshen Resident
- Ryan Hall, Town of Goshen Fire Chief
- Douglass Frost, Town of Goshen Fire Captain
- Derek Tremblay, Town of Goshen Board of Selectmen Member
- Shaedel Simino, Town of Goshen Road Agent
- Mark Caron, Town of Goshen Assistant Road Agent
- Ed Andersen, Town of Goshen Police Chief

- Grace Jackson, Associate Planner, Upper Valley Lake Sunapee Regional Planning Commission
- Anna White, Resilience Coordinator, Upper Valley Lake Sunapee Regional Planning Commission
- Jill Piwoski, Field Representative, NH Homeland Security and Emergency Management

The Hazard Mitigation Committee was composed of local officials, citizens of Goshen, an NH HSEM Field Representative, and staff representatives 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. INTRODUCTION¹



The Town of Goshen, New Hampshire is located in the southeastern corner of Sullivan County. Goshen is bordered by Lempster and Unity to the west, Newport and Sunapee to the north, Newbury to the east, and Washington to the south. NH Route 10 runs through the western portion of town from the Newport line to the Lempster line and follows the South Branch of the Sugar River. Other waterways in Goshen include Blood Brook, Gunnison Brook and Babb Brook.

In the village of Goshen, the Town Office, Police Department, Fire Department are all located within close proximity to each other on NH Route 10. There are about 11 miles of State roads in Goshen. There are about 14 miles of Class V maintained roads and about 4 miles of Class VI (unmaintained) roads in Goshen.

There is a total of approximately 13,376 acres within the town. Currently, there is a total of 11,227 acres of land in Current Use within the town of Goshen.²

B. DEVELOPMENT TRENDS

Goshen remains a rural community with limited population growth. The rate of growth was very high between 1980 and 1990, but has slowed significantly since then. In 2010, the total population was 810 people and the population for 2020 is slightly less. Not counted in these statistics from the NH Office of Planning and Development is the large seasonal population in Goshen; approximately one-quarter of housing units are not occupied for the full year.

Population projections show Goshen to continue to grow at a very slow rate. See the population projections table below.

¹ Town of Goshen Master Plan (2013)

² NH Department of Revenue Administration: Summary Inventory of Valuation Form MS-1 for 2025.

There are areas of Goshen that have the potential for development. The Mount Sunapee ski area was acquired by Vail Resorts, Inc. in 2018, and they have taken over the operation and management of the resort and ski area. Included in the acquisition is a parcel in excess of 600 acres known as the West Bowl located on Brook Road. This parcel continues to have potential for development and as of November 2020, Vail Resorts had included expansion of it in their master plan. There is no known timeline for any possible development.

Any erosion concerns will be addressed during the State permitting process. The west side of Route 10, Mummery Road to the Lempster town line, was also determined by the Committee as an area that has great potential for development in the future.

During the last five years, there have only been six building permits for new houses: one in 2020, one in 2021, three in 2022, zero in 2023, and one in 2024. The data for 2025 was not available.

The Committee does not feel that the vulnerability of the Town to hazards has changed in the last five years due to new developments.

Table II-1: NEW HOME BUILDING PERMITS ISSUED APPROVED BY YEAR

Year	New Home Building Permits
2020	1
2021	1
2022	3
2023	0
2024	1

The following tables provide the current population in Goshen as well as the past and future projected populations. Note that future population in Goshen is projected to remain steady over the next few decades, which will not be cause for significant growth and development in town.

Table II-2: AREA POPULATION TRENDS

Area	1980	1990	2000	2010	2020
Goshen	549	718	744	810	796
Lempster	637	948	976	1,154	1,118
Washington	411	629	907	1,123	1,192
Newport	6,229	6,110	6,269	6,508	6,299
Sunapee	2,312	2,559	3,055	3,364	3,342
Newbury	961	1,347	1,702	2,072	2,072
Sullivan County	36,063	38,592	40,458	42,093	43,063
New Hampshire	920,475	1,109,252	1,235,786	1,315,000	1,316,470

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

	1980	1990	2000	2010	2020
Population	549	718	744	810	796
Decade Change in Population		31%	4%	9%	-1.73%

*Source: 1980 – 2020 US Census***Table II-4: POPULATION PROJECTIONS FOR GOSHEN**

Area	2025	2030	2035	2040	2045	2050
Goshen	819	830	836	836	797	779
Change in Population	2.9%	1.3%	0.7%	0.0%	-4.67%	-2.26%

Source: State of New Hampshire, Regional Planning Commissions, Office of Planning and Development; US Census

III. HAZARD IDENTIFICATION

The Goshen Hazard Mitigation Committee reviewed the list of hazards provided in the *State of New Hampshire Multi-Hazard Mitigation Plan Update 2023* and hazard history for the State of New Hampshire and Sullivan County in particular. A list of past hazard events in Goshen, 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 GOSHEN?

Goshen is prone to a variety of natural and human-made hazards. The hazards that Goshen 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 Goshen 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 2021 Goshen 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, Dam Failure to High Hazardous Potential Dams). The Committee determined that Landslide is relevant to Goshen as they have occurred along the slope of Mount Sunapee; this was not considered in the 2016 plan. They added or retained evaluations of Natural Contaminants, Hazardous Materials Spills, Terrorism, Invasive Plants, and Cybersecurity, although they are not required by the State. Avalanche was determined to not be a relevant hazard in Goshen. The Committee determined a relative risk for each type of hazard. Here are the hazards evaluated in this plan:

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

B. DESCRIPTIONS OF HAZARDS

An assessment of each hazard relevant to Goshen 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.



Dam Failure

Dam Failures result 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 dams in Goshen. Appendix F shows the assessment for the Gunnison Dam and Sugar River Dam. NH DES assigns a hazard designation to each dam in the state depending upon the potential damage it would cause if the dam failed: 1.) 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. 2.) 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. 3.) A “low” hazard dam failure could cause some structural damage to buildings and roads. 4.) A “non-menace” dam failure would not cause any significant damage. See Table III-1.

Past Dam Failures

There have been no dam failures within the Town of Goshen or outside the Town that would have affected the Town including since the last hazard mitigation plan.

Potential Future Dam Failures

Although there are 27 dams in Goshen (4 not built at time of inventory), there is only one “high” and no “significant” hazard dams within town. The “high” hazard dam is the Gunnison Lake Dam at the outflow of the lake. Outside the Town of Goshen, there are no dams that would affect the Town of Goshen if they failed.

The Gunnison Lake Dam is shown on a map in Appendix D along with the Emergency Action Plan from the State of NH which owns the dam. Within the dam inundation area, there are 93 parcels. The committee determined that the Dam Failure risk in Goshen to be high.

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 mis-operation 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 mis-operation 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 mis-operation 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 mis-operation 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.

Table III-2: DAMS

Dam ID	Haz Class	Status	Dam Name	Water Body Name	Height (Ft)	Acres	Owner (Now or Formerly)	Tax Map
D095001		Ruins	South Branch Sugar River Dam	South Branch Sugar R	5		Robert E Hadley	
D095002		Ruins	Branch Gunnerson Brook Dam	Branch Gunnison Brook			Harry G Bartlett	
D095003		Ruins	Blood Brook Dam	Blood Brook			Emily Blossom	
D095004		Re	Rand Pond Outlet Brook Dam	Outlet Brook Rands Pd	4	0.15	NH Fish and Game Dept	
D095005	NM	Active	Erickson Dam	Unnamed Stream	15	0.32	Carl G Erickson	
D095006		Not Built	Stephan Fire Pond Dam	Unnamed Stream			David W Stephan	
D095007		Exempt	Fire Pond	Tr Gunnison Brook	5	0.5	Joseph Perrino	
D095008	NM	Active	Fire Pond	Unnamed Stream	11	0.3	George A Dorr Jr	
D095009	NM	Active	Hopkins Farm Pond Dam	Tr Blood Brook	8	0.18	Arthur G Jillette Jr	206-20
D095010		Not Built	Recreation Pond Dam	Unnamed Stream			Edward J Anderson	
D095011	NM	Active	Fire Pond	Tr Sugar River	13	0.26	Mr And Mrs Harold Covit	
D095012		Exempt	Wildlife Pond	Unnamed Stream	4	0.54	Virginia Schendler	
D095013		Exempt	Farm Pond	Tr South Branch River	5	0.14	Adelord Ayotte	
D095014		Not Built	Wildlife Pond	Unnamed Stream	10.5	1.4	Roy Balla	
D095015	NM	Active	Wildlife Pond	Unnamed Stream	8	0.54	Virginia Schendler	
D095016	NM	Active	Wildlife Pond	Trow Brook	8	2	Thomas B Powers	
D095017		Exempt	Scranton Farm Pond Dam	Tr Gunnison Brook	5	0.46	John Scranton	
D095018	NM	Active	Farm Pond	Tr Trow Brook	6	0.32	Thomas B Powers	
D095019		Not Built	Hughs Wildlife Pond Dam	Unnamed Stream			William Hughs	
D095020		Exempt	Suarez Recreation Pond Dam	Tr Trow Brook	2	0.3	Richard Suarez	
D095021		Exempt	Fire Pond	Unnamed Stream	4	0.2	Virginia Schendler	29-237
D095022	NM	Active	Fire Pond	Unnamed Stream	11	0.32	Richard Andrews	
D095023	NM	Active	Wildlife Pond Dam	Trask Brook	15.5	6.1	Dirk R Casagrande	
D095024		Exempt	Recreation Pond Dam	Unnamed Stream	3	1	Arthur Nelson	
D095025	H	Active	Gunnison Lake Site D2 Dam	Blood Brook	62	96.2	NH DES Water Division	
D095026	NM	Active	Pheasant Run Farm Pond	Runoff	7.5	0.27	Pheasant Run Farm	411/22
D095027		Ruins	Rand Pond	Rand Pond			Town Of Goshen	

Dam Status: A = Active; R = Ruins; Re = Removed; B = Breached; E – Exempt; NB = Not Built

Source: NH DES Dam Bureau September 2026

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 Goshen 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.

100-Year 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 no 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. The following tables provide a list of floods in the State, County, and Goshen. Other flooding issues are listed in the Erosion section—primarily for roads. There were flooding impacts in Goshen in July 2017 when several home basements took in water from the storm runoff. In 2021, a late July storm caused severe damage to roads and bridges in Goshen and neighboring towns.

Table III-3: FLOODING

HAZARD	DATE	LOCATION	DESCRIPTION OF AREAS IMPACTED	DAMAGES
Flood / Severe Storm	April 16, 1987	Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan	FEMA # 789- DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain.	\$4,888,889 in damage; no substantial damage in Goshen
Flood	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	FEMA DR # 876. Flooding caused by a series of storm events with moderate to heavy rains.	\$2,297,777 in damage; no substantial damage in Goshen
Flood (Ice Jam)	March 26, 1992	Cold River, Acworth	Ice jam (CRREL) which formed near a bend caused road flooding. Ice was removed by State equipment.	Unknown; no damage in Goshen
Flood	October 29, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan Counties	FEMA Disaster Declaration # 1144- DR. Flooding caused by heavy rains.	\$2,341,273 in damage; no damage in Goshen
Flood	October 7-18, 2005	Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties, NH	FEMA Disaster Declaration # 1610. Severe storms and flooding; major devastation in neighboring town of Acworth	\$3,000,000 in damages; no damage in Goshen
Flood	October-November 2005	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan counties	FEMA Disaster Declaration # DR-1144- NH	Unknown; no damage in Goshen
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 damage in Goshen
Flood	July 24, 2008	Central and Southern NH; Counties Declared: Belknap,	FEMA DR 1782	Severe storms, tornado, and flooding; no damage in Goshen

HAZARD	DATE	LOCATION	DESCRIPTION OF AREAS IMPACTED	DAMAGES
		Carroll, Merrimack, Rockingham, and Strafford		
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
Flood	March 14-31, 2010	Statewide	FEMA DR-1913; severe storms & flooding; Declared Counties: Hillsborough and Rockingham Counties	75% federal match; no damage in Goshen
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 Goshen
Flood	May 29-31, 2012	Cheshire County	FEMA DR-4065; severe storm and flood event	No damage in Goshen
Flood	June 26-July 3, 2013	Grafton, Sullivan and Cheshire Counties	FEMA DR-4139; severe storms, flooding, and landslides	No damage in Goshen
Flood	July 2014	Town of Goshen	A week of heavy rain in July 2014 that lead to the South Branch of the Sugar River cresting on July 15 th	Temporary foot bridge for Old Home Day washed out resulting in \$1,000 loss in materials
Flood	July 1-2, 2017	Grafton & Coos Counties (although damage in Goshen in Sullivan County as well)	FEMA DR-4329; severe flooding and storms	\$5 million in public assistance; basements flooded in Goshen
Flood	Oct 29 – Nov 1, 2017	Several counties including Sullivan	FEMA DR-4355	\$8 million in public assistance; no damage in Goshen
Flood	July 11-12, 2019	Grafton County	FEMA DR-4457	Unknown; no damage in Goshen
Flood	July 29-30, 2021	Cheshire and Sullivan Counties	4624-DR-NH	Damage to Route 10 and out to homes on Mummery Road; took out Ball Park Road bridge, Lempster Coach Road bridge, Brickyard Road bridge

Goshen became a participating member of the National Flood Insurance Program on April 2, 1986. Updated maps and flood insurance studies for all municipalities within Sullivan County were finalized on May 23, 2006. There are currently four policies in the town, three residential and one other residential, with \$511,255 of insurance.

However, flood insurance purchase is not a reflection of the number of structures within the flood plain. Two loss claims have been paid for a total of \$22,312; there have not been any repetitive loss claims made. (Source: NH OPD office, 2026)

Goshen's 1% (100-Year) Special Flood Areas are located within the A and AE Zone, with no base flood elevations determined. See Appendix D for a map showing all Special Flood Hazard Areas. There are no non-compliant structures in the Town of Goshen according to the NH Floodplain Insurance Program State Coordinator (2026).

As an NFIP participant, the Town of Goshen 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. The zoning ordinance further restricts development of residences and accessory buildings within the flood plain unless the purpose is directly related to agricultural use. The Building Inspector, in coordination with any other applicable official, shall be responsible for the following:

1. Determine if a substantial damage (SD) determination needs to be made and communicate SD and permit requirements to property owners
2. Verify the cost of repairs to the structure
3. Verify the market value of the structure

Potential Future Flooding Events

Future flooding is likely as noted in the above table based upon local knowledge of past flood events. There are currently 86 parcels located within the FEMA determined 1% flood areas. The Hazard Mitigation Committee will recommend to the Planning Board that the zoning ordinance be amended to prevent further new development within the 1% flood plain.

There are a total of seven state and town owned bridges with the flood plain. No value has been assigned to these structures as it is unknown. Flooding is especially prone along Route 10 near the intersection with Mummery Road due to the low elevation of Route 10.

According to the State's Mitigation Plan, Sullivan County has a high hazard risk for flooding. The Committee determined flooding is a high risk in Goshen.

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 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.

During the summer of 2013 the NH Department of Environmental Services hired a contractor to assess the conditions and attributes of many reaches of river and stream throughout the Sugar River Watershed. The results of that data provided the towns with information regarding vulnerabilities to erosion, or Fluvial Erosion Hazard (FEH) Sensitivity Rating, and the conditions that contribute to the rating. In Goshen, a reach of the South Branch of the Sugar River extending from the Newport/Goshen town line to just north of Brook Road was assessed. This section was given a “Very High” FEH rating due to several characteristics of the stream, including: migration of the stream bed, stormwater input, steep riffle or head cuts, and bridges and culverts not be correctly positioned or sized for the water body. The area along the river that the town is concerned with is the bank behind the Fire Station and Grange Hall which are located on NH Route 10. This area has seen severe erosion from the river in the past and is a growing concern for the town. The past history is outlined below. The town has used an engineer to identify the actions that need to be taken to mitigate the erosion and protect the town’s critical facility.

Past Erosion Events

The bank of the South Branch of the Sugar River, behind the Fire Station Grange Hall, post office, and commercial business, has experienced erosion in the past and is part of an ongoing effort to mitigate the erosion/landslide of materials. In the 1990s the bank adjacent to the Grange Hall collapsed due to the swift movement of the water causing erosion. The northern corner of the Grange Hall was suspended in air due to the land below it washing into the river. At that time, the bank behind the Grange was stabilized using large rocks for a retaining wall. The area behind the Fire Station and Grange has flooded many times through the last two decades, most recently in 2009, 2011 and 2014. So far, the flooding has not impeded the ability of the fire department to respond but the erosion is becoming more severe and will eventually impact the structural integrity of the land under the fire station and therefore the building itself.

There is also an erosion problem on Mountain Road where it changes from Class V to Class VI. Severe erosion occurred here in 2016-2017. In July/August 2021 there were rainstorms on several roads, and bridges and culverts were washed out. In 2026, the Committee noted that there were no specific instances of erosion since the last update. They said multiple areas in the town continue to erode.

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 medium risk for erosion damage.



Landslide

A landslide is the downward or outward movement of slope-forming materials reacting under the force of gravity, including mudslides, debris flows, and rockslides. Landslides can damage or destroy roads, railroads, electrical and phone lines, and other structures.

While no universally accepted standard or scientific scale has been developed for measuring the severity of all landslides, severity can be measured several other ways:

- Steepness/grade of the Slope (measured as a percent)
- Geographical Area
 - Measured in square feet, square yards, etc.
 - More accurately measured using LiDAR/GIS systems
- Earthquake, either causing the event or caused by the event (measured using the Moment Magnitude Intensity or Mercalli Scale)

There are also multiple types of landslides:

- Falls: A mass detaches from a steep slope or cliff and descends by free-fall, bounding, or rolling
- Topples: A mass tilts or rotates forward as a unit
- Slides: A mass displaces on one or more recognizable surfaces, which may be curved or planar
- Flows: A mass moves downslope with a fluid motion. A significant amount of water may or may not be part of the mass

Like flooding, landslides are unique in how they affect different geographic, topographic, and geologic areas. Therefore, consideration of a multitude of measurements is required to determine the severity of the landslide event.

Past Landslide Events:

The NH Department of Environmental Services personnel visited an area at along the western slope of Sunapee Mountain in Goshen. There is a severe erosion problem coming off the mountain which they assessed as a result of a landslide down the slope. The Committee noted this is still an ongoing issue in 2026.

Potential Future Landslide Events:

The best predictor of future landslides is past landslides. If any landslide events were to occur, they would be most likely in areas of very steep slope. There is little development in these areas, so no future structural damage cost due to this natural hazard is anticipated although there could be road or utility pole damage as well as forest damage. The Committee delineated an area where a landslide could potentially occur along the slope of Mount Sunapee on the map in Appendix D. The Committee determined there is a low/medium risk for landslide 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 Goshen 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

Hazard	Date	Location	Description of Areas Impacted	Damages
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 Goshen
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast	No damage in Goshen
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds	No damage in Goshen
Hurricane (Belle)	August 10, 1976	Southern New England	Primarily rain with resulting flooding in New Hampshire. Category 1	No damage in Goshen

Hazard	Date	Location	Description of Areas Impacted	Damages
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 Goshen
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 Goshen
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 Goshen
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains	No damage in Goshen
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 Goshen
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 Goshen
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 Goshen	\$2 Million primarily for roads and bridges; Goshen had \$50,000 in damage with \$25,000 on Mountain Road
Hurricane (Sandy)	October 26 – November 8, 2012	East Coast of US	FEMA-4095-DR-NH for Belknap, Carroll, Coos, Grafton and Sullivan Counties.	No damage in Goshen
Hurricane (Hermine)	September 6, 2016	Coastal NH	Closed Hampton Beach	No damage in Goshen

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 high in Goshen.

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. Macrobust, 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 2023*). 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) and the *NH Multi-Hazard Mitigation Plan Update 2023*. The Committee does not recall any high wind event damage in Goshen except in 2018. High wind occurred during a windy snow storm in 2022. The committee recalled the Fire Department receiving a dozen phone calls reporting downed trees. The committee could not recall when Goshen had experienced any wide spread and notable damage from tornadoes or downbursts.

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; no damage in Goshen
Tornado	June 27, 1964	F0	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	August 11, 1966	F2	No deaths or injuries; costs unknown; no damage in Goshen

Hazard	Date	Fujita/Enhanced Fujita Scale	Damages
Tornado	August 25, 1969	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	May 31, 1972	F1	No deaths or injuries; costs unknown (Merrimack County); no damage in Goshen
Tornado	July 21, 1972	F1	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	May 11, 1973	F2	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	June 11, 1973	F0	No deaths or injuries; costs unknown; no damage in Goshen
Tornado	August 15, 1976	F1	No deaths; 5 injuries; costs unknown (Merrimack County); no damage in Goshen
Tornado	August 13, 1999	F1	No deaths or injuries; costs unknown; Sullivan County; no damage in Goshen
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 in Goshen
Tornado	Summer 2006	NA	Began in Barnet, VT and moved to Monroe, NH; no damage in Goshen
Tornado	April 15, 2007	NA	Numerous trees were knocked down in Enfield, NH; no damage in Goshen
Tornado	July 24, 2008	(EF 2)	DR 1799: Trees, utility poles, houses down near Concord; 1 fatality and 2 injuries; no damage in Goshen
Tornado	May 4, 2018	EF 1	Sullivan/Merrimack Counties; knocked down some trees in Goshen

Source: www.tornadoproject.com

Table III-6: ENHANCED FUJITA SCALE

Scale	Wind Strength (MPH)	Typical Damage
EF0	65-85	Light damage (Gale): Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
EF1	86-110	Moderate damage (Weak Winds): Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
EF2	111-135	Considerable damage (Strong Winds): 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	Severe damage: 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	Devastating damage: Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated
EF5	Over 200	Incredible damage: 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

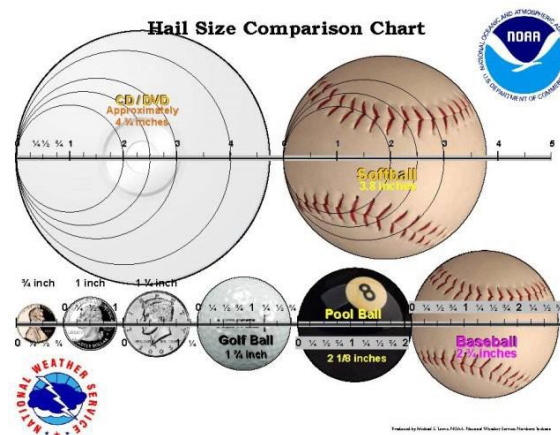
It is impossible to predict where a tornado or downburst will occur or what damage it will inflict. If a high wind event occurred it could affect a specific location or the entire town depending upon the size and power of the event. The FEMA website places the State of NH in the Zone II Wind Zone which 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 Goshen.

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-1: 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

Lightning Activity Level	Description
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 Goshen, but none were noteworthy according to the Committee. A thunderstorm with lightning or hail could impact the entire town, although lightning is more likely in isolated areas. In Goshen, it has been noted that there have been “snow lightning or thundersnow” events of thunderstorms with snow as the precipitation. These have been a rare occurrence until three years ago in town. They caused no damage in Goshen. There have been no significant hail events in Goshen to the Committee’s recollection. There has not been any thunderstorm, lightning, or hail events since the last hazard mitigation plan update.

Potential Future Thunderstorm Damage

It is inevitable that thunderstorms will occur in Goshen’s future. Lightning, hail, or wind from a thunderstorm could impact anywhere in town. It is not possible to estimate possible damage. According to the State’s mitigation plan, Sullivan County has a low risk of a lightning hazard. The risk for future thunderstorm damage was determined by the Committee to be medium risk in Goshen.

Table III-8: THUNDERSTORM/LIGHTNING/HAIL

Hazard	Date	Location	Description of Areas Impacted	Damages
Hail	June 16, 2007	SW NH	A severe thunderstorm produced large hail (.75 in) in southwestern New Hampshire.	unknown
Hail	August 3, 2007	Sullivan County	An isolated thunderstorm produced large hail in Sullivan County.	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 Goshen is in Area 2. The NH Drought Management Team, coordinated by the NH Department of Environmental Services Dam Bureau, uses these maps (see below) to help determine which areas are hardest hit.

Figure III-2: DROUGHT MAPS

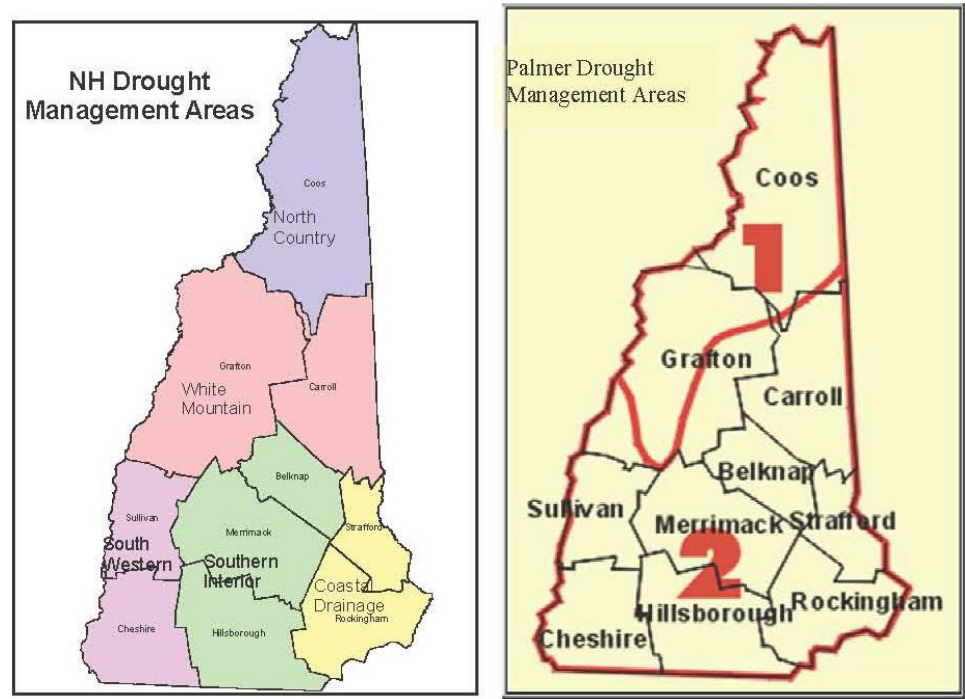


Figure III-3: PALMER DROUGHT INDEX

	D0 - Abnormally Dry - Short-term dryness slowing planting, growth of crops - Some lingering water deficits - Pastures or crops not fully recovered	60.0% of State	60.0% D0-D4
	D1 - Moderate Drought - Some damage to crops, pastures - Some water shortages developing - Voluntary water-use restrictions requested	0.0% of State	0.0% D1-D4
	D2 - Severe Drought - Crop or pasture loss likely - Water shortages common - Water restrictions imposed	0.0% of State	0.0% D2-D4
	D3 - Extreme Drought - Major crop/pasture losses - Widespread water shortages or restrictions	0.0% of State	0.0% D3-D4
	D4 - Exceptional Drought - Exceptional and widespread crop/pasture losses - Shortages of water creating water emergencies	0.0% of State	

Past Drought Events

Around 2001-2002, Goshen and other nearby towns had drought issues. This occurred again in 2010 and 2020.

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; no impact in Goshen recalled
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; minor impact in Goshen
2010	Most southerly counties	Affected dug well and those in hillsides	Unknown; minor impact in Goshen
2016-2017	Statewide	Water systems and private wells were adversely impacted. Impact to agricultural crops; Hundreds of private wells failed.	Extreme drought declared; no known impact in Goshen
2020 - 2021	Sullivan County	Abnormally dry conditions, moderate drought, and severe drought sporadically occurring over this time period	Unknown: no impact in Goshen
2025	Statewide	Areas in NH ranged from moderate to extreme drought. Sullivan County in between severe and extreme drought.	Wells drying up around Goshen, water supply 6 inches above line in fire hydrants

Source: NH DES through 2025; Concord Monitor August 22, 2010; NH Multi-Hazard Mitigation Plan 2018; Drought.gov

Potential Future Drought Damage

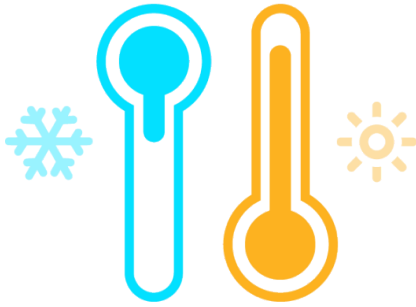
Drought may affect the entire town. The damage will depend upon the crops being grown at the time of the drought. No cost has been assigned to residential wells going dry though new wells may have to be dug or drilled. According to the State's mitigation plan, Sullivan County has a low risk for drought.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

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://www.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 reduces 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. Figures III-5 and III-6 below show which hot and cold temperatures are extremely dangerous for people to be exposed to.

Figure III-4: HEAT INDEX

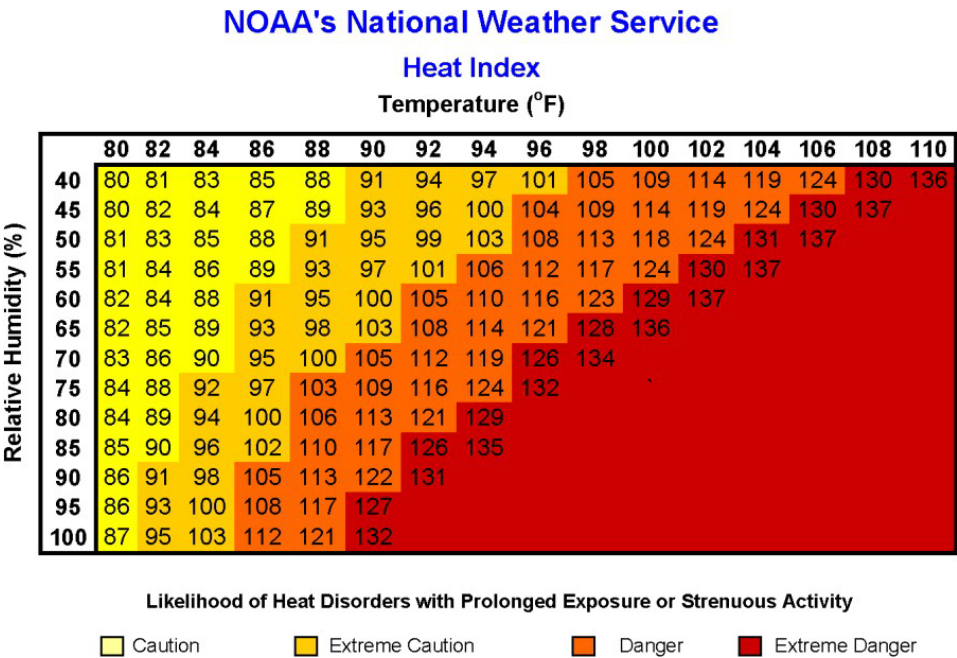
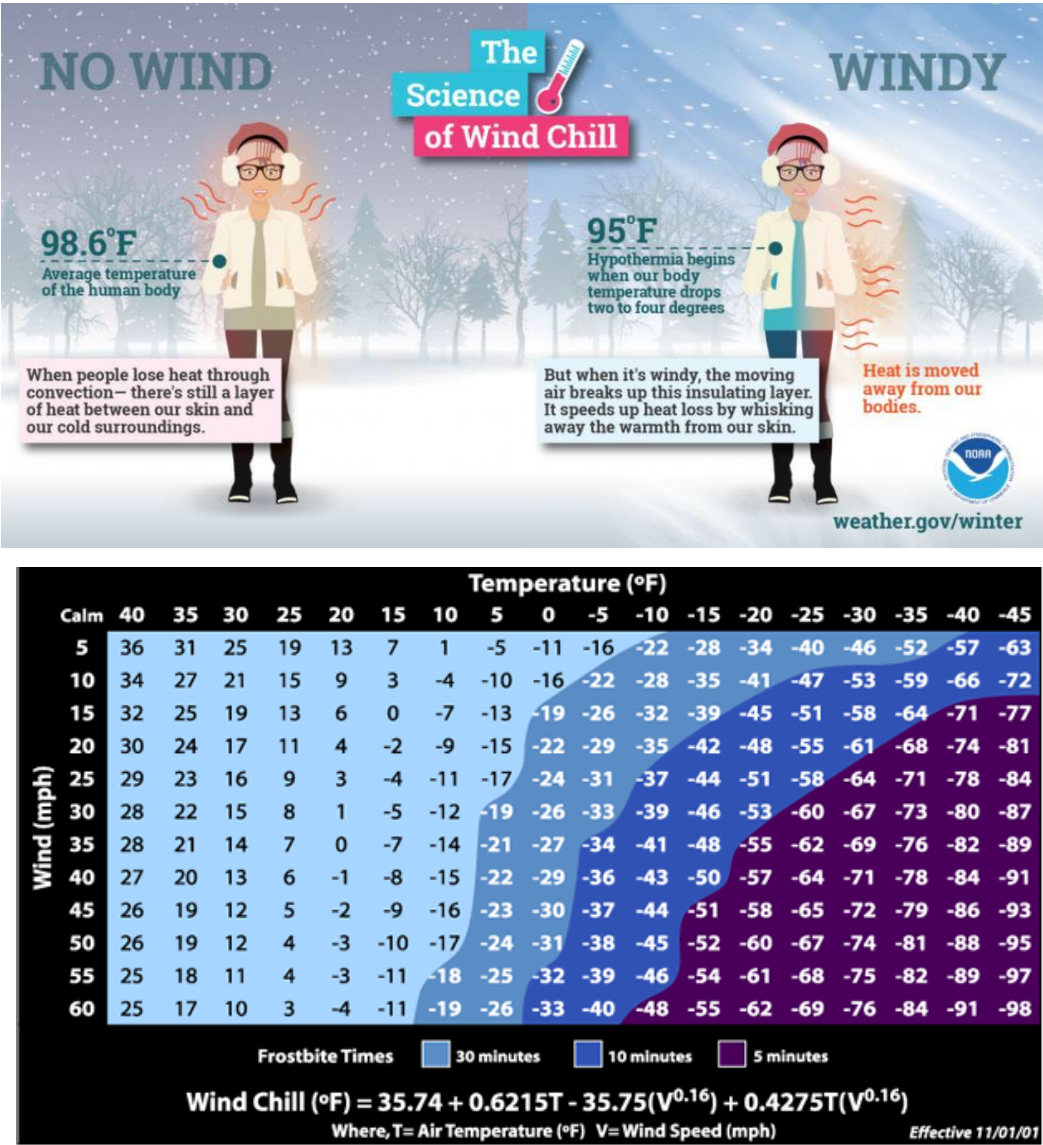


Figure III-5: WIND CHILL



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 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. The hottest day recorded in Goshen area was 98°F on Mount Sunapee in 1988. In 2026, the Committee recalled temperatures in the winter dropping to below 30 degrees Fahrenheit with wind chills two years ago.

Table III-11: EXTREME TEMPERATURE EVENTS

Date	Event	Location	Additional Information	Damage
July 1911	Heat Wave	New England	11-day heat wave in New Hampshire	Unknown
Late June to September, 1936	Heat Wave	North America	Temps to mid 90s in the northeast	Unknown
June - August, 1999	Heat Wave	Northeast	Mean temperatures well above long-term average	Unknown
Early August, 2001	Heat Wave	New Hampshire	Mid 90s and high humidity	Unknown
August 2-4, 2006	Heat Wave	New Hampshire	Regional heat wave and severe storms	Unknown
July 2010	Heat Wave	Northeast	Regional heat wave	Unknown
September 2017	Heat Wave	New Hampshire	High temperature records	Unknown
December 2017	Cold Wave	New Hampshire	Record low temperatures; wind chill warnings	Unknown
February 2018	One Day Heat Wave	New Hampshire	Record high winter temperatures	Unknown
Winter 2023-2024	One Day Cold Wave	Goshen	Temperatures dropped to below 30 with wind chill.	Unknown
Summer 2025	Heat Wave	Goshen	Warmer than usual temperatures lasting for days.	Unknown

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 medium/high risk in Goshen.

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). The majority of wildfires usually occur in April and May, when home owners 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 been no significant wildfire events in Goshen.

Potential Future Wildfire Events

There are many large, contiguous forest tracts in Goshen. 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 down trees and branches providing provide fuel for a fire. The State plan gives the county a low risk of wildfire. The Committee determined that the risk of wildfire in Goshen is medium.

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-6: SCALED PREDICTIVE ICE STORM AFTERMATH INDEX

Ice & Wind: Average Ice in Inches and Wind in Miles per hour	<15 mph	15-25 mph	25-35 mph	≥35 mph
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 Goshen. The Police Chief has had to help people get back home after a storm if their road had not been cleared. Eversource reported that there were 68 tree-related outages from August 2016-2021.

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	No damage in Goshen
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH	No damage in Goshen
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH	No damage in Goshen
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH	No damage in Goshen
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	No damage in Goshen
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH	No damage in Goshen
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH	No damage in Goshen
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH	No damage in Goshen
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH	No damage in Goshen
Snow Storm	February, 1979	New Hampshire	President's Day storm	No damage in Goshen
Ice Storm	January 8-25, 1979	New Hampshire	Major disruptions to power and transportation	No damage in Goshen
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH	No damage in Goshen
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 yrs 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 Goshen
Extreme Cold	November-December, 1988	New Hampshire	Temperature was below 0 degrees F for a month	No damage in Goshen

Hazard	Date	Location	Description of Areas Impacted	Damages
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH	No damage in Goshen
Snow Storm	1996	Regional	Two major storms with five feet of snow in a week	No damage in Goshen
Snow Storm	1997	New Hampshire	Power outages throughout region due to heavy snowfall	No damage in Goshen
Ice Storm	January 15, 1998	New Hampshire; Substantial power outages in Goshen	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 Goshen
Snow Storm	2000	Regional	Heavy snow	No damage in Goshen
Snow Storm	March 5-7, 2001	New Hampshire	Heavy snow.	No damage in Goshen
Snow Storm	December 6-7, 2003	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3193-NH	No damage in Goshen
Snow Storm	February 10-12, 2005	New Hampshire	Heavy snow. Federal Disaster Declaration FEMA-3208-NH	No damage in Goshen
Ice Storm	December 2008	New Hampshire	Debris removal. FEMA DR-1812; power outages in Goshen for up to 10 days; downed trees blocked roads and damaged utility lines	\$15 Million; no damage in Goshen
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 Goshen
Snow Storm	October 29-30, 2011	Statewide	EM-3344; FEMA-4049 Hillsborough & Rockingham Counties	No damage in Goshen
Ice Storm	January 27, 2012	Region	Isolated power outages in Goshen; several limbs down	No damage in Goshen
Snow Storm	February 8-10, 2013	New Hampshire	Heavy Snow. FEMA DR-4105	No damage in Goshen
Heavy Snow	January 2 – 3, 2014	New Hampshire	6-14 inches of snow across much of the state	No damage in Goshen
Heavy Snow	February 5, 2014	New Hampshire	Low pressure moving off the mid-Atlantic coast intensified as it moved over Nantucket.	No damage in Goshen

Hazard	Date	Location	Description of Areas Impacted	Damages
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 Goshen
Heavy Snow	February 14, 2015	New Hampshire	6-12 inches	No damage in Goshen; electrical outages
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 Goshen; electrical outages
Heavy Snow	February 9, 2017	New Hampshire	Several to 15 inches	No damage in Goshen; electrical outages
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 Goshen; electrical outages
Heavy Snow	January 4, 2018	New Hampshire	10-15 inches with lesser amounts in the Connecticut River Valley	No damage in Goshen; electrical outages
Snow	March 1-9, 2018	New Hampshire	This storm resulted in DR-4370.	No damage in Goshen; electrical outages
Heavy Snow	March 13, 2018	New Hampshire	15-29 inches; this storm resulted in DR-4371	No damage in Goshen; electrical outages; difficulty getting to Town Meeting
Heavy Snow	Just before Christmas 2020	New Hampshire	40" of snow	No damage other than electrical outages and difficult travel in Goshen
Heavy Snow	February 2024	Goshen	3 feet of snow fall in a single day (about 18 inches). More ice fell than snow	Unknown

Potential Future Severe Winter Damage:

There is the potential for severe winter damage every year. An event would affect the entire town. Electrical outages are very common during winter storms in Goshen due to the wind and heavy snow on trees. 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/high risk in Goshen.

Solar Storms and Space Weather



Our Sun is a huge ball of electrically-charged hot gas. This charged gas moves, generating a powerful magnetic field. The Sun's magnetic field goes through a cycle, called the solar cycle. Every 11 years or so, the Sun's magnetic field completely flips. This means that the Sun's north and south poles switch places. Then it takes about another 11 years for the Sun's north and south poles to flip back again. The solar cycle affects activity on the surface of the Sun, such as sunspots which are caused by the Sun's magnetic fields. As the magnetic fields change, so does the amount of activity on the Sun's surface.

This 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. There is the potential for loss of communications, power, and GPS.

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. 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 figure shows the NOAA scale for radio blackouts.

Past Solar Storm and Space Weather Events:

The Carrington Event was a powerful geomagnetic storm on September 1–2, 1859, during solar cycle 10 (1855–1867). A solar coronal mass ejection (CME) hit Earth's magnetosphere and induced the largest geomagnetic storm on record. The associated "white light flare" in the solar photosphere was observed and recorded by British astronomers Richard Carrington and Richard Hodgson. The storm created strong auroral displays observed around the world including in New England and caused serious damage to telegraph systems. The now-standard unique IAU identifier for this flare is SOL1859-09-01. A solar storm of this magnitude occurring today would cause widespread electrical disruptions, blackouts, and damage due to extended outages of the electrical grid.

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 solar storm of 2012 was of similar magnitude to the 1859 event, but it passed Earth's orbit without striking the planet, missing by nine days.

The Committee recalled solar flares and sunspots causing poor emergency communication reception a few times a year over the past five years.

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 Goshen.

Figure III-7: RADIO BLACKOUTS SCALE

Scale	Description	Effect	Physical measure	Average Frequency (1 cycle = 11 years)
R 5	Extreme	HF Radio: 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. Navigation: 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 (2×10^{-3})	Less than 1 per cycle
R 4	Severe	HF Radio: HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. Navigation: 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)
R 3	Strong	HF Radio: Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. Navigation: Low-frequency navigation signals degraded for about an hour.	X1 (10^{-4})	175 per cycle (140 days per cycle)
R 2	Moderate	HF Radio: Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes. Navigation: Degradation of low-frequency navigation signals for tens of minutes.	M5 (5×10^{-5})	350 per cycle (300 days per cycle)
R 1	Minor	HF Radio: Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact. Navigation: 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	I – Not felt except by a very few under especially favorable conditions.
3.0-3.9	II-III	II – Felt only by a few persons at rest, especially on upper floors of buildings. III – Felt quite noticeably by persons indoors. Standing motor cars may rock slightly.
4.0-4.9	IV-V	IV – Felt indoors by many, outdoors by few during the day. Dishes, windows, doors disturbed; walls make cracking sound. V – Felt by nearly everyone; many awakened. Some dishes, windows broken.
5.0-5.9	VI-VII	VI – Felt by all. Some heavy furniture moved; a few instances of fallen plaster. VII – 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	IX – Damage considerable in specially designed structures; damage great in substantial buildings, with partial collapse.
7.0 and higher	VIII or higher	VIII and higher: damage slight in specially designed structures. Fall of chimneys, factory stacks, columns, monuments, walls. X – Some well-built wooden structures destroyed, most masonry and frame structures destroyed with foundations. XI – Few if any masonry structures remain standing. Bridges destroyed. XII – 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 Goshen.

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 Goshen
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 Goshen
September 18, 2012	Concord, NH	1.2	Epicenter was Concord, NH and the quake was felt in the Concord area; no damage in Goshen
October 16, 2012	Southern Maine	4.0	The earthquake was located in southern Maine and was felt throughout the area into southern NH; no damage in Goshen
February 2025	Southern Maine	3.8	Located off the coast in Southern Main and felt throughout the Upper Valley/Goshen area. No damage in Goshen

Source: 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 (2026)

*Committee recollection

Potential Future Earthquake Damage:

A United States Geographic Survey mapping tool on the web (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 Goshen. 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/medium in Goshen.

**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 is at least one home using radon abatement measures in Goshen. No other events related to natural water and air contamination in Goshen are known although uranium is a known water contaminant in neighboring towns. Uranium was found when constructing I-

89 to the east and northeast of Goshen. 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. The beaches in Goshen have never been tested for natural contaminants due to a lack of funding.

Table III-15: RADON

Summary Table of Short-term Indoor Radon Test Results in NH's Radon Database 11/04/2003)					
County	# Tests	G. Mean	Maximum	% > 4.0 pCi/l	% > 12.0 pCi/l
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
Sullivan	466	1.4	29.4	15.7	2.1
STATEWIDE	15860	2.4 pCi/L	478.9 pCi/L	32.4	8.6

Figure III-8: MAP OF RADON ZONES

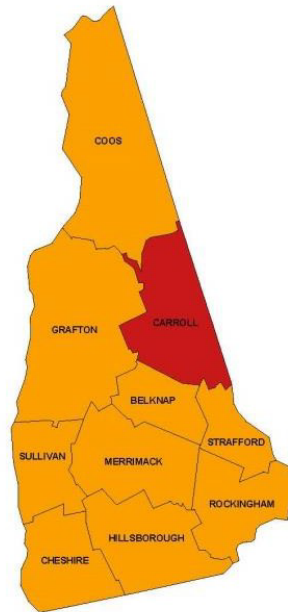
NEW HAMPSHIRE - EPA Map of Radon Zones<http://www.epa.gov/radon/zonemap.html>

The purpose of this map is to assist National, State and local organizations to target their resources and to implement radon-resistant building codes.

This map is not intended to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones.

All homes should be tested, regardless of zone designation.

IMPORTANT: Consult the publication entitled "Preliminary Geologic Radon Potential Assessment of New Hampshire" (USGS Open-file Report 93-292-A) before using this map. <http://energy.cr.usgs.gov/radon/grpinfo.html> This document contains information on radon potential variations within counties. EPA also recommends that this map be supplemented with any available local data in order to further understand and predict the radon potential of a specific area.



Zone 1 counties have a predicted average indoor radon screening level greater than 4 pCi/L (picocuries per liter) (red zones) **Highest Potential**

Zone 2 counties have a predicted average indoor radon screening level between 2 and 4 pCi/L (orange zones) **Moderate Potential**

Zone 3 counties have a predicted average indoor radon screening level less than 2 pCi/L (yellow zones) **Low Potential**

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 Goshen, 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 medium.

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 Goshen, there are nine potential hazardous waste generators listed on the NH Department of Environmental Services (DES) “one-stop” list (September 2026): one is listed as “declassified;” three are listed as “inactive;” and only four are listed as currently active. The active sites include Filkins Jack Residence and Twin Ridge Polaris Inc. There is one “Non-Notifier” at the Town of Goshen Tra

Past Hazardous Waste Spill Events

In 2023, at the intersection of Brook Road and Cross Road, a 250-gallon diesel truck spilled over a bridge in the area. NH DES came to assist with the cleanup, and was completed as of August 2023. There are no large hazardous waste generators in the Town.

Potential Future Hazardous Waste Spill Damage

Although there have not been many significant spills in Goshen, hazardous materials spills could occur along NH Route 10 or NH Route 31. 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. There conceivably could be spills near any home in Goshen due to home heating fuel delivery. The property owner is responsible for clean-up. The State oversees these reported spills. The Committee determined that a hazardous waste spill is a low/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 Goshen in the past. There are not centers for large gatherings except at local churches.

Future Terrorism Events

Terrorism is not considered a major risk, although vandalism is an occasional problem. The Committee determined that the risk of terrorism is a low/medium risk in Goshen.

Cyber Security



As defined by IBM, cybersecurity is the practice of protection people, systems, and data from cyberattacks by using a variety of technologies, processes, and policies. Cyberattacks have the potential to disrupt and damage entire communities if conducted at a large scale. These attacks can lead to identity theft, extortion, a loss of private, sensitive information, and other significant impacts to the economy. Cyberattacks continue to grow in strength, mainly targeting municipalities, which are often understaffed and/or underfunded. Municipalities remain at a disadvantage when it comes to investing in cybersecurity and other forms of digital protection.

Past Cybersecurity Events

Multiple times throughout the year, the Town of Goshen's staff emails will be the target of a hack and are at risk of being compromised. These hacks include examples like someone pretending to be the Building Inspector for the Town and will email other staff members. The Committee does have concerns about the protection of their devices.

Future Cybersecurity Events

Cyber events/cybersecurity are not considered a major risk. The Committee determined that the risk of cybersecurity is low/medium in Goshen.

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, USA), 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.

In 2020, the World Health Organization declared a global health emergency related to the SARS-coV-2 Virus, Coronavirus (COVID-19). Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age. The State of New Hampshire issued numerous emergency orders related to COVID-19 from 2020 through 2023.

Past Infectious Disease Events

As of 2023, the State of New Hampshire stopped tracking new COVID-19 cases. The emergency order expired and was not amended past 2023. In Goshen, there have been a total of 218 reported COVID-19 cases.

Future Infectious Disease Events

The potential of infectious disease is there though there are no centers for large gatherings except for churches. The State plan determined that Sullivan County is at low risk for infectious disease events. The Committee determined infectious disease events to be a high risk in Goshen.

Table III-16: INFECTIOUS DISEASE MEASUREMENT

Endemic	Constant presence and/or unusual prevalence of a disease or infection agent in a population within a geographic area
Hyper-endemic	The persistent, high levels of disease occurrence
Cluster	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
Epidemic	An increase, usually sudden, in the number of cases of a disease above what is normally expected
Outbreak	The same as epidemic, but over a much smaller geographical area
Pandemic	Epidemic that has spread over several countries or continents, usually affecting many people

Table III-17: 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 diapers, 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-18: 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 - 2023	COVID-19 coronavirus Pandemic	As of 2023, there have been a total of 218 reported COVID-19 cases in Goshen.	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 05/11/23 WMUR 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 palettes, 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 Goshen. 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. This is a problem behind the Fire Station and Grange. The Emerald Ash Borer is an example of an exotic invasive insect impacting New Hampshire by killing native ash trees. The Hemlock Wooly Adelgid is killing New Hampshire hemlock trees.

Some homes have become infested with bed bugs in Goshen as in many towns in New England.

Future Invasive Species Events

It is anticipated that invasive species will continue to thrive and expand within Goshen 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 medium/high risk in Goshen.

Figure III-9: 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 Goshen 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 2026. The ratings were based on past occurrences of hazards affecting the State of New Hampshire, Sullivan County, and the Town of Goshen. The highest risks in Goshen were determined to be Dam Failure, Flooding, Cybersecurity, and High Wind Events.

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-19 and III-20.

Table III-19: PROBABILITY OF HAZARD

	Natural Hazard																		
	Cybersecurity	Flooding	Drought	Earthquake	Extreme Temps	High Wind	Infectious Diseases	Landslide	Lightning	Severe Winter	Solar Storm and Space Weather	Tropical Storms	Wildfires	HHPD	Erosion	Haz Mat	Terrorism	Invasive Species	Natural Contaminants
Probability	H	H	H	M	H	H	M	M	H	H	L	M	M	H	H	L	L	M	M

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-20: VULNERABILITY OF HAZARD

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
High Hazard Potential Dam	3	3	3	3.00
Flooding	3	3	3	3.00
Erosion	1	2	2	1.67
Landslide	3	1	1	1.67
Tropical Storms	2	3	3	2.67
High Wind	2	3	3	2.67
Thunderstorm/Lightning/Hail	1	2	2	1.67
Drought	1	2	2	1.67
Extreme Temperatures	2	2	2	2.00
Wildfire	2	3	3	2.67
Severe Winter	2	2	2	2.00
Solar Storms and Space Weather	1	1	1	1.00
Earthquake	1	2	2	1.67
Natural Contaminants	1	1	3	1.67
HazMat Spills	1	2	2	1.67
Terrorism	2	2	2	2.00
Cyber Security	3	3	3	3.00
Infectious Disease	3	3	3	3.00
Invasive Species	3	3	3	3.00

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-21: 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	
High Hazard Potential Dam	3	3.00	9.00	High	
Flooding	3	3.00	9.00	High	
Erosion	3	1.67	5.01	Medium	
Landslide	2	1.67	3.33	Low/Medium	
Tropical Storms	2	2.67	5.34	Medium	
High Wind Events	3	2.67	8.01	High	
Thunderstorm/Lightning/Hail	3	1.67	5.01	Medium	
Drought	3	1.67	5.01	Medium	
Extreme Temperatures	3	2.00	6.00	Medium/High	
Wildfire	2	2.67	5.34	Medium	
Severe Winter	3	2.00	6.00	Medium/High	
Solar Storms and Space Weather	1	1.00	1.00	Low	
Earthquake	1	1.67	2.33	Low/Medium	
Natural Contaminants	2	1.67	3.34	Low/Medium	
HazMat	1	1.67	1.67	Low	
Terrorism	1	2.00	2.00	Low/Medium	
Cyber Security	3	3.00	9.00	High	
Infectious Disease	2	3.00	6.00	Medium/High	
Invasive Species	2	2.00	4.00	Medium	

IV. CRITICAL FACILITIES/LOCATIONS

The Critical Facilities list, identified by the Goshen 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 Goshen. 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 2025. This is for land and improvements such as buildings.

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

Critical Facility	Hazard Vulnerability	Tax Map #	Value
Fire Station (Emergency Operations Center)	All Hazards; Flooding	204-002-000	\$283,000
Town Hall (Shelter)/Police Station (2021)	All Hazards; Dam failure, Wildfire, Earthquake	204-038-000	\$356,860
Highway Garage	All Hazards; Wildfire	209-122-000	\$174,520
Grange Hall/Police Station (2022+)	All Hazards; Flooding	204-003-000	\$353,800

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

Critical Facility	Hazard Vulnerability	Tax Map #	Value
Post Office	All Hazards; Flooding	204-001-A00	\$312,530
Library	All Hazards: Dam Failure; Wildfire; Earthquake	204-039-000	\$320,950
Goshen Community Church	All Hazards: Dam Failure; Wildfire; Earthquake	204-037-000	\$533,300
Power Conversion Station (Co-op)	Wildfire and Severe Winter		Unknown

Table IV-3: FACILITIES & POPULATIONS TO PROTECT

Critical Facility	Hazard Vulnerability	Tax Map #	Value
Old Man's Junk	All Hazards; Flooding and Dam Failure	203-008-002	\$551,580
75 Homes around Rand Pond Road	All Hazards; Severe Winter	Varies	Unknown
Brook Road Inn	All Hazards	209-002-000	\$359,770
Tippie Canoe Campground	All Hazards	209-097-000	\$1,466,740

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 are 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
A and AE Flood Zones	Flooding	Fire Station - \$283,000 Grange/Police - \$353,800 Post Office - \$312,530	Estimated 41 parcels	Unknown	Unknown	\$6 Million
Dam Inundation Areas	Dam Failure	Fire Station - \$283,000 Grange/Police - \$353,800 Post Office - \$312,530 Town Hall - \$356,860 Olive G Pettis Library - \$320,950 Goshen Community Church - \$533,300	Estimated 93 parcels	Unknown	Unknown	\$10 Million

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 2025 town records. The total value of all structures is \$77,105,755. It was assumed that one building was located on each of these parcels at an average value of \$90,000. The land damage cost, structure content loss costs, and function loss cost were not determined.

Dam Failure – High Risk - \$2.8 Million Estimated Cost (not including other town impacts, roads, bridges)

The Committee determined the risk for Dam Failure to be high. The Gunnison Lake Dam is the only dam that is designated as “high.” The cost of a dam failure is unknown due to the many variables in such an event; however, the impact could be devastating in not only Goshen, but also in the Town of Newport and the City of Claremont. The inundation area of this dam if it were to fail, follows north along Route 10 into downtown Newport and then travels west into downtown Claremont and finally into the Connecticut River. A dam failure would affect several homes in Goshen as well as the Fire Station, Grange/Police Station, Post Office, Goshen Country

Store, Town Hall (emergency shelter), Dunbar Free Library, Goshen Community Church and Police Station and an estimated 93 buildings in Goshen. Additionally, neighboring towns, roads, bridges, and stream beds would be detrimentally impacted.

The estimated value of buildings within the dam inundation area is \$10 million. If each building received a 28% damage from a dam failure, the cost would be \$2.8 million.

Flooding – High Risk - \$1.6 Million Estimated Cost (not including roads, bridges)

There are approximately 41 parcels located within the FEMA designated Special Flood Hazard areas. These areas are all “Zone A and AE.” There are also several critical facility buildings in the flood zone. The total value of the buildings (including residential and non-residential) is \$6 million.

Assuming a 28% structural damage to the buildings, the damage would total close to \$1.6 million. There are seven town and state bridges and several sections of road in these flood areas. No value estimate has been done for these structures. No estimate for contents of buildings was done.

Erosion – 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. Severe erosion has occurred along the South Branch of the Sugar River near the intersection with Gunnison Brook and behind the Fire Station. The cost of repair is estimated at \$85,000 which does not include previous damage to the road shoulder. This is only one example of potential erosion/landslide in Goshen and does not reflect a town-wide impact of various instances over time.

Landslide – Low/Medium – No Recorded or Estimated Cost

The landslide area in Goshen is primarily on the western side of Sunapee Mountain where there is no development.

Tropical/Post-Tropical Storms – High Risk – \$830,000 Estimated Cost

Damage caused by hurricanes can be severe and expensive. Goshen has been impacted in the past by both wind and flooding damage as a result of hurricanes. The total assessed value of all structures within Goshen is approximately \$83 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 \$830,000.

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

Tornadoes, downbursts, and microbursts are relatively uncommon natural hazards in New Hampshire. On average, about two tornado events strike each year in New Hampshire. In the State, the average annual cost of tornadoes between 1950 and 1994 was \$9 million (NOAA's Storm Prediction Center) in adjusted US dollars. 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 although it is likely that there could be severe damage to buildings, utilities, crops, livestock, and trees as well as potential for human fatalities.

Although more recent information was not found for New Hampshire, a July 2008 tornado which touched down in Deerfield, NH where it resulted in one fatality and damaged nearly 100 homes and completely destroyed two homes. The 52-mile long damage path was the longest damage path for any tornado in NH and extended from several other NH counties before crossing into Maine. Twisted trees still remained in some towns five years later, as property owners could not afford to clear them. No cost estimate for this disaster was found, but FEMA provided about \$2.5 million in assistance to affected NH communities.

Thunderstorm/Lightning/Hail –Medium 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. Lightning strikes can start fires in buildings and forests causing great loss of property and natural resources. Lightning can also cause power outages costing significantly in repairs to utilities, not to mention great inconvenience to homeowners and businesses.

Drought – Medium 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 Goshen as no drought has significantly affected Goshen in the past. If any farms are impacted, the crop loss could be devastating, but it depends upon the length of the drought. Drought can also require the development of new and deeper wells for residential use. Fires can occur during a drought especially if combined with a lightning strike and dry tinder.

Extreme Temperatures – Medium/High 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 – Medium Risk – \$415,000 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 Goshen interfaces with forest, all structures are potentially vulnerable to wildfire. The estimated 2025 value of all structures in the Town is approximately \$83 million. If 1% of the structures received 50% damage, the total estimated cost would be about \$415,000.

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/High 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). U.S. average insurance claim was \$1,325 for personal property, \$1,980 for commercial property, and \$1,371 for automobiles. In a 2014 study by the Insurance Information Institute, winter-related disasters totaled \$3.7 billion nationwide. The organization further reported that severe winter weather caused 15% of all insured auto, home, and business catastrophe losses in the US in 2014.

Data from NOAA show that between the years 1998-2024, there have been seven billion-dollar winter storm events to affect New Hampshire. These storms resulted in widespread power outages and a few deaths.

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/Medium Risk - \$8,300,000 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 Goshen were impacted by an earthquake, the estimated damage could be around \$8,300,000.

Natural Contaminants – Medium 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 as often people do not even know they have radon in their home interior air or water. The impact to their health may never be known as they may not realize the source of their illness if it is related to radon which can cause cancer. The Centers for Disease Control and Prevention, the American Lung Association and the American Medical Association agree with estimates that radon causes thousands of preventable lung cancer deaths every year. (US EPA)

Hazardous Material Spills –Low/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 Goshen.

Cyber Security – Low/Medium Risk – No Recorded or Estimated Cost

The cost of any cyber event is unpredictable and not estimated in this document. Cyber events in the Town could range from personal and work devices being impacted to work documents and record being held for ransom.

Infectious Disease – 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 the COVID-19 epidemic, 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 2021 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 Goshen’s public facilities are potential sources for an outbreak.

Invasive Species – Medium/High – 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. The cost of invasive species is not estimated in this plan.

VI. MITIGATION PROGRAMS AND ACTIONS

A. HAZARD MITIGATION ACTION NEEDS ASSESSMENT

The Goshen Hazard Mitigation Committee evaluated each potential hazard that could affect the Town in terms of how the Town 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.

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

Hazard	Committee Ideas and Assessment
All Hazards	Community education. Improve emergency communication and community involvement through outreach events.
High Hazard Potential Dam	The committee felt that over all they did not have the ability to mitigate dam failures. They noted that NH DES keeps record of dam inspections and that the State-owned Gunnison Lake Dam keeps an updated inundation plan. The committee felt that any actions that could be taken regarding dam failure were beyond the scope of their jurisdiction; however, <i>they can encourage the State to update the dam emergency action plan including current contacts.</i>
Drought	The Committee did not feel they could pursue restrictive mitigation strategies for drought as there is no public water system. <i>They could put drought advisories on the Town website, and communicate to the public through advisories. They could post an outdoor burning notice since many residents rely on physical signage.</i>
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 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. <i>Public education on the Town web site will include measures to protect people and homes by these measures: secure heavy items in like bookcases, refrigerators, televisions and objects that hang on walls. Store heavy and breakable objects on low shelves. Consider making improvements to buildings to fix structural issues that could cause the building to collapse during an earthquake. Concerns with dead trees on all roads. Keep these mitigation efforts in mind during any municipal building renovation.</i>
Erosion	Road maintenance and upgrades; Subdivision Regulations restrict development on steep slopes and Site Plan Review Regulations address stormwater; Driveway Regulations assure proper culvert size. <i>Mitigate</i>

Hazard	Committee Ideas and Assessment
	<i>erosion/landslide hazard along the South Branch of the Sugar River before land and well are lost between Old Man's Junk and Lear Hill Bridge. This includes behind the Goshen Fire Station and Grange.</i>
Landslide	<i>Evaluate possibility of warning signs at access points to the recreational area along the southern base of Mount Sunapee.</i>
Extreme Temperatures	The town offers warming stations and water to the public at the Town Office. There are no cooling spaces with air conditioning for public use during a heat wave although when the Grange opens next year it will have A/C. The Town Office work space on the first floor has A/C. <i>Apply for grant to install A/C on second floor of Town Offices as this is the primary shelter.</i>
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.
Thunderstorms, Lightning and Hail	The Committee discussed the hazards, but did not feel a particular area of town is more prone to lightning strikes. <i>Evaluate installation of lightning rods on all town buildings; consider digitizing public records and/or providing fire safe storage; consider fire suppression measures in Town buildings.</i>
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 International Building Code and International Residential Code which are enforced by the Building Inspector. The Town provides shelter during major storms and power outages. <i>There are extreme snow drifts along Brook Road. Encourage NH DOT to implement snow fencing to keep the snow from blowing out of the road.</i>
Wildfire	The Town requires fire permits to reduce unsafe fire practices. Danger of fires where equipment and vehicles such as for logging and recreation are used in the forest. <i>Place "No Fires" signs with reference to misdemeanor RSA reference at Gunnison Dam, Gunnison Lake, and Rand Pond.</i>
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. It was noted there is a plate of uranium 1500' down.
Hazardous Materials	The Committee felt the most suitable strategies for hazardous materials was to continue their mutual aid agreements 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 except to educate the public about what to do in the case of a hazardous waste spill.
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 not have a school. Vandalism is present.
Cyber Security	The Committee shows a large concern over their current infrastructure and believes they are at a high risk of continuing to experience cyber events. The Town does not have enough in their budget for infrastructure upgrades for cyber events. They do want to take action, but even applying for grants is difficult due to the match requirements.

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. Highway Department uses a non-commercial license to spray for bamboo on roadways.
Infectious Disease	<i>Goshen 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. The Committee noted there is a Lyme Disease vaccine for dogs and they can include this in their public outreach messaging. The EMD is in contact with the Department of Public Health and has a specialist attending outreach events.</i>
Solar Weather	Communications is critical for emergency management. Communication can be impacted by solar weather. <i>The Committee determined to look into the possibility of tower repeaters to strengthen their emergency communication abilities.</i>

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 HAZARD MITIGATION PROGRAMS

Existing Mitigation Program & Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Future Proposed ACTIONS to Improve Program
Floodplain Ordinance & NFIP – Regulate development in floodplain. Enforce ordinance to prevent disruption of flood zones.	Flooding/Entire Town	Planning Board	Average	None
Conservation Commission – Conserves land unsuitable for development and protection of natural resources	Erosion, Flooding/ Entire Town	Conservation Commission	Average	None
Zoning Ordinance - The town regulates development on steep slopes thereby mitigating potential erosion. Restricts hazardous, unsafe or unsanitary situations	Erosion/Entire Town	Zoning Board	Average	None
Subdivision Regulations – Requirements and guidance for subdivision including in hazard-prone areas	Erosion and Flooding/ Entire Town	Planning Board	Average	None
Building Codes – Requirements for new building construction. Now have a building inspector on-site.	Wind Events & Severe Winter/ Entire Town	Select Board and Code Enforcement Officer	Average	None
Emergency Power – Maintain emergency power systems for critical facilities. There is a stationary generator in the Town Offices and a portable in the Fire Station	All hazards/Entire Town	Select Board	Average	<i>Need generator for the Grange/ Police Station and Highway Department</i>
Tree Trimming – Keep trees along roadways trimmed to prevent future hazards; work with utility company and NH DOT to determine need for trimming.	Severe Winter & Wind Events/ Entire Town	Road Agent	Average	Continue working with NH DOT and Utility Company
Public Education & Outreach – hazard mitigation and emergency preparedness	All hazards/Entire Town	EMD	Average	<i>Provide educational information about hazards, preparation, mitigation, and emergency response on Town website.</i>
Capital Improvement Plan – Municipal budget for capital purchases; continue to update plan every 6-10 years	All hazards/Entire Town	Planning Board	Average	None

Existing Mitigation Program & Description	Hazard Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Future Proposed ACTIONS to Improve Program
Emergency Operations Plan – Describes the preparation and response necessary for the Town to address emergency situations	All hazards/Entire town	EMD and Department Heads	Average	See Section VII.
Highway Department – Road and bridge maintenance to mitigate flooding and erosion	All hazards/Entire town	Road Agent	Average	None (specific new projects in later table)

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. They are each designated as follows:

Completed – Action completed since the last plan update and no longer an action item.

Deleted – Action was deemed no longer an action item for this current plan.

In Progress – Action was started in between the last plan update and is not currently finished.

Deferred – A portion or all of this action will continue in the current plan update.

Continuing – Action continually in process such as tree trimming whenever there is a storm; there is not an end date.

New – This is a new action proposed during the current planning process.

The final column provides either an update of the mitigation action or proposed improvements that are currently being recommended for the future. The latter will be evaluated further in upcoming chapters of this plan.

Table VI-3: EXISTING AND PROPOSED MITIGATION ACTIONS

Proposed Mitigation Action & Description	Proposed in 2021 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
Emergency Power – Maintain emergency power systems for critical facilities: consider replacement of portable generator as quite old	COMPLETED AND DEFERRED: A stationary generator was placed at the Town Offices and the portable at the Fire Station never replaced	Need to install a generator at the Grange as this will be a secondary shelter and it will house the Police Department/Emergency Operations Center. Can be shared with the Fire Station. If the garage floods, there is only one remaining shelter.
Public Education & Outreach – hazard mitigation and emergency preparedness: continue to distribute educational materials via website and provide school outreach	DEFERRED: Not put on website and the school changed: The Select Board added an educational link for all hazards to the Town website; Added new hazard topics including Climate Change and Invasive Species. Will add alerts to Town website concerning current hazards such as droughts. Include information about Lyme Disease for dogs.	Put out more information, either weekly or monthly updates to website. Current system is outdated.

Proposed Mitigation Action & Description	Proposed in 2021 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
Stormwater Evaluation – Efforts to mitigate road washing by stormwater: Arrange for a storm water management study for 1.) the intersection of Brook Road and Route 10 heading north to the Newport Town line for re-channelization of storm waters and reduction of flooding; and 2.) Route 10 and Mummery Road intersection where brook overflows Route 10 during every major rain event.	DEFERRED due to lack of resources. Mummery Rd was submitted in 2025.	The Town of Goshen will lobby the State Department of Transportation to address the flooding/erosion of these areas by submitting the areas for the regional 10-year plan through the regional planning commission.
South Branch Sugar River (Fire Station) Erosion Mitigation – Address erosion area from Old Man’s Junk north to Lear Hill Bridge including behind Fire Station and the Grange; research removal of Japanese knotweed and other invasive plants threatening the embankment	DEFERRED due to lack of resources	The Town of Goshen will work with the Conservation Commission and the NH Department of Environmental Services to weigh options to stop the erosion on this embankment.
Gunnison Dam Emergency Action Plan – Encourage the State Dam Bureau to provide updated plans to the Town	Site reviews were completed, no Emergency Action Plan. Continue to work on.	Continue to contact the NH Dam Bureau to request they provide updated EAPs to the Town.
Municipal Building Hazard Modification –Consider modifications in Grange and other municipal buildings to secure large objects in case of high wind or earthquake event	DELETED for this plan.	Take out in the next update.
Landslide Awareness – Look into placing warning signs at entrances to wilderness/ recreation area on south side of Mount Sunapee	DELETED for this plan	Take out in the next update.
Town Office/Shelter Air Conditioning – Install air conditioning in upper floor of town offices	DEFERRED due to lack of resources. Continue to work on.	Continue to obtain AC for the town office building.

Proposed Mitigation Action & Description	Proposed in 2021 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
Town Building Lightning Protection – Assess buildings for use of lightning rods and other protection and install appropriate systems	COMPLETED: surge protectors installed, continue to assess buildings	Assess each building for lightning rods; consider fire suppression options
New Bridge on Center Road (Class VI road) off Brook Road (Class V road) – Replace 28' bridge for access to Class VI for emergency lane	COMPLETED	N/A
Replace Lempster Coach Road Bridge (Class V portion) – Replace bridge for access to several homes	COMPLETED	N/A
Repair Lempster Coach Road (Class VI portion) - Replace bridge and repair road for emergency lane to homes on Lempster Coach Road while Class V road bridge being replaced	COMPLETED	N/A
Replace Culvert on Mountain Road (Class V portion) – Replace culvert at beginning of Class VI road where stream comes in at an angle	Planned for 2026	The stream flow comes into the road at an angle and the culvert is too small and at an inefficient angle for the water
Replace Ball Park Road (Class V) Bridge over Trow Brook – Washed out	In progress	Replace bridge that washed out on July 29, 2021
Replace Lempster Coach Road (Class VI) and Repair Road	COMPLETED	N/A
Replace Brickyard Road (Class V) Bridge	DEFERRED – no longer an action item	Replace bridge that washed out on July 29, 2021

Proposed Mitigation Action & Description	Proposed in 2021 Plan (Completed, Deleted, or Deferred) or New Proposal	Explanation/Additional Actions Proposed
Create Action Plan for Cyber Events	NEW	Create an action plan for the Select Board to review for cases of cyber events/cybersecurity. Consider digitizing town records or storing in fire-proof safe
Work with UVLSRPC's Thriving Communities Program	NEW	Work with UVLSRPC staff to increase resiliency through their Thriving Communities Program
Work with NH HSEM for grant applications	NEW	Work with NH HSEM staff to get assistance when applying for grants for generators, AC/heating, etc.
Obtain additional physical signage	NEW	Get physical signage made/bought for events/hazards. Town residents often rely on physical signs

The Town of Goshen will provide a public education and outreach program by using brochures and the town website to reach their citizens. There will 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	Town web site
High Hazard Potential Dam	Share evacuation plan on website	Town web site
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, map of flood areas in town that aren't addressed by FEMA.	Town web site
Erosion	High risk areas; stormwater management; bank stabilization; water body buffers	Town web site
Landslide	Provide information on the website	Town web site
Tropical Storms	Wind retrofits such as shutters, hurricane clips; school and town official sheltering basics; resident and business sheltering basics; window coverings	Town web site
High Wind Events	Structural and non-structural home retrofitting; securing furnishings	Town web site
Thunderstorm/Lightning/Hail	Taking cover; staying inside when it thunders	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	Assess most vulnerable areas reducing fuel for fires such as dry brush; danger of equipment/vehicles operating in forested areas	Town web site; Fire Department and Fire Warden interactions
Severe Winter	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
HazMat	What to do if there's a fuel delivery spill	Town web site

Natural Hazard	Educational Topics	Outreach Methods
Terrorism	What to do if there is a terrorist attack	Town web site
Cyber Security	What to do if being scammed	Town Library
Infectious Disease	Prevention	Town web site
Invasive Species	Provide information on the web site to eliminate invasive species on private property	Town web site

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

The Goshen Hazard Mitigation Committee reviewed each of the proposed improvements to existing actions and proposed new actions 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 Goshen 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	Administration Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
1	Town Building Lightning Protection – Assess buildings for use of lightning rods and other protection and install appropriate systems	3	3	3	3	3	3	3	3	24	Both
1	Replace Culvert on Mountain Road (Class V portion) – Replace culvert at beginning of Class VI road where stream comes in at an angle	3	3	3	3	3	3	3	3	24	Both
1	Replace Ball Park Road (Class V) Bridge over Trow Brook – Washed out	3	3	3	3	3	3	3	3	24	Both
2	Emergency Power – Maintain emergency power systems for critical facilities: consider replacement of portable generator as quite old	2	3	3	3	3	3	3	3	23	Both
2	Public Education & Outreach – hazard mitigation and emergency preparedness: continue to distribute educational materials via website and provide school outreach	2	3	3	3	3	3	3	3	23	Both
2	Town Office/Shelter Air Conditioning – Install air conditioning in upper floor of town offices	2	3	3	3	3	3	3	3	23	Both
2	Replace Lempster Coach Road Bridge (Class V portion) – Replace bridge for access to several homes	2	3	3	3	3	3	3	3	23	Both
3	Gunnison Dam Emergency Action Plan – Encourage the State Dam Bureau to provide updated plans to the Town	1	3	3	3	3	3	3	3	22	Both
4	South Branch Sugar River (Fire Station) Erosion Mitigation – Address erosion area from Old Man's Junk north to Lear Hill Bridge including behind Fire Station and the Grange; research removal of Japanese knotweed and other invasive plants threatening the embankment	3	3	2	1	3	3	2	3	20	Both

Rank	Strategy Improvement	Reduce Damage	Community Objectives	Existing Regulations	Quickly Implemented	Socially Acceptable	Technically Feasible	Administration Possible	Benefit - Cost	TOTAL SCORE	Mitigate Existing or New Development or Both
5	Stormwater Evaluation – Efforts to mitigate road washing by stormwater: Arrange for a storm water management study for 1.) the intersection of Brook Road and Route 10 heading north to the Newport Town line for re-channelization of storm waters and reduction of flooding; and 2.) Route 10 and Mummery Road intersection where brook overflows Route 10 during every major rain event.	1	3	3	1	3	3	2	3	19	Both
5	Work With NH HSEM for Grant Applications - Work with NH HSEM staff to get assistance when applying for grants for generators, AC/heating, etc.	3	2	2	2	2	2	2	3	18	Both
6	Work With UVLSRPC's Thriving Communities Program - Work with UVLSRPC staff to increase resiliency through their Thriving Communities Program	2	2	2	3	2	2	2	2	17	Both
6	Create Action Plan for Cyber Events - Create an action plan for the Select Board to review for cases of cyber events/cybersecurity.	2	2	3	1	2	1	2	3	16	Both
6	Obtain Additional Physical Signage - Get physical signage made/bought for events/hazards. Town residents often rely on physical signs	1	2.5	2.5	2	2.5	2	2	2.5	17	Both

E. PRIORITIZED IMPLEMENTATION SCHEDULE

The Goshen Hazard Mitigation Committee created the following action plan for implementation of priority mitigation strategies:

Table VI-6: PRIORITIZED IMPLEMENTATION SCHEDULE FOR EXISTING AND PROPOSED PROGRAM IMPROVEMENTS

Rank	Evaluation Score	Mitigation Action	Responsible Party	Timeframe	Potential Funding Source	Anticipated Cost
1	24	Replace Culvert on Mountain Road (Class V portion) – Replace culvert at beginning of Class VI road where stream comes in at an angle	Road Agent/Select Board	2026	Taxes/Grants	\$9,000
1	24	Replace Ball Park Road (Class V) Bridge over Trow Brook – Washed out	Road Agent/Select Board	2024-2030	Grants/Taxes	\$1.5 million
2	23	Emergency Power – Maintain emergency power systems for critical facilities: consider replacement of portable generator as quite old	Select Board/EMD/Fire Chief	Now-2027	Grants/Taxes	\$25,000
2	23	Public Education & Outreach – hazard mitigation and emergency preparedness: continue to distribute educational materials via website and provide school outreach	Department Heads	August 2030	Staff Time	\$0
2	23	Town Office/Shelter Air Conditioning – Install air conditioning in upper floor of town offices	Select Board	2028	Taxes/Grants	\$20,000

Rank	Evaluation Score	Mitigation Action	Responsible Party	Timeframe	Potential Funding Source	Anticipated Cost
3	22	Gunnison Dam Emergency Action Plan – Encourage the State Dam Bureau to provide updated plans to the Town	EMD	2026	Taxes	Unknown
4	20	South Branch Sugar River (Fire Station) Erosion Mitigation – Address erosion area from Old Man’s Junk north to Lear Hill Bridge including behind Fire Station and the Grange; research removal of Japanese knotweed and other invasive plants threatening the embankment	Select Board/ Conservation Commission	March – October 2030	Grants/Taxes	Unknown; need FEMA assessment
5	19	Stormwater Evaluation – Efforts to mitigate road washing by stormwater: Arrange for a storm water management study for 1.) the intersection of Brook Road and Route 10 heading north to the Newport Town line for re-channelization of storm waters and reduction of flooding; and 2.) Route 10 and Mummery Road intersection where brook overflows Route 10 during every major rain event.	Select Board	Dec 2021 – March 2030	State of NH project	Unknown
6	16	Create Action Plan for Cyber Events - Create an action plan for the Select Board to review for cases of cyber events/cybersecurity.	Select Board	2026-2030	Grants/Taxes	\$100,000
6	17	Work With UVLSRPC’s Thriving Communities Program - Work with UVLSRPC staff to increase resiliency through their Thriving Communities Program	Select Board/ Road Agent/ EMD	Now-2027	Grants	Unknown
5	18	Work With NH HSEM for Grant Applications - Work with NH HSEM staff to get assistance when applying for grants for generators, AC/heating, etc.	EMD/Select Board	Now-2029	Grants/Taxes	Unknown
6	17	Obtain Additional Physical Signage - Get physical signage made/bought for events/hazards. Town residents often rely on physical signs	All Department Heads	Now-2029	Grants/Taxes	Unknown

VII. EMERGENCY PREPAREDNESS ACTIONS

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 VII-1 below is a list of the emergency preparedness actions that the Committee felt should be addressed and included in this plan.

Table VII-1: EMERGENCY PREPAREDNESS ACTIONS

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/<i>Actions Taken to Meet Recommendations or Not Met</i>	Update/Future Proposed Improvements
Local Emergency Operations Plan - Describes the preparation and response necessary for the Town to address emergency situations	Emergency Preparedness/ Entire Town	EMD & Select Board	Average	Continue to evaluate updated LEOP	Needs to be updated in 2026 – last update was 2014.
School Notification and Evacuation	Emergency Preparedness/ schools	School Superintendent /EMD	Average	Develop plan for notification and evacuation of the Goshen-Lempster Co-op School, Newport High School and Fall Mountain High School. / COMPLETED: The Goshen-Lempster Co-Op School is complete; the other plans are not the town's responsibility. Was to be taken out as Goshen used to not be affiliated with Lempster School, but they are once again affiliated somewhat.	Look into partnering with Lempster Co-op School
Emergency Preparedness Training –	Emergency Preparedness/ Entire Town	Fire Chief; Police Chief; Road Agent	Average	Continue membership in Keene Mutual Aid; continue training departments for emergency response	Have a sit-down workshop training with NH HSEM, and Town Fire Dept, Police Dept, EMD

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/Actions Taken to Meet Recommendations or Not Met	Update/Future Proposed Improvements
Fire Department – training and response	Emergency Preparedness/ Entire town	Fire Chief	Average	Receive ongoing training in mitigating hazards before they occur and emergency response procedures/ COMPLETED: wildfire certifications, applying for AFG to replace CBAs (including masks)	Continue to provide fire department with training to improve disaster and emergency response
Police Support – Upper Sullivan/Merrimack Mutual Aide, State Police.	Emergency Preparedness/ Entire town	Chief of Police	Average	No recommendations in previous plan.	Continue to participate in police mutual aid programs.
Mutual Aid – Fire – SW Fire Mutual Aid; Kearsarge and Newport Mutual Aid	Emergency Preparedness /Entire Town	Fire Chief	Average	No recommendations in previous plan	Continue participation in the Cold River Fire Chiefs Association for training.
Snowmobile Club – Maintains trails	Emergency Preparedness/ Entire Town	EMD	Average	The club maintains and maps trails that can be used to access remote areas in the event of wildfire and other emergencies/COMPLETED: acquired new and updates maps	No additional improvements.
Hazard Communication & Equipment – Provide public information about hazards and provide equipment for road closures.	Emergency Preparedness/ Entire Town	Road Agent	Average	Acquire more barricades, cones, road closed and national weather service signs./ COMPLETED: The PD has acquired 1/3 ownership of a variable message board (no longer works)	Continue to acquire more barricades, cones, road closed and national weather service signs. Try to get a weather station at lakes or in Town to provide weather updates.

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/Actions Taken to Meet Recommendations or Not Met	Update/Future Proposed Improvements
Town Coordination – Standard Operating Procedures for each department to share	Emergency Preparedness/ Entire Town	Department Heads	Low	Develop a standard policy and procedure manual for each Town Department. The manual could include standard practice for the mitigation of potential hazards, information on day-to-day operations and information on what to do in the event of a hazard. This plan should enhance communication between departments. / DEFERRED: <i>Not completed due to lack of leadership.</i>	Pursue the writing of a single document that outlines the standard operating practices for each department. Organizing the manual with chapters specific to each department.
Emergency Response Committee - The town has established a committee for emergency operations planning.	Emergency Preparedness/ Entire Town	EMD	Average	Continue to meet on an as needed basis and address safety response issues./Did not follow through with – Committee does not recall this existing.	Continue to communicate between staff.
911 Numbering – Encourage residents to display the correct house numbers in a visible manner	Emergency Preparedness/ Entire Town	Fire Department	NA	New program; they are continuing to create reflective numbering signs	Continue to create reflective numbering signs
Reverse 911 – Participate in First Net System when it becomes available.	Emergency Preparedness/ Entire Town	EMD	NA	New program; Continuing the program	Continue to participate.
Emergency Communication – Acquire a trunk repeater for 2 police cars to improve emergency communication.	Emergency Preparedness/ Entire Town	Police Department	NA	New program; acquired trunk repeaters.	No additional improvements
Evacuation Plan – Write evacuation plans for town buildings and facilities.	Emergency Preparedness/ Entire Town	Fire Chief	NA	New program; continuing to write evacuation plans	Continue to write evacuation plans.

Existing Emergency Preparedness Action & Description	Type/Service Area	Responsible Local Agent	Effectiveness (Low, Average, High)	Recommendations in Previous Hazard Mitigation Plan/<i>Actions Taken to Meet Recommendations or Not Met</i>	Update/Future Proposed Improvements
Fire Suppression – Pursue a pressurized hydrant system using the water from the Gunnison Lake Dam that can service: Brook Road, Route 31, to the Newport Line and the Lempster School.	Emergency Preparedness/ Entire Town	EMD and Fire Chief	NA	New program; deferred since last update but would like to continue pursuing	Continue to pursue
Chainsaw Certification – Town employees and first responders obtain certification from the state as chainsaw operators.	Emergency Preparedness/ Entire Town	Fire Chief	NA	New recommendation; continuing	Continue to obtain chainsaw certification.

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 Goshen will revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Goshen 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.

A. IMPLEMENTATION THROUGH EXISTING PROGRAMS

The Hazard Mitigation Committee will meet annually to reassess the plan and to assure that they are accomplishing their goals. Additionally, the Hazard Mitigation Committee will revisit the plan within 90 days of a declared disaster to review and revise the goals and actions of the plan. The Town had not incorporated the Hazard Mitigation Plan into Town documents in the past but will include the plan in the upcoming Master Plan revisions. The Town Select Board, during the Capital Improvement Process, will review and include any proposed structural projects outlined in this plan. Going forward, the plan will be addressed annually at a Select Board meeting to review the progress of any mitigation activities that have been undertaken and to review the goals and strategies. At this time, the public will have the opportunity to participate in the meeting regarding the town's plan and fulfillment of the projects outlined in the plan. Notably to plan for infrastructure repairs and equipment purchases. The town will also add hazard mitigation information to town web site.

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.

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 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, 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.

In Goshen, the most recent version of the Master Plan is 2013, the latest version of Subdivision Regulations is 2018, the most recent Site Plan Review Regulations is 2005, the most recent Building Code and Zoning Ordinance (including floodplain) is 2026. The most critical documents to reference hazard mitigation are primarily the master plan and the zoning ordinance. Goshen also has driveway regulations that were updated in 2015. The town will continue to evaluate its documents to include hazard mitigation.

B. 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 sent to the following parties for review and comment:

- Select Board Offices in neighboring towns
- NH Homeland Security & Emergency Management
- Goshen 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*, 2025

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 Goshen Emergency Operations Plan, 2016

Town of Goshen Master Plan, 2013

NH HSEM's *State of New Hampshire Multi-Hazard Mitigation Plan Update 2023*

APPENDICES

Appendix A:	Technical Resources
Appendix B:	Hazard Mitigation Assistance Grants
Appendix C:	Meeting Documentation
Appendix D:	Map of Hazard Areas and Critical Facilities
Appendix E:	Public Opinion Survey Results
Appendix F:	Gunnison Dam and Sugar River Dam Assessments
Appendix G:	Town Adoption & FEMA Approvals of Hazard Mitigation Plan

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

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

FMA – www.fema.gov/government/grant/fma

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

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. http://www.epa.gov/OWOW/NPS/cwact.html	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. http://www.epa.gov/owow/wetlands/initiative/srf.html	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. http://www.epa.gov/owow/wetlands/initiative/#financial	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. http://www.csc.noaa.gov/funding/	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. http://www.csc.noaa.gov/funding/	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. http://coastalmanagement.noaa.gov/funding/welcome.html	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. http://www.nmfs.noaa.gov/habitat/recovery/	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. http://www.lre.usace.army.mil/planning/assist.html	50 percent non-federal match
USACE Flood Plain Management Services (FPMS)	Technical support for effective floodplain management. http://www.lrl.usace.army.mil/p3md-o/article.asp?id=9&MyCategory=126	See website
USACE Environmental Laboratory	Guidance for implementing environmental programs such as ecosystem restoration and reuse of dredged materials. http://el.erdc.usace.army.mil/index.cfm	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. http://ecos.fws.gov/coastal_grants/viewContent.do?viewPage=home	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. http://ecos.fws.gov/partners/viewContent.do?viewPage=home	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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/	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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/assistance.cfm	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. http://www.hud.gov/offices/cpd/communitydevelopment/programs/neighborhoodspg/	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. http://www.blm.gov/nifc/st/en/prog/fire/community_assistance.html	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. http://www.firewise.org/	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. http://www.csrees.usda.gov/funding/rfas/smith_lever.html	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. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population under 20,000
USDA Community Facilities Direct Loans	Loans for essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	Population of less than 20,000
USDA Community Facilities Direct Grants	Grants to develop essential community facilities. http://www.rurdev.usda.gov/rhs/cf/cp.htm	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. http://www.fsa.usda.gov/	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. http://www.forestsandrangelands.gov/	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. http://www.fs.fed.us/spf/coop/programs/eap/	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. http://www.nrcs.usda.gov/programs/ewp/	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. http://www.nrcs.usda.gov/programs/watershed/index.html	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. http://www.aoa.gov/doingbus/fundopp/fundopp.asp	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. http://www.eda.gov/AboutEDA/Programs.xml	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. http://www.sba.gov/services/financialassistance/index.html	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. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES	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. http://www.usgs.gov/contracts/nehpr/	Community with a population under 20,000

APPENDIX C:
Meeting Documentation



Upper Valley Lake Sunapee
Regional Planning Commission

**Hazard Mitigation Committee
Town of Goshen**

**WORK PLAN
To update hazard mitigation plan**

Meeting #1: Wednesday, April 22nd, 12-2pm (about 1-2 hours)

- General discussion of requirements and in-kind match process – role of committee
- Review goals of hazard mitigation plan and revise (hand out)
- Review hazards (hand out)
- Identify critical facilities and vulnerable populations (update map and list)
- Proposed future projects and developments: cost, timeframe, & funding
- Discuss community survey to determine hazard mitigation perception of the public
- Discuss future meetings, public notice, stakeholders to be notified, notices to abutting towns

Meeting #2: Wednesday, May 20th, 12-2pm (about 2 hours)

- Identify and map past/potential hazards (update map & lists in Chapter 2)
- Flooding – Are there any non-FEMA flood areas? Not in FEMA program-any plans to join?
- Specific past and potential events of hazards not in previous plan (recent events)
- Determine Vulnerability to Hazards for Town
- Determine Probability of Hazards for Town
- Anna/TCP: Discussion about Sugar River & long-term maintenance plan
- Review public opinion survey questions, format, and discuss distribution method

Meeting #3: Wednesday, June 17th, 12-2pm (about 1-2 hours)

- Review previously determined potential mitigation efforts (were they implemented? If not, why not and are they still on the table to be implemented?)
- Discuss public outreach topics and where information is available
- Brainstorm improvements to existing mitigation efforts
- Brainstorm potential new mitigation efforts

Meeting #4: Wednesday, July 22nd, 12-2pm (about 1-2 hours)

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

Meeting #5: TBD – via email

- Review and revise draft plan

Town of Goshen Hazard Mitigation Meeting Next Wednesday



Grace Jackson

To  Daniel Scott;  edandersen771@gmail.com;  rhall.77c1@gmail.com;  ssimino@goshennh.org;  dtremblay@goshennh.org;  doug.frost@outlook.com;  bonniebelden@goshenlibrary.org;  dianne craig;  Jill.L.Piwoski1@DOS.NH.GOV

Cc  Anna White

Goals .jpg
127 KB

Hazards.jpg
220 KB

Critical Facilities.jpg
266 KB

Vulnerable Facilities.jpg
172 KB

Vulnerable Populations.jpg
71 KB

MeetingWorkPlanGOSH2026.docx
179 KB

HazMitPlanUpdateGOSH2021 - For Meetings.docx
20 MB

Summarize

  Reply  Reply All  Forward  

Wed 4/15/2026 3:25 PM

Hi all,

Our first meeting to update the Town of Goshen’s Hazard Mitigation Plan will be held next Wednesday, April 22nd, from 12-2pm at the Goshen Town Hall. Please see attached the following meeting materials that we will be going over. I’ve included the 2021 full plan as reference in case you would like to review.

- Goals – page 5 in plan
- Hazards – page 10 in plan
- Critical Facilities and Vulnerable Populations– pages 60-62 in plan
- Work Plan/Agenda
- 2021 Plan

If you have any questions, please let me know. I look forward to working with you!

Thank you,
Grace Jackson

Associate Planner



Upper Valley Lake Sunapee Regional Planning Commission
10 Water Street, Suite 225
Lebanon, NH 03766
Phone: 603-448-1680
www.uvlsrpc.org

Meeting Materials for Next Wednesday

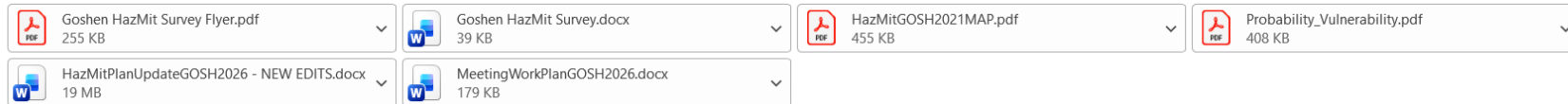


Grace Jackson

To: [Jill.L.Piwoski1@DOS.NH.GOV](#); [Daniel Scott](#); [edandersen771@gmail.com](#); [rhall.77c1@gmail.com](#); [ShaeDel Simino](#); [dtremblay@goshennh.org](#); [doug.frost@outlook.com](#); [bonniebelden@goshenlibrary.org](#); [dianne craig](#)
Cc: [Anna White](#)



Thu 5/14/2026 9:48 AM



Hi all,

Please see attached the following meeting materials for our upcoming meeting next Wednesday, May 20th from 12-2pm. I've also attached an updated copy of the meeting work plan and agenda.

- Plan Update 2026: Hazards Identification (pages 12-56)
- Paper copy of public opinion survey & flyer for digital survey
- Hazards map
- Probability and Vulnerability Scores

If you have any questions, please let me know.

Thank you,
Grace Jackson

Associate Planner



Upper Valley Lake Sunapee Regional Planning Commission
10 Water Street, Suite 225
Lebanon, NH 03766
Phone: 603-448-1680
www.uvlsrpc.org

Meeting Materials for Next Wednesday

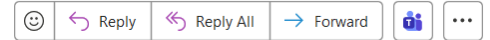


Grace Jackson

To: Jill.L.Piwoski1@DOS.NH.GOV; [Daniel Scott](#); edandersen771@gmail.com; rhall.77c1@gmail.com; [ShaeDel Simino](#); dtremblay@goshennh.org; doug.frost@outlook.com; bonniebelden@goshenlibrary.org; [dianne craig](#)
Cc: [Anna White](#)



Summarize



Thu 6/11/2026 9:58 AM

Hi all,

Our next hazard mitigation plan update meeting will be next Wednesday, June 17th, from 12-2pm. Please see attached the agenda, as well as a packet of what we will be discussing at this meeting.

If anyone needs to join remotely, please use this Teams link:

Microsoft Teams meeting

Join: <https://teams.microsoft.com/meet/299318336416072?p=UsZXJDCqPqPKz4HSNa>

Meeting ID: 299 318 336 416 072

Passcode: Ab2Br7Yw

[Need help?](#) | [System reference](#)

For organizers: [Meeting options](#)

If you have any questions, please let me know!

Thank you,
Grace

Associate Planner



Upper Valley Lake Sunapee Regional Planning Commission
10 Water Street, Suite 225
Lebanon, NH 03766
Phone: 603-448-1680

Final Hazard Mitigation Plan Update Meeting Next Week



Grace Jackson

To Jill.L.Piwoski1@DOS.NH.GOV; [Daniel Scott](#); edandersen771@gmail.com; rhall.77c1@gmail.com; [ShaeDel Simino](#);
dtremblay@goshennh.org; doug.frost@outlook.com; bonniebelden@goshenlibrary.org; [dianne craig](#)
Cc [Anna White](#)



MeetingWorkPlanGOSH2026.docx
179 KB



Materials Packet.pdf
2 MB

Summarize



Reply



Reply All



Forward



Wed 7/15/2026 3:42 PM

Hi all,

Our last hazard mitigation plan update meeting will be next Wednesday, July 22nd, from 12-2pm. Please see attached the agenda, as well as a packet of what we will be discussing at this meeting.

If anyone needs to join remotely, please use this Teams link:

Microsoft Teams meeting

Join: <https://teams.microsoft.com/join/27562466217807?p=wdbH3URAsTUhqQ3vwb>

Meeting ID: 275 624 662 178 07

Passcode: Vo9zB9Hx

If you have any questions, please let me know.

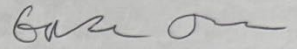
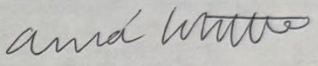
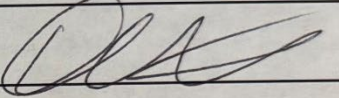
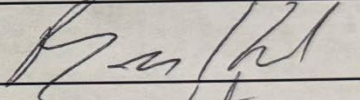
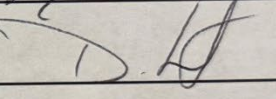
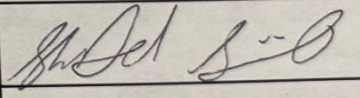
Thank you,
Grace Jackson

Associate Planner



Upper Valley Lake Sunapee Regional Planning Commission
10 Water Street, Suite 225
Lebanon, NH 03766
Phone: 603-448-1680
www.uvlsrc.org

**Goshen Hazard Mitigation Plan
Meeting - April 22, 2026**

	Last Name	First Name	Title	E-mail	Phone	Signature
1	Jackson	Grace	Associate Planner	gjackson@vulsrc.org	603-957-0010	
2	White	Anna	Resilience Coordinator	awhite@vulsrc.org	603-488-1860	
3	Daniel					
4	Scott	Daniel	EMD	ctvalleyservices@gmail.com	603-359-5437	
5	CRAIG	DIANNE	Public member			
6	Hall	Ryan	Fire chief	rhall.7767@gmail.com	603-454-4334	
7	Frost	DOUGLAS	Fire CAPT.	Doug.Frost@outlook.com		
8	Tremblay	Derek		dtremblay@goshennh.org		
9	Simino	ShaeDel	Road agent	SSimino@goshennh.org	603-477-1682	
10						
11						
12						

**Goshen Hazard Mitigation Plan
Meeting - May 20, 2026**

	Last Name	First Name	Title	E-mail	Phone	Signature
1	Jackson	Grace	Associate Planner	gjackson@uvlsrpc.org	603-957-6010	Grace Jackson
2	White	Anna	Resilience Coordinator	AWhite@UVLSRPC.org	603-448-1680	Anna White
3	Caron	Mark	Assistant Road Agent		603-477-1681	Mark Caron
4	Hall	Ryan	Fire chief	rhall-77-cx@gmail.com	603-477-4334	Ryan Hall
5	Frost	DOUGLAS	Fire Capt.	DOUG.FROST@outlook.com	860-982-6978	D. Frost
6	Scott	Daniel	EMD	cvalley services@gmail.com		
7	Piowski	Jill	NH HSEM Liaison	Jill.L.Piowski@dos.nh.gov	603-549-7136	Jill Piowski
8	Tremblay	Derek				
9	Shadell Simino					
10	Simino	Shadell	Road agent	ssimino@Goshen.nh.org	603-477-1682	Shadell Simino
11	CRAIG DIANE	DIANE	Resident	diannecraig328@gmail.com	603-863-4328	Diane Craig
12						

om →

**Goshen Hazard Mitigation Plan
Meeting - June 17, 2026**

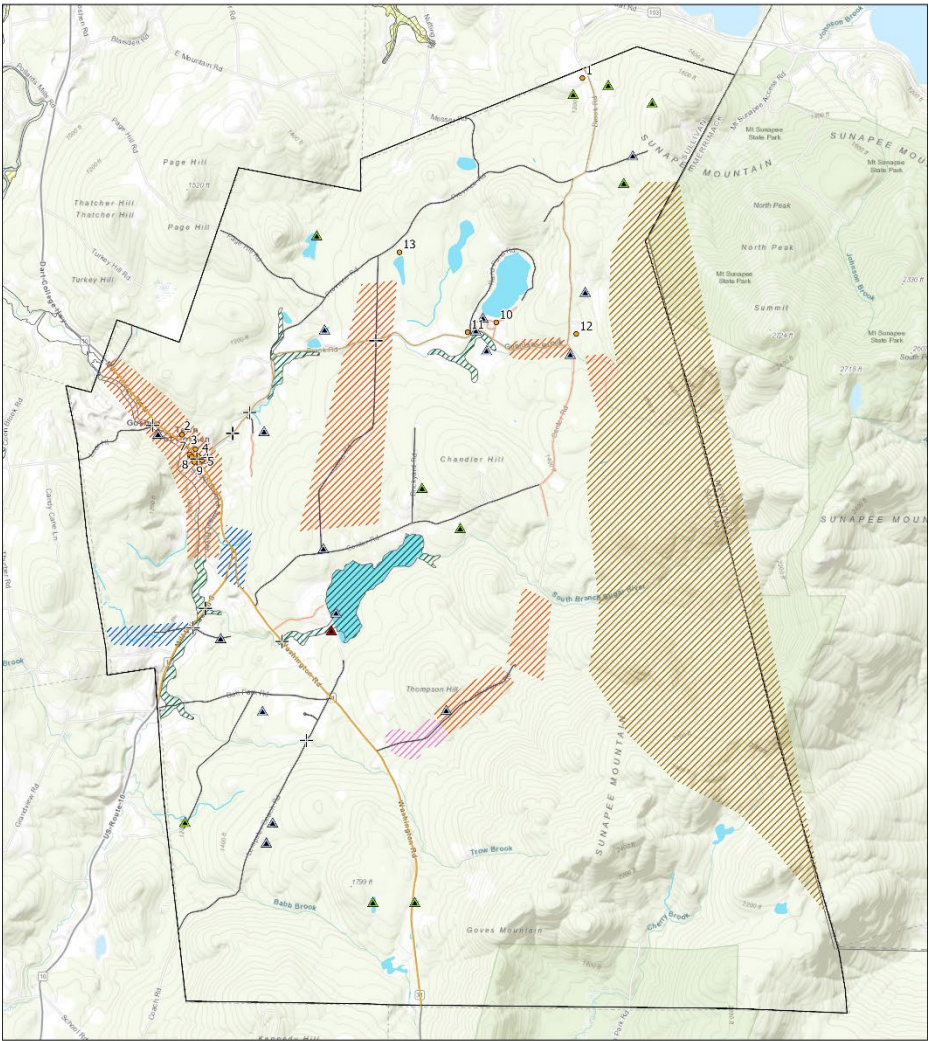
	Last Name	First Name	Title	E-mail	Phone	Signature
1	Jackson	Grace	Associate Planner	GJackson@uvlsrpc.org	603-957-6010	Grace Jackson
2	Piawski	Jill	Stakeholder Liaison	Jill.L.Piawski1@Dps.NH.gov	603-745-7136	Jill Piawski
3	White	Anna	Resilience coordinator	awhite@UVLSRPC.org	603-448-1680	Anna White
4	Frost	DOUGLAS	Capt.	Doug.Frost@outlook.com	860-982-6978	D. Frost
5	Simino	Shae Del	Road agent	SSimino@Goshennhicon	603 477 0931	Shae Del Simino
6	Scott	Daniel	EMD	ctvalley services@gmail	603-354-5932	Daniel Scott
7						
8						
9						
10						
11						
12						

**Goshen Hazard Mitigation Plan
Meeting - July 22, 2026**

	Last Name	First Name	Title	E-mail	Phone	Signature
1	Jackson	Grace	Associate Planner	gjackson@uvisrpc.org	603-937-6000	Grace Jackson
2						
3	Shue Del Simino		Road agent	SSimino@Goshennh.org	803 477 0931	Shue Del Simino
4	Caron	Mark	Ass. Road Agent		603 477 0109	Mark Caron
5	CRAIG	DIANNE	Resident	dianne@RAIG32se@gmail.com	603-863 4379	Dianne Craig
6	Scott	Daniel	EMD	EMD@goshennh.org	603-359 5437	Daniel Scott
7		BRAND				
8						
9						
10						
11						
12						

APPENDIX D:
Map of Hazard Areas and Critical Facilities

Goshen, NH Hazard Mitigation Map 2026



Legend

- Bodies of Water

Brooks

Bridges

FEMA Flood Hazard Areas

Flood Zone

A

AE

X

Critical Facilities

Dams

Classification

High
- Not Specified

Non-Mensure

Hazards

Type

Culvert Out

Erosion

Flooding

Landslide

Roads

Type

Local

Non-numbered state

Private

State



Critical Facility	ID_NUM
Junk Yard	1
Church	2
Police/Town Hall	3
Library	4
Goshen Country Store	5
Grange Hall	7
Fire Department	8
Post Office	9
Tippie Canoe Campground	10
Brook Road Inn	11
Highway Grange	12
NH Coop Power Station Transformers	13



This map was prepared by the Upper Valley Lake Sunapee Regional Planning Commission, September 2026. This map is intended for planning purposes only and does not represent a formal survey.

APPENDIX E:
Public Opinion Survey Results

Public Opinion Survey Results

Only 1 resident of Goshen submitted their response to the online Public Opinion Survey. Below are the questions they answered regarding the extent and severity of hazards in Goshen:

1. In your opinion, which of the following hazards affect Goshen?

Dam Failure, Flooding, Erosion, High Wind Events, Thunderstorm/Lighting/Hail, Drought, Extreme Temperatures, Invasive Species, and Severe Winter Weather

2. In your opinion, which of the following hazards have become more severe over the last 5 years?

Cyber Events, Flooding, Erosion, Drought, Wildfire, Severe Winter Weather, Invasive Species

3. What do you think Goshen can do about these hazards?

Seek out State resources.

APPENDIX F:

Dam Assessment Reports for Gunnison Dam and Sugar River Dam

EMERGENCY ACTION PLAN (EAP)

Gunnerson Lake Dam (Site D2) NH Dam #095.25

**Goshen, NH
(High Hazard Dam)**

Prepared by:



**Water Division
Dam Bureau
Maintenance Section**

Last Updated: 01/06/2014

TABLE OF CONTENTS

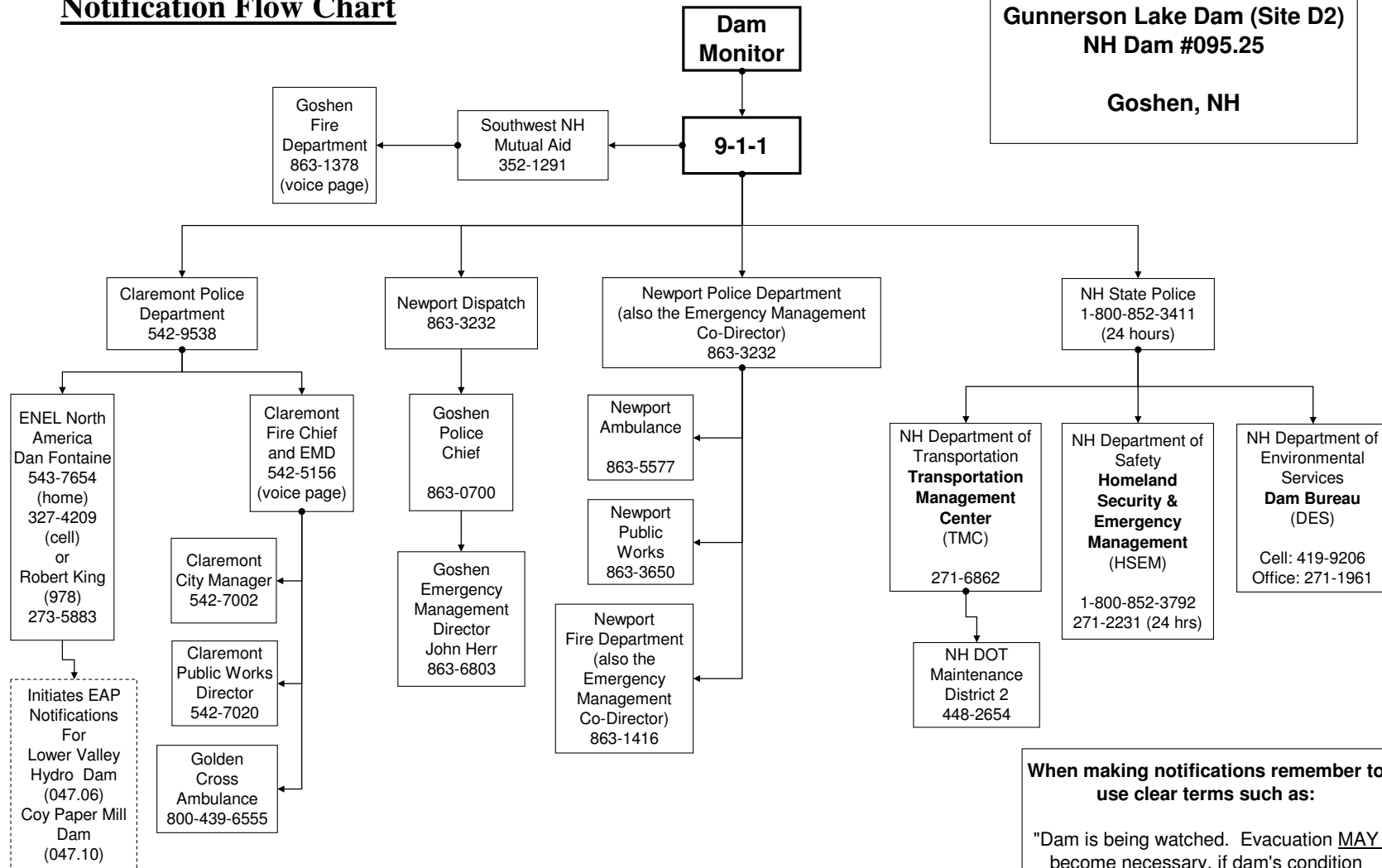
Section 1	Notification Flowchart
Section 2	General Responsibilities
Section 3	Notification Procedures
Section 4	Preventive Actions
Appendix A	Project Description
Appendix B	Impact of Breach
Appendix C	Inundation Map
Appendix D	Training and Testing
Appendix E	Local Evacuation Procedure
Appendix F	Posting of the Plan
Appendix G	Documentation
Appendix H	Record of Changes and Additions

SECTION 1

Notification Flow Chart

Gunnerson Lake Dam (Site D2)
NH Dam #095.25

Goshen, NH



Revision Date: 01/06/2014

SECTION 2

(NH Dam #095.25)

General Responsibilities

Gunnerson Lake Dam (Site D2) in Goshen, New Hampshire is owned and operated by the New Hampshire Department of Environmental Services Water Division (NHDES-WD), Dam Bureau. The Emergency Action Plans (EAPs) for this dam have been developed under guidelines outlined in the NHDES-WD administrative rules, section Env-Wr 505. This section was established to ensure notification of local emergency response personnel in the event that a potentially hazardous situation develops at the dam.

Each person making calls as indicated on the Notification Flowchart is responsible for completing the appropriate Notification Checklist, in Section 3. These checklists should be completed during testing, and during any actual emergency incident. Additional copies are available by contacting the NHDES-WD, Dam Bureau (refer to Appendix D for more information regarding the testing of the plan.)

If an actual or potentially hazardous situation exists at the dams, personnel are requested to start the notification process as shown in the detailed notification procedures and flow charts included in this report. Flood inundation maps are also included in Appendix C to assist local authorities in the development of an evacuation plan in the case of dam failure.

Table 2-1 provides a reference for the responsibilities of each agency or person shown on the notification flowchart during an emergency situation at these dams.

Table 2-1
Notification Flowchart Responsibilities

Person or Agency	Responsibility
Dam Monitor	Monitor and operate the dam, phone or radio 9-1-1 if an emergency situation is developing or has developed. Initiates testing of the notification procedures.
911 Dispatch	Contacts the Claremont Police Department, the New London Police Department, the Newport Police Department (also the Emergency Management Director), and the NH State Police to alert them of the emergency situation. Participates in testing of the notification procedures.

Person or Agency	Responsibility
Southwest Mutual Fire Aid	Contacts the Goshen Fire Department. Participates in testing of the notification procedures.
Goshen Fire Department	Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont Police Department	Contacts the Claremont Fire Department (also the Emergency Management Director), and the owner(s) of the Lower Valley and Sweetwater Hydro (Coy Paper Mill) Dams. Participates in testing of the notification procedures.
Lower Valley and Sweetwater Hydro Dams	Initiates EAP notifications for those dams. Participates in testing of the notification procedures.
Claremont Fire Department (also the Emergency Management Director)	Contacts the Claremont City Manager, the Claremont Public Works Director, and the Golden Cross Ambulance service. Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont City Manager	Provides emergency response as necessary. Participates in testing of the notification procedures.
Claremont Public Works Director	Provides emergency response as necessary. Participates in testing of the notification procedures.
Golden Cross Ambulance	Provides emergency response as necessary. Participates in testing of the notification procedures.
Goshen Police Department	Contacts the Goshen Emergency Management Director. Provides emergency response as necessary. Participates in testing of the notification procedures.
Goshen Emergency Management Director	Provides emergency response as necessary. Participates in testing of the notification procedures.

Person or Agency	Responsibility
Newport Police Department (also the Emergency Management Co-Director)	Contacts the Goshen Police Department, Newport Fire Department (Emergency Management Co-Director), the Newport Public Works Department, and the Newport Ambulance. Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Fire Department (also the Emergency Management Co-Director)	Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Public Works Director	Provides emergency response as necessary. Participates in testing of the notification procedures.
Newport Ambulance	Provides emergency response as necessary. Participates in testing of the notification procedures.
NH State Police	NH State Police will contact the NHDOS (HSEM), NHDES (after hours use the DES call sheet), and NHDOT (TMC). The State Police may also aid in road closures. Participates in testing of the notification procedures.
NHDOT Traffic Management Center (TMC)	TMC personnel will alert the District 2 offices of the emergency situation. Participate in testing of the notification procedures.
NHDOT District 2	District 2 highway personnel will close all impacted state highways and provide for detours as necessary. Participates in testing of the notification procedures.
NH Department of Safety Homeland Security & Emergency Management (HSEM)	Provides help or assistance to local communities as necessary. Participates in testing of the notification procedures.
NHDES-WD Chief Engineer or his designee	Provides instructions to dam monitor, start notification procedure.

Any questions concerning actions to be taken or notifications to be made should be addressed to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

SECTION 3

(NH Dam #095.25)

Notification Procedures

Each person making calls as indicated on the Notification Flowchart is responsible for completing the appropriate Notification Checklist provided in this Section. In this section there is a generic Notification Checklist which may be used for reporting. DES also provides Notification Checklists specific to each agency in the Notification Flowchart with responsibility for notifying others.

These checklists should be copied from this section and completed during testing, and during any actual emergency incident. Additional copies are available by contacting the NHDES-WD, Dam Bureau (refer to Appendix D for more information regarding the testing of the plan.)

DES can also provide the generic Notification Checklist in electronic format (MS Word) so that it can be used and modified electronically and emailed directly to the address provided below to make the process of reporting paperless.

Please return completed checklists to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406

Or scan signed version and send to:

damsafety@des.state.nh.us

If an actual or potentially hazardous situation exists at the dam, personnel are requested to start the notification process as shown in the detailed notification procedures and flow charts included in this report. A flood inundation map is also included in Appendix C to assist local authorities in the development of an evacuation plan in the case of dam failure.

State-Owned Dam <i>Notification Checklist</i>

NH Dam # _____ NH Dam Name _____

Reporting Agency (Dispatch Service) _____

(This checklist to be filled out during any emergency condition notification and during testing of the EAP – refer to the Notification Flow Chart for contact responsibilities, see Section 1)

Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: “Evacuation MAY become necessary, if dam’s condition worsens” or “Evacuation should begin immediately”		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED

Dispatcher Name/Signature: _____

Submit completed checklist via email to damsafety@des.nh.gov, or mail to:

Emergency Action Plan Coordinator
 New Hampshire Department of Environmental Services
 Water Division, Dam Bureau, Operations & Maintenance Section
 29 Hazen Drive
 Concord, NH 03302-0095
 (603) 271-3406

DAM MONITOR <i>Notification Checklist</i>

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

*(to be filled out during any emergency condition notification
and during testing of the EAP)*

Monitor's Name:		
Date:	Time:	
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. 911		

Signature: _____

Southwest Mutual Fire Aid Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

*(to be filled out during any emergency notification incident
and during testing of the EAP)*

Dispatcher's Name:		
Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. Goshen Fire Department		

Return completed checklist to:

Emergency Action Plan Coordinator
 New Hampshire Department of Environmental Services
 Water Division, Dam Bureau, Maintenance Section
 29 Hazen Drive
 Concord, NH 03302-0095
 603-271-3406
damsafety@des.nh.gov

Signature: _____

Claremont Police Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)

*(to be filled out during any emergency notification incident
and during testing of the EAP)*

Dispatcher's Name:		
Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. Lower Valley and Sweetwater Hydro Dam Owner(s)		
2. Claremont Fire Chief and Emergency Management Director		

Return completed checklist to:

Emergency Action Plan Coordinator
 New Hampshire Department of Environmental Services
 Water Division, Dam Bureau, Maintenance Section
 29 Hazen Drive
 Concord, NH 03302-0095
 603-271-3406
damsafety@des.nh.gov

Signature: _____

Claremont Fire Department Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
*(to be filled out during any emergency notification incident
and during testing of the EAP)*

Dispatcher's Name:		
Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. Claremont City Manager		
2. Claremont Public Works Director		
3. Golden Cross Ambulance		

Return completed checklist to:

Emergency Action Plan Coordinator
 New Hampshire Department of Environmental Services
 Water Division, Dam Bureau, Maintenance Section
 29 Hazen Drive
 Concord, NH 03302-0095
 603-271-3406
damsafety@des.nh.gov

Signature: _____

Goshen Police Department Notification Checklist
--

(NH Dam

#095.25)

Gunnerson Lake Dam (Site D2)

*(to be filled out during any emergency notification incident
and during testing of the EAP)*

Dispatcher's Name:		
Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. Goshen Emergency Management Director		

Return completed checklist to:

Emergency Action Plan Coordinator
 New Hampshire Department of Environmental Services
 Water Division, Dam Bureau, Maintenance Section
 29 Hazen Drive
 Concord, NH 03302-0095
 603-271-3406
damsafety@des.nh.gov

Signature: _____

Newport Police Department &
Emergency Management Co-Director
Notification Checklist

(NH Dam #095.25)
Gunnerson Lake Dam (Site D2)
*(to be filled out during any emergency notification incident
and during testing of the EAP)*

Dispatcher's Name:		
Date:	Time:	Call Received from:
Check if: Actual Emergency _____ Remember to use clear terms such as: "Evacuation MAY become necessary, if dam's condition worsens" or "Evacuation should begin immediately"		EAP Test _____

PARTY CONTACTED	TIME	PERSON CONTACTED
1. Newport Fire Department (also the Emergency Management Co-Director)		
2. Newport Public Works Director		
3. Newport Ambulance		

Return completed checklist to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

Signature: _____

SECTION 4

(NH Dam #095.25)

Preventive Actions

The Gunnerson Lake Dam (Site D2) is not continuously manned by NHDES-WD. Therefore, during high water conditions and routinely throughout the year, the NHDES-WD personnel will carefully inspect the dam in order to identify any potential problems. Frequency of dam monitoring will be determined by the NHDES-WD. An inspection checklist is included in this section.

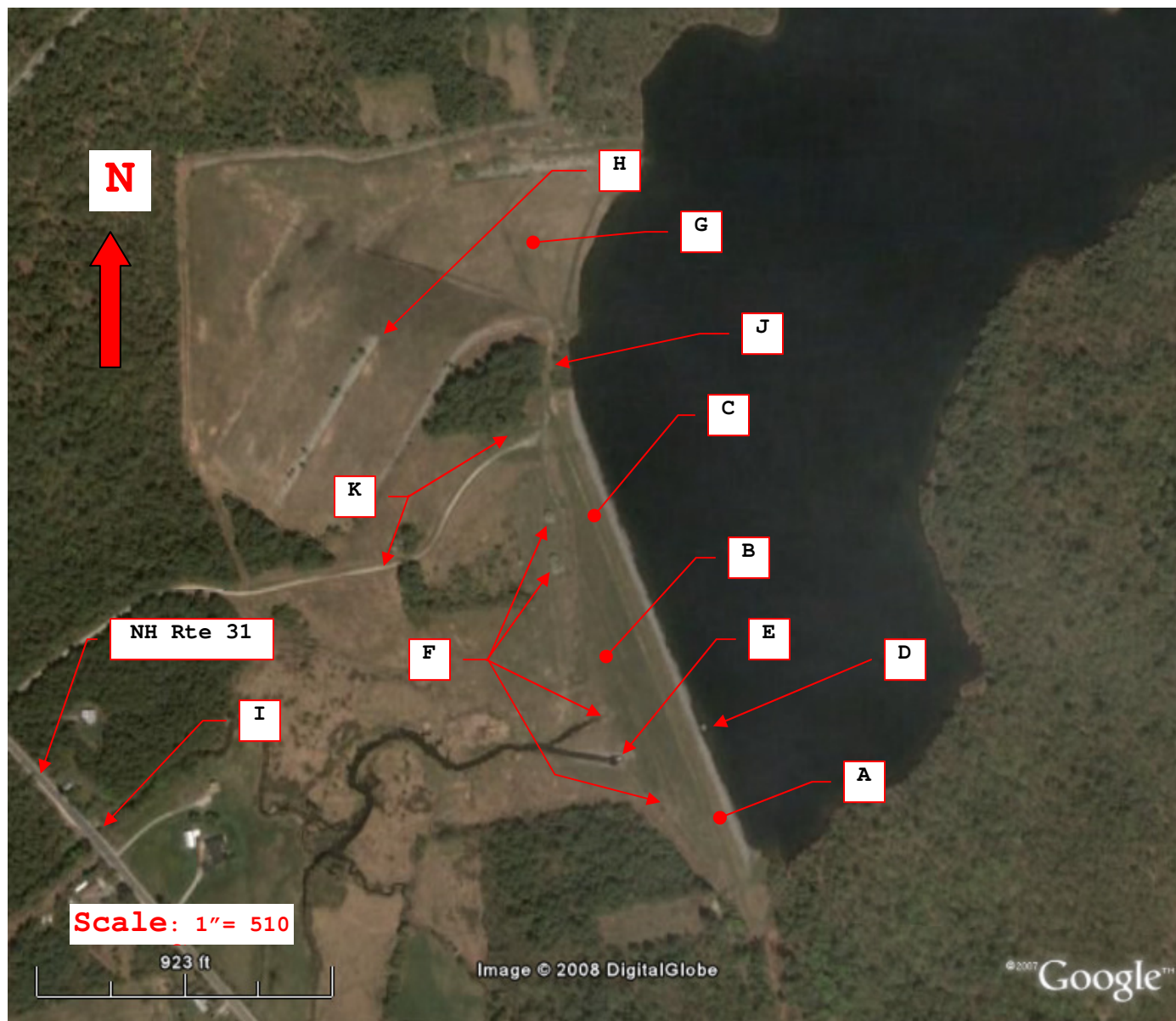
NHDES-WD personnel will initiate notification if a potentially hazardous situation is developing which could threaten the integrity of the Gunnerson Lake Dam (Site D2). This warning notification informs emergency response personnel that a dangerous situation exists, and that evacuation may become necessary.

If a dangerous situation develops during normal flow conditions, NHDES-WD relies on the flood control dam riser to lower the water level and alleviate pressure behind the dam. No power is necessary to operate the pond drain at this dam. Any deficiency will be closely monitored to detect further deterioration, and recorded on the form. If any of these conditions occur during high flow conditions, NHDES-WD personnel will closely monitor the dam. Debris around the outlet riser will be removed.

During periods of anticipated high runoff, the NHDES-WD personnel will inspect the dam for signs of stress. If the water elevation is approaching the top of the dam, and especially if more rainfall or runoff is expected, NHDES-WD personnel will make frequent return trips to the dam, until the pond level begins to drop.

If an emergency condition exists, and dam failure or overtopping is imminent or has occurred, the NHDES-WD personnel will immediately initiate notification of emergency personnel and the site will be monitored continuously until the emergency condition has subsided.

Conditions which warrant close monitoring of the dam include the development of seepage, the sudden increase in existing seepage, prolonged overtopping of the dam, especially if overtopping is more than a few inches, especially when it results in erosion of the embankment material. Dam Bureau personnel shall attempt to monitor the dam during these situations, but if high water conditions are occurring throughout the State or region, DES may not be able to closely monitor the situation. In such instances, local emergency responders and personnel may contact DES staff to assist in assessment of the situation. DES contact numbers are listed on the notification flowchart. DES may also be contacted through the NH State Police.

Figure 4-1: Sketch of Gunnerson Lake Dam (Site D2)**Components of Dam:**

- A = Dam embankment upstream slope
- B = Dam embankment downstream slope
- C = Dam crest
- D = Outlet riser
- E = Outlet of 30" reinforced concrete pressure pipe
- F = Embankment drains
- G = Vegetated spillway
- H = Stone dike
- I = 1st Crossing, Rte 31
- J = Natural ground
- K = Right side access road and recreational park.

DAM INSPECTION CHECKLIST		
Dam Name/Town:		
Dam Number:		
Inspected by:		Date:
Item	Comments	
SPILLWAY General Condition Cracks? Leaning? Seepage?		
GATES/ STOPLOG BAYS General Condition Gate mechanism condition		
EMBANKMENT CREST Visual Settlement? Misalignment? Cracking?		
EMBANKMENT UPSTREAM SLOPE Erosion? Condition of Ground Cover? Longitudinal/Vertical Cracks? Settlement, depressions, bulges? Trees, shrubs, other woody vegetation? Adequate riprap protection? Other comments		
EMBANKMENT DOWNSTREAM SLOPE Erosion? Condition of Ground Cover? Longitudinal/Vertical Cracks? Settlements, depressions, bulges? Soft spots or boggy areas? Movement at or beyond toe? Boils at Toe? Other comments		
SEEPAGE Location: Does seepage contain fine soil particles? Approximate amount (hint: garden hose full blast = approximately 5 gallons per minute.)		
ABUTMENT CONTACTS General Condition Cracks? Leaning?		
OTHER COMMENTS 		

APPENDICES

Appendix A	Project Description
Appendix B	Impact of Breach
Appendix C	Inundation Map
Appendix D	Training and Testing
Appendix E	Local Evacuation Procedure
Appendix F	Posting of the Emergency Action Plan (EAP)
Appendix G	Documentation
Appendix H	Record of Changes and Additions

APPENDIX A

Project Description

(NH Dam #095.25)

Gunnerson Lake Dam is located in the Town of Goshen, New Hampshire. The dam was constructed for flood control purposes. The drainage area for Gunnerson Lake consists of 5.5 square miles (3,520 acres) of gently to steeply sloping wooded terrain.

Gunnerson Lake is classified as a high hazard structure, the failure of which would result in any of the following: probable loss of life; significant economic loss; major damage to town, city, and Class I and II state highways and interstate highways.

Gunnerson Lake Dam is an earthen embankment flood control dam. The dam has a structural height of 62 ft and an overall length of approximately 2,140 ft. There is a 450' vegetated emergency spillway located to the right of the dam. The principal spillway for the dam consists of a concrete riser with a low level 30-inch R.C.P. outlet pipe. There is also a pond drain for the lake. The following two pages provide an inspection checklist and a site sketch.

Table A-1
Basic Data – Gunnerson Lake Dam (Site D2)

DESCRIPTION	DATA	COMMENT
Impoundment Area	96.2 acres	
Drainage Area	5.5 sq mi	
Maximum Storage	1,900 ac-ft	Storage with Pond level at Top of dam
Spillway Freeboard	16 ft	Distance from the top of the highest inlet in riser to the top of the dam
Dam Height	62 ft	Lowest Elevation at Downstream Side to Top of dam
Design Flow	15,255 cfs	PMP outflow
Discharge Capacity	18,270 cfs	Top of Dam no ops

APPENDIX B

Impact of Breach

(NH Dam #095.25)

The effects of a Gunnerson Lake Dam failure during the 100 yr flood were analyzed by the NHDES-WD Dam Bureau, December 1997, using the BOSS DAMBRK version 3.0, dated 1988-92. This software is based upon highly optimized versions of the "National Weather Service Dam-Break Flood Forecasting Computer Model," developed by D. L. Fread. Input for the model consists of storage characteristics of the reservoir, selected geometry and roughness coefficients for the downstream channel.

Initially two hypothetical dam-break scenarios were analyzed; the sunny-day breach and the flood event breach. It was determined that the storm day failure resulted in a more severe flood with higher peak flows and flood elevations downstream of the dam. Therefore, inundation mapping was completed for failure during the 100 year flood.

The possibility of multiple dam failures of Lower Valley Hydro and Sweetwater dams on the Sugar River was also analyzed. However, the failure of these dams did not significantly increase the flooding in impacted areas (see Scenario 2 on page B-3.)

The breach assumptions are listed in the table below.

Dam Breach Conditions	
Initial Water Surface Elevation	1236 ft NGVD (0.5 ft over riser crest elevation)
Peak Inflow to the Lake 100 year storm (HydroCAD analysis)	4,931 cfs
Mechanism of Breach	Piping failure
Piping Center Elevation	1220 ft NGVD
Final Breach Bottom Elevation	1187 ft NGVD (elevation of the downstream pipe outlet)
Lake Elevation at Time of Breach	1241.5 ft NGVD (max. elevation 100 year flood inflow reaches - based on initial water surface elevation stated above)
Average width of Breach	200 ft
Side Slope of Breach	1 Vertical : 0.25 Horizontal
Time to Dam Failure in hours	0.8 hr
Flow depth over emergency spillway	1.57 ft

Scenario 1 - Gunnerson Lake Dam Failure Results

The flood event simulation performed for Gunnerson Lake dam assumed that inflow into the impoundment was approximately equal to the 100 year flood, and that Gunnerson Lake dam fails because of piping through the embankment (internal erosion.) The peak discharge from the assumed Gunnerson Lake dam breach is approximately 58,220 cfs at a point immediately downstream of the dam.

The effects of the dam breach were computer modeled in four reaches. The first reach was from Gunnerson Lake dam to just upstream of the bridge at Route 31 in the Town of Goshen. The second reach extends from this point to just upstream of the bridge at Route 10. The third reach continued the dam failure routing through the Town of Goshen to a point just past the Newport town line (approximately 3.14 miles downstream of the dam.) The fourth reach included the analysis from this point on through the Towns of Newport and Claremont to the confluence of the Sugar River with the Connecticut River. This reach includes the Lower Valley Hydro dam and the Sweetwater Hydro dam in the analysis as well as many bridges.

This assumed failure of Gunnerson Lake dam would cause probable loss of life and considerable damage to the Towns of Goshen, Newport and Claremont. Table B-1 below provides a reference for some critical cross section locations downstream of Gunnerson Lake dam. For the complete inundation area and cross section locations, refer to the inundation maps in Appendix C of this document.

TABLE B-1					
Downstream Distance from Gunnerson Lake Dam (Miles)	Inundation Map Page #	Peak Discharge (cfs)	Due to Gunnerson Lake Dam Failure - Rise above		Location Description
			NLW (ft)	100 yr (ft)	
0.1	1	58,177	+13	+9.5	Just downstream of the dam
0.39	1	55,382	+22.4	+13.9	Route 31 bridge

TABLE B-1

Downstream Distance from Gunnerson Lake Dam (Miles)	Inundation Map Page #	Peak Discharge (cfs)	Due to Gunnerson Lake Dam Failure - Rise above		Location Description
			NLW (ft)	100 yr (ft)	
1.04	1	29,794	+48	+34	Route 10 bridge
1.97	1	19,343	+13	+4	Snowmobile bridge w/ chain link fencing
2.24	1	19,279	+18	+8.5	Near Post Office & Brook Rd
2.52	1	19,276	+30	+15.5	Bridge at Lear Hill Rd
3.58	2	23,683	+17.3	+7.4	Near Coon Brook Bridge
5.53	2	18,017	+14	+7	Near development off Unity Rd
7.35	2	17,331	+19	+11	Near golf course
8.31	3	16,540	+20	+11	Elm St Bridge
8.74	3	17,612	+18	+11	Belknap Ave Bridge
9.32	3	17,402	+18.5	+11	Oak St Bridge
10.5	3	14,924	+16	+11	Near Parlin Airport
11.71	4	14,986	+15	+7	2nd Oak St Bridge Crossing
14.12	5	14,945	+15.1	+9	Rte 11 Bridge
20.61	6	13,522	+9	+4	
22.01	7	13,503	Dam overtopped		Lower Valley Hydro dam
24.97	7	13,065	Dam overtopped		Sweetwater Hydro dam
25.54	8	13,059	+12	+3	Connecticut River

Scenario 2 - Multiple (Lower Valley & Sweetwater Hydro) Dam Failure Results

This scenario assumes that Gunnerson Lake dam breaches under the same conditions described in the previous section. The flood wave from the breach of Gunnerson dam was routed downstream on the Sugar through Lower Valley Hydro and Sweetwater dams in Claremont. In the modeling, it was assumed the initial water level at these dams was at the crest of the spillway and that the dams would fail when the water level reaches just over the top of the dams. The resulting peak elevations from the assumed dam failure were less than one foot above the breach elevations in Scenario 1 (Gunnerson dam failing alone.) Because the increase from a multiple dam failure is small, it is not shown on the inundation map.

Impact to Bridges

The assumed dam breach scenarios would impact many bridges and homes in Goshen, Newport and Claremont. The inundation area is shown on the inundation maps in Appendix C. The information in this section may be used in conjunction with the inundation maps in Appendix C by the local communities in their development of a local evacuation plan.

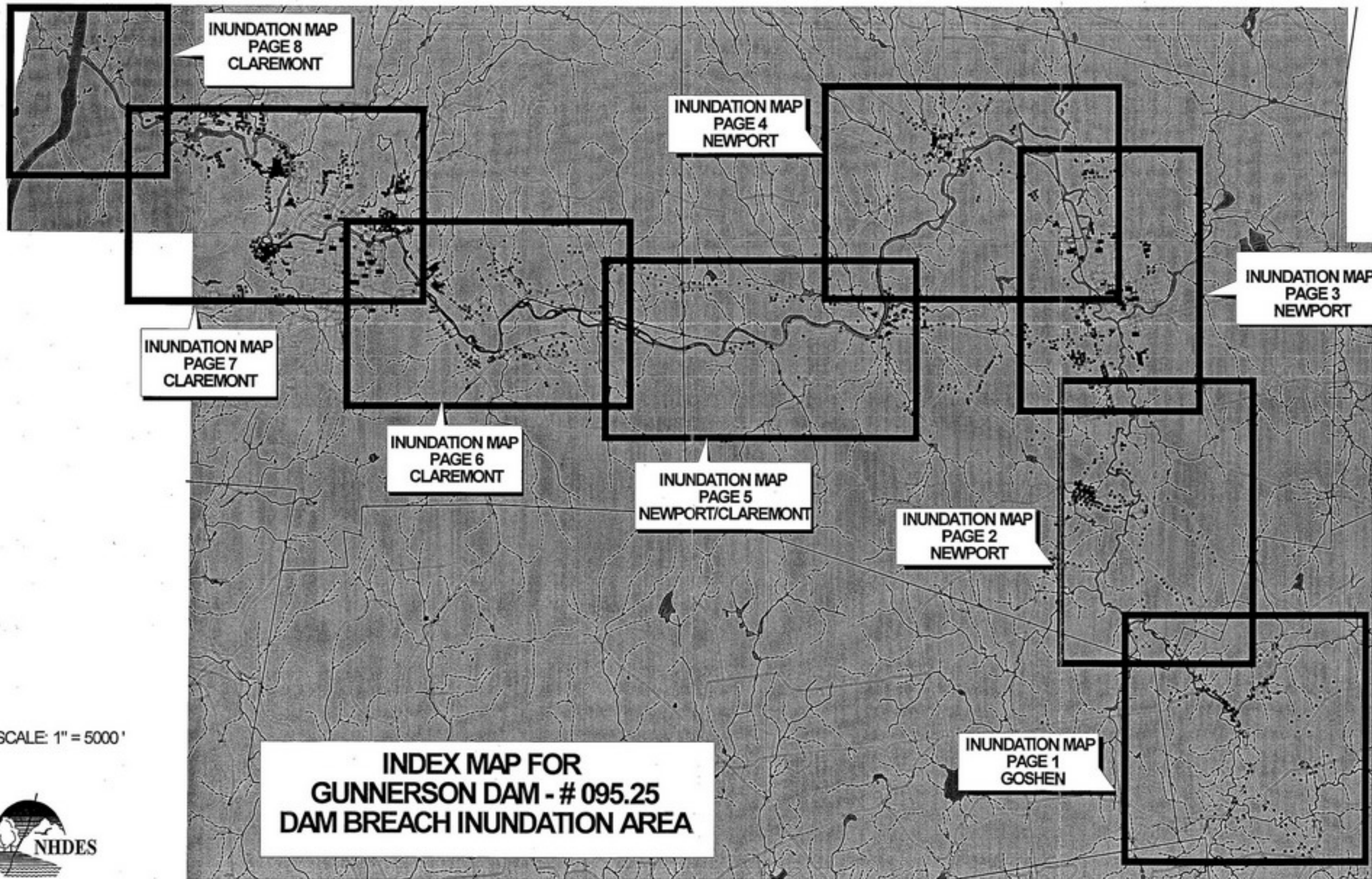
APPENDIX C

Inundation Map

(NH Dam #095.25)

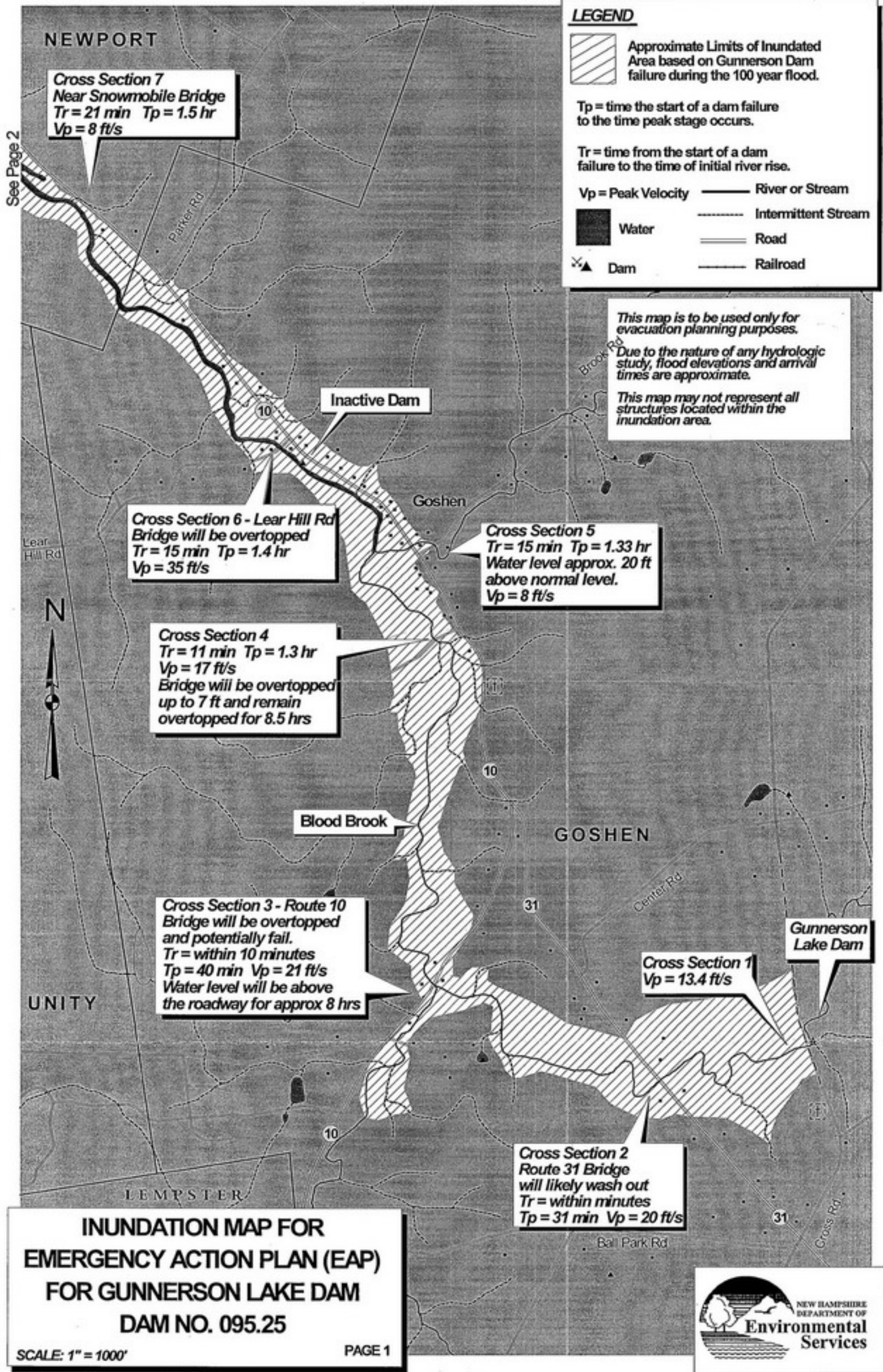
The map on the following page is for use only in emergency planning. The purpose of these inundation maps is to delineate and quantify the extent of the likely inundation area in the event of a dam-break at the Gunnerson Lake Dam (Site D2). The actual inundation area may vary, depending on the conditions existing at the time of dam failure, and the degree of failure. The map represents the approximate limits of the area inundated by a failure of the dam. All structures in and near the inundation area may not be represented on this map.

This inundation mapping is approximate and in most instances is limited to the accuracy of 20 foot USGS contour maps. The inundation area shown is based upon the assumed dam break conditions described in Appendix B. The dam break conditions in the event of an actual dam failure may vary based upon the specific failure conditions.



SCALE: 1" = 5000'





LEGEND

 Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.

T_p = time the start of a dam failure to the time peak stage occurs.

T_r = time from the start of a dam failure to the time of initial river rise.

V_p = Peak Velocity  River or Stream
 Intermittent Stream
 Road
 Railroad
 Dam

This map is to be used only for evacuation planning purposes.

Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.

This map may not represent all structures located within the inundation area.

See Page 3

Area near golf course
Cross Section 10
 $T_r = 55 \text{ min}$ $T_p = 2.2 \text{ hr}$
 $V_p = 8 \text{ ft/s}$
Flood level will be approx. 19 +/- above normal level.

Cross Section 9
 $T_r = 40 \text{ min}$ $T_p = 1.8 \text{ hr}$
 $V_p = 15.4 \text{ ft/s}$
Flood level 15 feet +/- above normal water level.

Cross Section 8
Coon Brook Rd
Bridge will be overtopped
 $T_r = 30 \text{ min}$ $T_p = 1.7 \text{ hr}$
 $V_p = 20 \text{ ft/s}$



INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 2

See Page 1

LEGEND

Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.

T_p = time the start of a dam failure to the time peak stage occurs.

T_r = time from the start of a dam failure to the time of initial river rise.

V_p = Peak Velocity

	River or Stream
	Intermittent Stream
	Road
	Railroad

Water

Dam

Cross Section 14
 $T_r = 1.5$ hr $T_p = 4$ hr
 $V_p = 6.6$ ft/s
 Flood level 16 ft +/- above normal water level.

Parlin Airport

Sewage Disposal Plant Inundated

Cross Section 13 - Oak St
 $T_r = 1.3$ hr $T_p = 2.6$ hr
 $V_p = 9$ ft/s
 Bridge will be overtopped by up to 4 ft for approx. 2.5 hrs

High School

Cross Section 12
 Belknap Ave $V_p = 10$ ft/s
 Bridge will be overtopped by up to 5 ft for approx. 3.5 hrs

Sugar River

Critical Facilities in Downtown Newport are shown, but not all structures are represented.

Town Offices, Police and Fire

NEWPORT

Cross Section 11 - Elm St
 $T_r = 1.1$ hr $T_p = 2.4$ hr
 $V_p = 7$ ft/s
 Bridge will be overtopped up to 8 ft for approx. 4.5 hrs



NEW HAMPSHIRE
 DEPARTMENT OF
**Environmental
 Services**

**INUNDATION MAP FOR
 EMERGENCY ACTION PLAN (EAP)
 FOR GUNNERSON LAKE DAM
 DAM NO. 095.25**

SCALE: 1" = 1000'

PAGE 3



LEGEND

 Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.

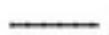
T_p = hours from the start of a dam failure to the time peak stage occurs.

T_r = hours or minutes from the start of a dam failure to the time of initial river rise.

V_p = Peak Velocity  River or Stream

 Intermittent Stream

 Water  Road

 Dam  Railroad



This map is to be used only for evacuation planning purposes.

Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.

This map may not represent all structures located within the inundation area.

Sugar River

Cross Section 15
Oak St N. Newport
 $T_r = 1.7$ hr $T_p = 4.2$ hr
 $V_p = 7.5$ ft/s
Bridge will be overtopped
by up to 2.5 ft for 2 hrs +/-

Cross Section 14
 $T_r = 1.5$ hr $T_p = 4$ hr
 $V_p = 6.6$ ft/s
Flood level 16 ft +/-
above normal water level.

NEWPORT

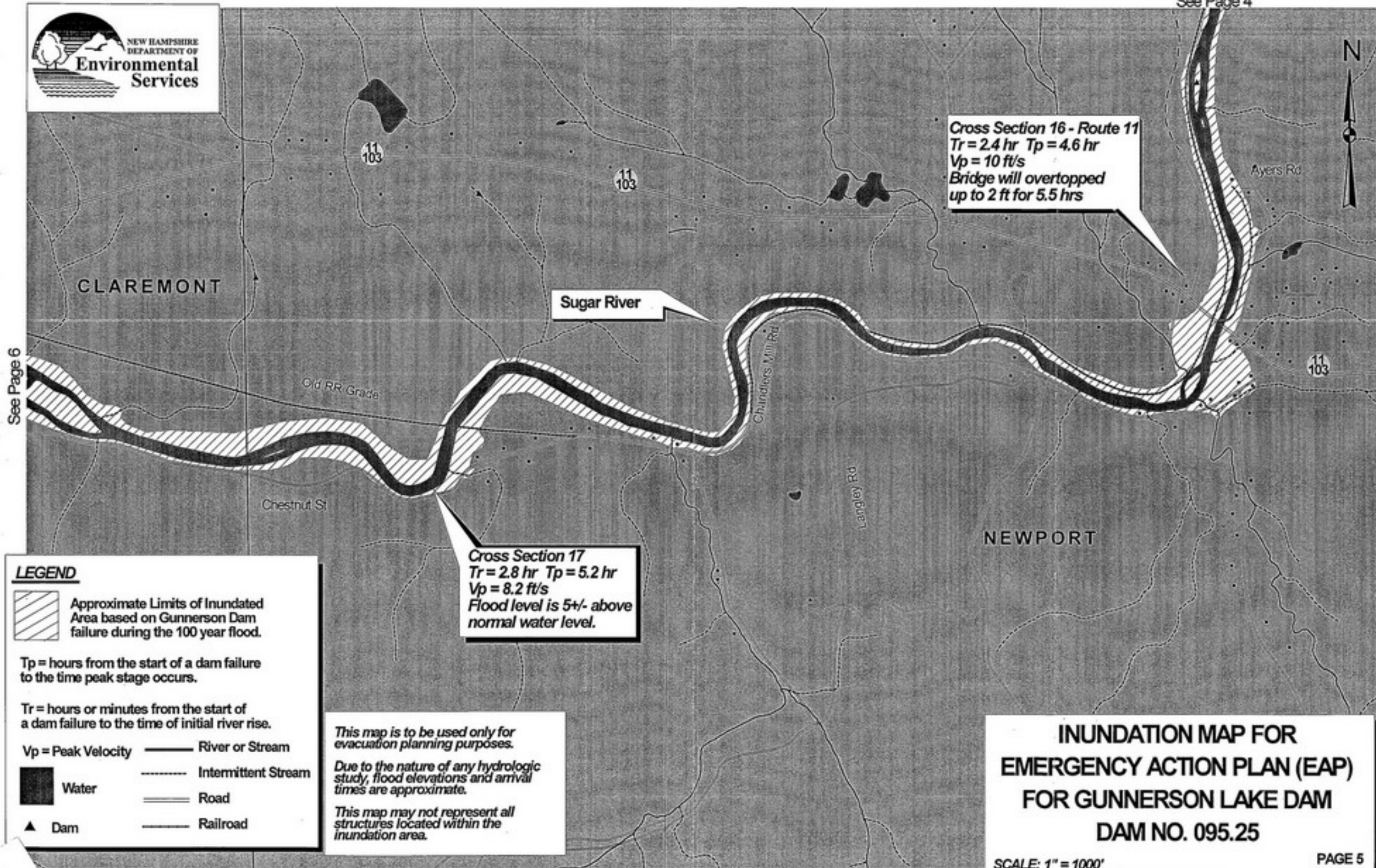
INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 4

See Page 5

See Page 3



This map is to be used only for evacuation planning purposes.

Due to the nature of any hydrologic study, flood elevations and arrival times are approximate.

This map may not represent all structures located within the inundation area.

LEGEND

 Approximate Limits of Inundated Area based on Gunnerson Dam failure during the 100 year flood.

T_p = hours from the start of a dam failure to the time peak stage occurs.

T_r = hours or minutes from the start of a dam failure to the time of initial river rise.

V_p = Peak Velocity

	River or Stream
	Intermittent Stream
	Road
	Railroad

 Water

 Dam

Cross Section 18
 $T_r = 3.5$ hr $T_p = 7.2$ hr
 $V_p = 4$ ft/s
 Flood level 9 +/- feet above normal water level.

Sugar River

CLAREMONT



INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 7

Cross Section 22
Sweetwater Hydro Plant
 $T_r = 5.1$ hr $T_p = 9.1$ hr
 $V_p = 8$ ft/s downstream
Dam will be overtopped
approx. 0.6 ft +/-

Cross Section 21
 $T_r = 4.5$ hr $T_p = 8.7$ hr
 $V_p = 8$ ft/s
Flood water level approx.
14 ft +/- above normal

Cross Section 20
Lower Valley Hydro
Dam will be overtopped
by approx. 5 ft.
 $T_r = 4.2$ hr $T_p = 7.8$ hr
 $V_p = 12.5$ ft/s (downstream)

Cross Section 19
Bridge (may be overtopped)
 $T_r = 4$ hr $T_p = 7.7$ hr
 $V_p = 7.6$ ft/s
Bridge may sustain
major damage

Sugar River

This map is to be used only for
evacuation planning purposes.

Due to the nature of any hydrologic
study, flood elevations and arrival
times are approximate.

This map may not represent all
structures located within the
inundation area.

LEGEND

 Approximate Limits of Inundated
Area based on Gunnerson Dam
failure during the 100 year flood.

T_p = hours from the start of a dam failure
to the time peak stage occurs.

T_r = hours or minutes from the start of
a dam failure to the time of initial river rise.

V_p = Peak Velocity  River or Stream

 Intermittent Stream

 Water  Road

 Dam  Railroad



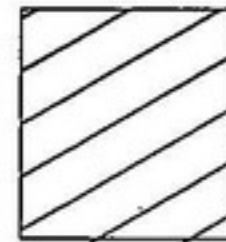
Various small dams on the
Sugar River will also be
overtopped.

Critical Facilities in
Claremont are shown,
but not all structures
are represented.

Connecticut River

$T_r = 5.3 \text{ hr}$ $T_p = 9.3 \text{ hr}$
Limit of Critical
Inundation Area.
Areas downstream
may still experience
flooding.

LEGEND



Approximate Limits of Inundated
Area based on Gunnerson Dam
failure during the 100 year flood.

T_p = hours from the start of a dam failure
to the time peak stage occurs.

T_r = hours or minutes from the start of
a dam failure to the time of initial river rise.

V_p = Peak Velocity



Water



Dam

————— River or Stream

----- Intermittent Stream

==== Road

——+—— Railroad



Sugar River

*This map is to be used only for
evacuation planning purposes.*

*Due to the nature of any hydrologic
study, flood elevations and arrival
times are approximate.*

*This map may not represent all
structures located within the
inundation area.*

INUNDATION MAP FOR EMERGENCY ACTION PLAN (EAP) FOR GUNNERSON LAKE DAM DAM NO. 095.25

SCALE: 1" = 1000'

PAGE 8

APPENDIX D

Training and Testing

(NH Dam #095.25)

D.1 Training

The dam is monitored by:

New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

The dam monitors have several years experience in the operation and maintenance of this specific dam and dams of similar size, configuration and age. The dam monitors have had constant dialogue with NHDES-WD Dam Safety inspectors as well as the Dam Maintenance design engineers.

D.2 Testing

Once every four years for Significant Hazard dams, and once every two years for High Hazard dams, the owner shall conduct or arrange to have conducted a test of the emergency notification procedure. The owner or designee will initiate the test by calling 9-1-1, and indicating **“This is a test of the Emergency Action Plan for the Gunnerson Lake Dam (Site D2) in Goshen, New Hampshire.”**

Each person responsible for making calls, as indicated on the Notification Flowchart, will make contacts as indicated, stressing that this is a test of the procedures. Each person is requested to complete the appropriate checklist, included in Section 3, and return it to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

The owner is responsible for monitoring the test and collects a copy of the notification checklists noting any large discrepancy in the times calls were received by the different organizations/agencies. The results of the test shall be reported to the NHDES-WD Dam Bureau. If the test indicates that changes are necessary to ensure proper and complete notifications, the owner will update the notification flowchart, as necessary, and mail updated pages to all EAP holders.

APPENDIX E

Local Evacuation Procedure

(NH Dam #095.25)

Please refer to local authorities for evacuation procedures.

APPENDIX F

(NH Dam #095.25)

Posting of the Emergency Action Plan (EAP)

All persons and agencies listed below have been issued a copy of the EAP, and shall be provided with an up-to-date copy of the plan.

NH Bureau of Emergency Communications (911)
Attn: Operations Supervisor
110 Smokey Bear Boulevard
Concord, NH 03305
(Copy of the flowchart only.)

NH Dept. of Safety - State Police
Headquarters/Communications
33 Hazen Drive
Concord, NH 03301
1-800-852-3411

NH Dept. of Transportation,
Transportation Management Center (TMC)
110 Smokey Bear Boulevard
Concord, NH 03301
Ph 271-6862 Fax 271-8626
Email TMC@dot.state.nh.us
(Copy of the flowchart only.)

NH Dept. of Transportation - District 2
8 Eastman Hill Road
Enfield, NH 03748
448-2654

NH Dept. of Safety Homeland Security and Emergency
Management (HSEM)
33 Hazen Drive
Concord, NH 03305
1-800-852-3792, 271-2231
(Copy of the flowchart and inundation map.)

NH Dept. of Environmental Services (DES)
29 Hazen Drive
PO Box 95
Concord, NH 03301-0095
Cell: 603-419-9206, Office: 603-271-1961
(continued)

Dam #095.25 - Goshen, NH F-2

Southwest New Hampshire Mutual Aid
32 Vernon Street
Keene, NH 03431
352-1291

Goshen Fire Department
PO Box 411
Goshen NH 03752
863-1378

Claremont Police Department
1 Police Court
Claremont NH 03743
542-9538

Victor Engel
ENEL North America, Inc.
1 Tech Drive – Suite 220
Andover, MA 01810-2452
(978) 681-1900 x811

Claremont Fire Department
100 Broad Street
Claremont NH 03743
542-5156

Claremont City Manager
58 Opera House Square
Claremont NH 03743
542-7002

Claremont Public Works Director
8 Grandview Street
Claremont NH 03743
542-7020

Golden Cross Ambulance
1 Lincoln Heights
Claremont NH 03743
800-439-6555

(continued)

Goshen Police Department
PO Box 68
Goshen NH 03752
863-0700

John Herr
Goshen Emergency Management Director
267 Center Road
Goshen NH 03752
863-6803

Newport Police Chief/Emergency Management Co-Director
59 Main Street
Newport NH 03773
863-3232

Newport Fire Chief/Emergency Management Co-Director
11 Sunapee Street
Newport NH 03773
863-1416

Newport Public Works Director
15 Sunapee Street
Newport NH 03773
863-3650

Newport Ambulance
11 Sunapee Street
Newport NH 03773
863-5577

APPENDIX G

Documentation

(NH Dam #095.25)

The following sheets include signed Acknowledgment Forms and any letters relative to implementation of the Emergency Action Plan.

ACKNOWLEDGMENT FORM

I certify that I have received the latest copy of the
Emergency Action Plan

for

Gunnerson Lake Dam (Site D2)
Goshen, NH
(NH Dam No. 095.25)

dated January 6, 2014

and acknowledge the role of this agency in the event of an
emergency and during testing of the plan.

Signed: _____ Date: _____

Representing: _____
(Name of Agency)

Please return to:

Emergency Action Plan Coordinator
New Hampshire Department of Environmental Services
Water Division, Dam Bureau, Maintenance Section
29 Hazen Drive
Concord, NH 03302-0095
603-271-3406
damsafety@des.nh.gov

APPENDIX H

Record of Changes and Additions

(NH Dam #095.25)

Table H-1 documents pages which have been modified or added.

Table H-1
Record of Changes and Additions – Gunnerson Lake Dam (Site D2)

Page Number	Modified By	Date Of Revision	Description/Reason For Modification
	KRF	11-17-10	Correct owner, address, and phone number for downstream dams (Lower Valley Hydro and Sweetwater Hydro Dams)
Footer Date, Apps. F&G	TD	10/30/13	Remove pager number, add Chief Engineer's office number
2, Apps. F and G	HAL	01/06/2014	Remove New London Police Dept as dispatcher to Goshen Police Dept

REHABILITATION ASSESSMENT REPORT

Sugar River Site D-2 Dam

Sullivan County, New Hampshire



National Inventory of Dams ID: NH01000

New Hampshire Dam Number: D095025

Hazard Classification: High

August 2016

REHABILITATION ASSESSMENT REPORT

Sugar River Site D-2 Dam

Sullivan County, New Hampshire

NID ID#: NH01000

NH Dam#: D095025

August 2016

Prepared for:

The State of New Hampshire
Department of Environmental Services
29 Hazen Drive
Concord, NH 03302-0095

Prepared by:

Gannett Fleming, Inc.
P.O. Box 67100
Harrisburg, PA 17106-7100
GF Project No. 59469



REHABILITATION ASSESSMENT REPORT

Sugar River Site D-2 Dam

Sullivan County, New Hampshire

TABLE OF CONTENTS	Page
1. INTRODUCTION AND PURPOSE.....	1
2. PROJECT SETTING AND HISTORY	1
3. SITE INSPECTION SUMMARY.....	2
4. HYDROLOGIC AND HYDRAULIC ANALYSES	7
5. AUXILIARY SPILLWAY INTEGRITY ANALYSES	8
6. HAZARD CLASSIFICATION SUMMARY & BREACH INUNDATION MAPPING.....	9
7. REVIEW OF AVAILABLE GEOTECHNICAL INFORMATION.....	12
8. FAILURE AND RISK INDICES.....	14
9. DESIGN CRITERIA AND POTENTIAL REHABILITATION ALTERNATIVES.....	14
10. COST ESTIMATES FOR REHABILITATION ALTERNATIVES	15
11. ENVIRONMENTAL CONSIDERATIONS.....	16
12. CONCLUSIONS AND RECOMMENDATIONS.....	17

APPENDICES

Appendix A	Selected As-Built Drawings
Appendix B	Updated Hydrologic Data
Appendix C	Breach Inundation Mapping
Appendix D	SITES Input and Output Summaries
Appendix E	Site Inspection Photographs and Checklist
Appendix F	Evaluation of Potential Rehabilitation Projects - Priority Ranking Spreadsheet



1. INTRODUCTION AND PURPOSE

1.1 Background

The Watershed Protection and Flood Prevention Act (Section 14 of PL-83-566, as amended) authorizes funding and technical assistance to rehabilitate aging flood control dams originally built with assistance of the USDA Watershed Programs. Sponsors of these dams may apply for assistance to extend the project service life and ensure that the facility meets applicable safety and performance standards. If the project is eligible for rehabilitation assistance, the NRCS may provide funding for 65 percent of the total rehabilitation project costs; the project sponsors are responsible for the remaining 35 percent. Technical assistance by NRCS for planning and design of the rehabilitation project is provided at no cost to project sponsors.

1.2 Scope of Study

The purpose of this report is to provide New Hampshire Department of Environmental Services (DES) and the Natural Resources Conservation Service (NRCS) an assessment of Sugar River Site D-2 Dam, as authorized by contract dated May 27, 2015 for 18 Dam Assessments in New Hampshire. The report provides a description of the dam, an assessment of the current conditions and status of operation and maintenance, and the scope of potential rehabilitation alternatives. In addition to assessing the overall integrity of the structure, available design information was reviewed to determine whether the structure meets current NRCS and DES design criteria. This information is provided to assist the NRCS and local sponsor(s) in determining future actions concerning potential rehabilitation of the dam to extend the service life of the dam and meet current safety criteria.

2. PROJECT SETTING AND HISTORY

Sugar River Site D-2 Dam is located about one mile southeast of the Town of Goshen in Sullivan County, New Hampshire. An aerial photo and USGS quadrangle of the dam are shown on Figure 1 and Figure 2, respectively. The location of the dam is also shown on the inundation map in Appendix C.

Engineering design and other reference materials collected and reviewed for this report include:

1. As-Built Drawings, Sugar River Site D-2 Dam, September 1983, 44 pp.
2. National Inventory of Dams. Sugar River Site D-2 Dam, 6 pp.
3. Data Sheet, Sugar River Site D-2 Dam, August 2015, 1 pp.
4. Inspection Report, Sugar River Site D-2 Dam, November 3, 2011, 4 pp.
5. Inundation Map, Sugar River Site D-2 Dam, 9 pp.



6. Operation and Maintenance Plan, Sugar River Site D-2 Dam, March 2008, 3 pp.
7. Design Calculations, Sugar River Site D-2 Dam, 1979, 24 pp.
8. Impact of Breach, Sugar River Site D-2 Dam, June 2011, 4 pp.
9. Hydrograph Calculations, Sugar River Site D-2 Dam, 1975, 55 pp.
10. Land Rights Map, Sugar River Site D-2 Dam, April 1980, 2 pp.
11. Watershed Work Plan, Sugar River Watershed, August 1969, 43 pp.

Review of the above data indicates that Sugar River Site D-2 Dam was designed by the United States Department of Agriculture, Soil Conservation Service (SCS), now the Natural Resources Conservation Service (NRCS). Construction of the dam was completed in 1983. The dam is multipurpose and is used for flood control and recreation. The dam is owned by New Hampshire Department of Environmental Services.

Based on the as-built drawings, the dam and its appurtenances consist of a 1,638-foot-long, 61-foot-high earthen embankment, a reinforced concrete riser structure containing a principal spillway riser chamber, a principal spillway outlet conduit and plunge pool, a 120-foot long pond drain conduit with a reinforced concrete intake structure and an open channel earth-cut vegetated auxiliary spillway. The pond drain is controlled by a sluice gate in the riser structure. The auxiliary spillway crest is set approximately 6.4 feet below the crest of the embankment. Both the principal spillway crest and the auxiliary spillway rest are uncontrolled. Reservoir flow is discharged through the principal spillway until the pool level reaches the auxiliary spillway crest. The principal spillway outlet conduit is a 30-inch inside diameter pre-stressed concrete pressure pipe, steel-cylinder type conforming to AWWA-301 standards. The outlet conduit is approximately 266 feet long and supported by a concrete cradle. Three reinforced concrete anti-seep collars at 20-foot spacing are located on the pond drain conduit beginning approximately 25 feet upstream of the riser structure. Four anti-seep collars at 20-foot spacing are located on the principal spillway conduit beginning approximately 13 feet downstream of the riser structure.

A summary of specific design data is presented in Table 1. Select As-Built Drawings are provided in Appendix A.

3. SITE INSPECTION SUMMARY

Gregory Richards, P.E., Kate Aulenbach, E.I.T., and Wesley Hollenbach, E.I.T. of Gannett Fleming, Inc. conducted a site inspection of the dam on August 18, 2015. Jim Weber and William Haskell of New Hampshire DES participated in the inspection. A dam inspection checklist was used to record findings and is presented in Appendix E. General photographs of the dam site and photographs of deficiencies observed during the site inspection are also presented in Appendix E. Additional photos taken during the field review are furnished in electronic format in the Supporting Data Folder.



Figure 1. Aerial photograph of Sugar River Site D-2 Dam

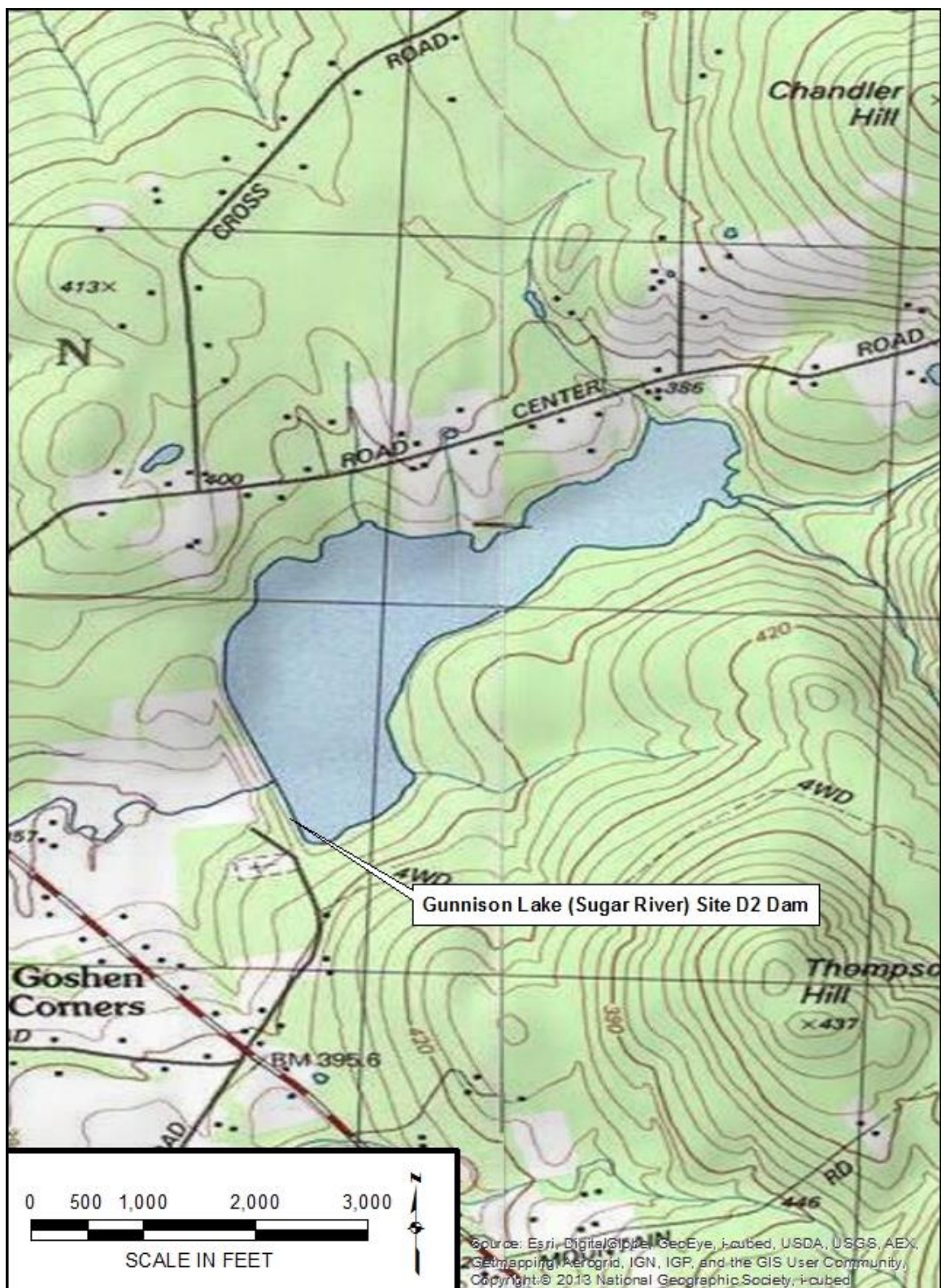


Figure 2. USGS Quadrangle of Sugar River Site D-2 Dam

**Table 1. As-Built Design Data**

Description	Value
General Data	
Year Designed	1980
Year Constructed	1983
Purpose	Flood Control, Recreation
Original / Current Hazard Classification	High (Class C) / High (Class C)
Design Life	100 Years
Design Drainage Area	3,501 Acres (5.47 mi ²)
Dam Height Above PSW Outlet Invert	61.2 Feet
Embankment Length (Total)	1,638 Feet
Embankment Top Width	25 Feet
Embankment Upstream Slope	3H:1V
Embankment Downstream Slope	2.5H:1V
Critical Elevations (MSL)	
Top of Dam (Design)	1,248.2 Feet
Auxiliary Spillway Crest	1,241.8 Feet
PSW Weir Crest	1,235.5 Feet
Normal Pool (Permanent Pool)	1,232 Feet
PSW Conduit Invert @ Riser / Outlet	1,190.5 Feet / 1,187.0 Feet
Pond Drain Conduit Invert @ Inlet / Riser	1,192.6 Feet / 1,192.0 Feet
Allotted Storage Capacities	
Sediment (Sediment Pool)	60 Acre-Feet
Conservation (Permanent Pool)	1,856 Acre-Feet
Retarding (Auxiliary Spillway Crest)	2,927 Acre-Feet
Pool Surface Areas	
Permanent Pool	96.2 Acres
Other Features	
Principal Spillway Conduit Diameter	30 Inches
Principal Spillway Conduit Length	265.9 Feet
Principal Spillway Weir Crest Length	2 @ 7.5 Feet, 15 Feet (Total)
Upstream Pond Drain Diameter	30 Inches
Upstream Pond Drain Length	119.7 Feet
Auxiliary Spillway Design Crest Width	450 Feet (@ Level Control Section)



Minor rutting and bare spots were observed on the crest of the dam. Tall grasses were present on the upper half of the upstream slope. The lower half of the upstream slope has adequate and sound riprap; however, a few small diameter trees and woody vegetation are growing through the riprap. Tall grasses and light woody vegetation were observed on the downstream slope. An eroded footpath was observed on the left downstream slope. Small diameter trees and woody vegetation are growing in the riprap of the downstream gutters. Grass cover on the auxiliary spillway was generally in good condition. The slopes of the auxiliary spillway are lined with riprap which is choked with trees and woody vegetation. Additionally, a rock dike runs along the centerline of the auxiliary spillway from the level control section to the outlet of the constructed spillway. Mature trees and woody vegetation are growing throughout the rock dike. A dense forest is located at the outlet of the auxiliary spillway.

The intake structure has minor concrete spalling concentrated near the waterline. The reservoir level was at 0.25 feet at the time of the inspection. Minor corrosion was observed on the low level trash racks. Logs were observed obstructing the trash rack and were cleared by the operator during the inspection visit. The stem and stem guides of the low level outlet were viewed but not operated as a part of this inspection. The top stem guide was broken.

The outlet of the principal spillway conduit is cracked at the end of the conduit and on the cradle. There is also exposed reinforcement at the end of the conduit. Previous documentation of video inspection of the principal spillway conduit was not available for review. Outlet Drain 2 daylights just to the left of the principal spillway outlet. Flow through Outlet Drain 2 was estimated at 0.25 to 0.5 gpm and contained iron precipitate. No concentrated flow was observed at Outlet Drains 1, 3, and 4. Woody vegetation is growing in and around the riprap around the plunge pool, and the fence surrounding the plunge pool is broken and leaning.

Recommended maintenance items include mowing the upstream slope, downstream slope and auxiliary spillway; removing woody vegetation growing in the riprap on the upstream slope, downstream gutters, auxiliary spillway slopes, and auxiliary spillway rock dike; filling and seeding the eroded footpath on left downstream slope; repairing the broken stem guide; repairing the fence surrounding the plunge pool; and repairing cracks and exposed reinforcement on the principal spillway conduit outlet and concrete cradle. Seepage through Outlet Drain 2 should be monitored. Removing debris from the principal spillway riser structure and trash racks should continue on a routine basis. It is recommended that video inspection of the interior of the principal spillway conduit be performed. The above maintenance items are not included in the rehabilitation alternatives described in Section 9 or in the project costs in Section 10.

It should be recognized that the reported condition of the dam as described herein is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is also important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would



be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Continued care and inspection are necessary to detect unsafe conditions.

4. HYDROLOGIC AND HYDRAULIC ANALYSES

Hydrologic and hydraulic analyses were conducted to determine whether the dam meets current NRCS and New Hampshire DES criteria. NRCS design precipitation and other hydrologic parameters have become more stringent since the dam was designed in the 1980s. As part of this assessment, updated hydrologic and hydraulic analyses using the NRCS SITES model were performed to determine the required auxiliary spillway crest and top of dam elevations.

Structure geometry and reservoir storage inputs as well as watershed hydrologic characteristics for the SITES model were obtained from As-Built Drawings and other design documents provided by the NRCS. Frequency precipitation data was obtained from Cornell University's Northeast Regional Climate Center Extreme Precipitation Tables on July 29, 2015. Probable Maximum Precipitation (PMP) data was obtained from Hydrometeorological Report No. 51. Updated hydrologic parameters (drainage area, runoff curve number, and time of concentration) developed for the watershed are shown in Appendix B. The SITES analyses involved evaluation of the dam for both the short duration (6-hour) storm and the long duration (24-hour) storm in accordance with procedures outlined in the latest version of TR-60 (July 2005). The SITES input and output summaries for as-built, Class C (*high hazard*) criteria for the 6-hour and 24-hour duration storms and the auxiliary spillway crest elevation are presented in Appendix D. A side-by-side comparison of key SITES model input and output for the different scenarios analyzed is presented in Table 2.

The following can be concluded based on the analysis results summarized in Table 2:

1. The auxiliary spillway crest needs to be raised 0.45 feet in order to pass the 100-year Principal Spillway Hydrograph (PSH) flood using NRCS runoff criteria.
2. For a Class C (high hazard) structure, the dam would be overtopped and would need to be raised 0.88 feet to pass the 6-hour Freeboard Hydrograph without overtopping the dam (assuming the auxiliary spillway crest remains unchanged).
3. New Hampshire DES requires that a high hazard dam (constructed prior to February 19, 1981) pass 250% of the 100-year flood with one foot of freeboard. During this flood event, the maximum reservoir elevation is 1,244.76 feet, resulting in more than three feet of freeboard. Therefore, the dam satisfies this requirement.

Additionally, the principal spillway is required by NRCS TR-60 to empty the retarding pool to less than 15 percent of the retarding storage volume in no more than 10 days. The dam does not



satisfy this requirement; therefore, the starting reservoir elevation for both the PSH and FBH routings has been raised accordingly. The routing results shown in Table 2 reflect this increase in starting reservoir elevation. **Without this requirement, the existing auxiliary spillway crest would not need to be raised to meet PSH spillway activation criteria; however, the dam would still need to be raised so that it does not overtop during the FBH event.**

Table 2. Side-By-Side Comparison of Key SITES Model Input and Output

Parameter	Original 1980 Design	Updated 2016 Analyses		
		100-Year ASW Crest	Top of Dam (NRCS 6-hr)	Top of Dam (NRCS 24-hr)
Key Input Data				
Watershed Area	3,501 Acres	3,408 Acres	3,408 Acres	3,408 Acres
Weighted Curve Number	67	67	67	67
Time of Concentration, T _c	2.5 Hours	1.33 Hours	1.33 Hours	1.33 Hours
100-Year Rainfall (P-100)	6.0 Inches	6.71 Inches	-	-
Freeboard Rainfall (P-FB)	21.2 Inches	-	23.3 Inches	28.9 Inches
Key Output Data (NRCS TR-60 Criteria)				
ASW Crest Elevation (Point Rainfall Criteria)	1,241.8 Feet	1,241.75 Feet	-	-
ASW Crest Elevation (Runoff Criteria)	1,241.8 Feet	1,242.25 Feet	-	-
Top of Dam Elevation	1,248.2 Feet	-	1,249.08 Feet	1,247.35 Feet
Freeboard	-	-	-0.88 Feet	0.0 Feet
Approximate Maximum Depth of Overtopping	0.0 Feet	-	0.39 Feet	0.0 Feet

5. AUXILIARY SPILLWAY INTEGRITY ANALYSES

Preliminary auxiliary spillway integrity analyses were performed as part of this assessment using the SITES program. Subsurface information obtained from the As-Built Drawings and published geology mapping were used to develop a representative geologic profile of the most erodible section through the auxiliary spillway. Headcut erodibility index (k_h) values for each soil and rock layer were estimated by comparing the descriptions of rock type and degree of weathering noted in the boring logs with similar rock types and assigned index values depicted in high resolution photos of documented eroded spillway materials included in a supplement to NEH 628, Chapter 52. It is noted that all headcut erodibility index values were estimated based on limited information regarding the soil and rock properties on site and supplemented with engineering judgment. These parameters should not be interpreted as comprehensive or precise.



The subsurface stratigraphy at the control section of the auxiliary spillway for the SITES integrity analysis was modeled as one foot of topsoil underlain by a layer of silty sand and clayey sand (typical USCS classification SM and SC). This layer is underlain by top of rock at approximate Elevation 1140 feet. The bedrock material is unknown and not described in available As-Built Drawing or reports; however, the depth to rock is quite deep and well below the existing valley floor according to profiles provided on the As-Built Drawings.

The auxiliary spillway surface condition parameters were estimated based on the conditions observed during the site inspection. The Vegetal Retardance Curve Index is approximated by the Manning's roughness value of the cover through the auxiliary spillway. A value of 0.035 was used for the constructed portion of the auxiliary spillway. The vegetal cover factor ranges from zero for non-vegetated surfaces to 0.87 for typical turf grass sod covers. The auxiliary spillway was assumed to have a vegetal cover factor of 0.5 which corresponds to typical bunch grasses. The maintenance code describes the overall uniformity of the cover in the channel. A maintenance code of 1 was used where there was uniform cover over the entire area subjected to flow. A maintenance code of 2 was used where discontinuities are present in the cover. The potential rooting depth is the depth to which roots could reasonably penetrate under good growing conditions and was estimated to be one foot.

A schematic profile of the auxiliary spillway obtained from the SITES output is presented on Figure 3. Assumed soil and rock material properties are also presented in Figure 3.

The SITES auxiliary spillway analysis shows minimal damage to the downstream end of the auxiliary spillway and no breach of the spillway crest during passage of the 6-hour and 24-hour FBHs. The headcut having the maximum final overfall height during the 24-hour FBH was 9.5 feet deep. The headcut that progressed the farthest upstream was 4.0 feet deep and extended to a point 489 feet from the upstream end of the level control section. Additional subsurface exploration may show that the spillway will breach during passage of the FBH; however, the current information available suggests that a breach will not occur.

The SITES input and output summaries for both the 6-hour and 24-hour storms for as-built, Class C criteria are presented in Appendix D. The electronic input files for the SITES model are furnished in the Supporting Data Folder.

6. HAZARD CLASSIFICATION SUMMARY & BREACH INUNDATION MAPPING

An independent dam breach hydraulic analysis was performed using the U.S. Army Corps of Engineers' HEC-RAS computer model in order to determine the downstream inundation limits of the flood wave created by a sudden breach of the dam. A field assessment of downstream structures located within the path of the flood wave was also performed to assess the current hazard classification. The dam was classified according to NRCS definitions in NEM, Part 520, Subpart C-Dams.

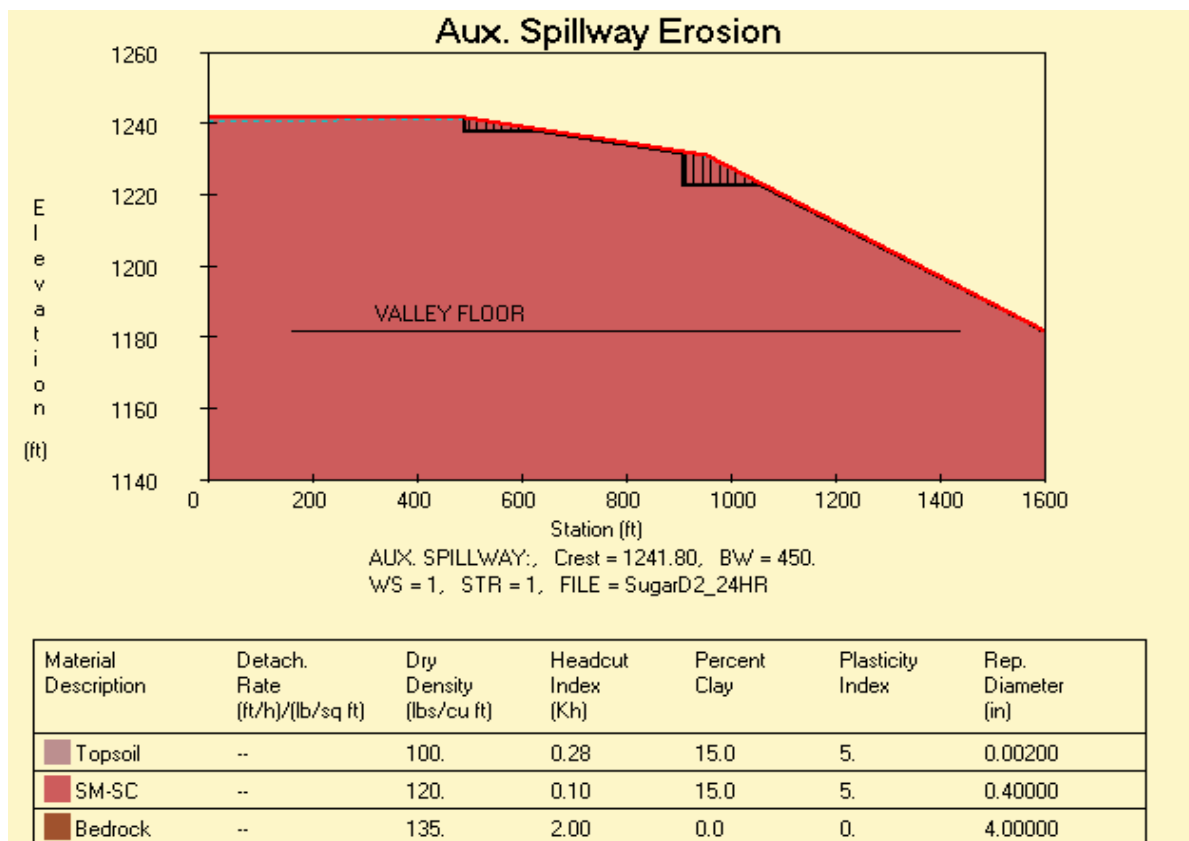


Figure 3. Plot of Auxiliary Spillway Profile and Extent of Erosion from Integrity Analysis for 24-hour Freeboard Hydrograph

Sugar River Site D-2 Dam was analyzed for breach scenarios associated with failure in a seismic condition (sunny day failure with reservoir water level at the crest of the auxiliary spillway), a static condition (sunny day failure with reservoir water level at the top of the dam), and a Freeboard Hydrograph (FBH) condition (Probable Maximum Flood event failure with 100-year base flows occurring in downstream river reaches).

No LiDAR data for the area was available from the New Hampshire Granit Program. USGS terrain data was used to develop a 29-foot by 29-foot raster digital terrain model (DTM) which was used to create the geometric cross sections in GIS for the HEC-RAS hydraulic model. The inflow hydrograph, reservoir stage-storage relationship, and other inputs used to describe the dam in the HEC-RAS model were obtained from the 6-hour FBH SITES output and As-Built Drawings.

The river reach downstream of the dam (South Branch of Sugar River) runs approximately 9 miles before joining Sugar River which runs another 20 miles before reaching the Connecticut River. The river network was modeled as a single reach system with uniform lateral inflows discharged into the system at the river confluences. Unsteady flow modeling in HEC-RAS was used in this analysis to simulate the flood wave from the FBH dam breach analysis.



The dam breach parameters, including the time to breach, breach bottom width and side slopes were determined by trial and error until the peak breach discharge criteria specified in TR-60 was satisfied. The peak breach discharge using TR-60 criteria was computed to be between 93,800 and 131,300 cfs for the FBH breach scenario. Assuming a 320-foot-wide breach of the dam occurs within 15 minutes, a peak breach discharge of approximately 116,000 cfs was computed using the HEC-RAS model. The height of the breach flood wave at the dam site, from the top of the dam to the valley floor would be approximately 20 feet. See Appendix C for detailed TR-60 peak breach discharge calculations for all modeled scenarios.

The breach model and inundation mapping was extended downstream to a point where the difference in water surface elevation due to dam failure is no more than 2 feet above the non-failure conditions. For Sugar River Site D-2 Dam, the inundation mapping for the dam breach analysis was extended to the Connecticut River, approximately 29 miles downstream of the dam. The extent of downstream inundation was plotted using GIS tools on an orthophoto base map, and is presented in Appendix C. All associated HEC-RAS analysis files, inundation shapefiles, and other supporting computer files are furnished in the Supporting Data Folder.

According to NRCS definitions in NEM, Part 520, Subpart C, *high hazard* dams are those dams located where failure may cause loss of life or serious damage to homes, commercial or industrial buildings, highways or railroads, or important public utilities. This classification must be used if failure may result in loss of human life. Existing and future downstream development including controls for future development must be considered when classifying the dam.

According to NH DES criteria, *high hazard* dams are 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 a 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 materials which qualify as hazardous waste; or any other circumstance which would more likely than not cause one or more deaths.

According to NRCS definitions in NEM, Part 520, Subpart C, a *significant hazard* dam is a dam located in a predominantly rural or agricultural area where failure may cause damage to isolated homes, commercial or industrial buildings, main highways, minor railroads, or interrupt service of relatively important public utilities.

According to NH DES criteria, *significant hazard* dams are in a location and of a size that failure or misoperation of the dam would not result in probable loss of life, but may result in any of the following: major economic loss to structures or property; structural damage to a Class I or II road



which could render the roadway impassable or otherwise interrupt public safety services; or major environmental or public health losses.

According to NRCS definitions in NEM, Part 520, Subpart C, a *low hazard* dam is located in a rural or agricultural area where its failure may cause minor damage to a building, agricultural land, a township or country road that is defined as having an average annual daily traffic (AADT) of 500 vehicles or less and would be overtopped by more than 0.5 foot, or a road or highway that would be overtopped by 0.5 foot or less.

According to NH DES criteria, *low hazard* dams are in a location and of a size that failure or misoperation of the dam would result in no probable loss of life; low economic loss; structural damage to a town or city road or private road other than the dam owner's which could render the road impassable or otherwise interrupt public safety services; the release of liquid industrial, agricultural or commercial wastes, septage, or contaminated sediments if the storage capacity is less than 2 acre-feet and is located more than 250 feet from a water body or water course; or reversible environmental losses to environmentally-sensitive sites.

The dam was designed in 1980 as a *high hazard* (Class C) structure. Based on the inundation mapping presented in Appendix C, and the downstream reconnaissance of the area within the inundation zone, it is recommended that the dam remain classified as a *high hazard* potential (Class I) structure. Sudden failure of the dam during the FBH event impacts considerable downstream dwellings, road crossings/bridges, commercial buildings and other structures, and meets both the loss of life and property damage criteria for a *high hazard* dam.

A total of approximately 265 dwellings and 54 commercial structures were judged to experience flooding of the adjacent ground by a depth of more than 3 feet based on the aforementioned FBH dam failure analysis. The corresponding persons at risk (PAR) assuming an average of 2.5 persons per dwelling and 50 persons per commercial structure is 3,363 persons.

It should be noted that according to the HEC-RAS model results, it will take approximately 20 minutes for a flood wave created by a sudden failure of the dam to reach its peak flood level at the dwellings in the Town of Goshen. There is, therefore, a limited amount of time available to warn people located in the downstream inundation area to evacuate. The dwellings just downstream of the dam may have little warning time.

7. REVIEW OF AVAILABLE GEOTECHNICAL INFORMATION

Available geotechnical information was reviewed with respect to items that are considered in the "*Evaluation of Potential Rehabilitation Projects-Priority Ranking Spreadsheet*". It appears that the design of Sugar River, Site No. D-2 was completed in accordance with SCS/NRCS criteria in effect at the time of the design.



As-Built drawings indicate that the dam is a zoned earthfill dam. Soil gradation results and compatibility analyses between the various zone fills were not available for review. Design criteria for internal drainage and filter material compatibility have changed since the design was completed. There are two zones of embankment materials designated as Zones I and II as depicted on the As-Built Drawings (Sheet 7). Zone I, which consists of the majority of the embankment, is described as silty sand (SM) obtained from the emergency spillway excavation and local borrow area. Zone II material, which is placed just downstream of the chimney drain, is described as sand with silt (SP-SM) and gravel with sand (GP).

The existing drainage system includes a chimney drain with a graded filter consisting of fine and coarse drain aggregate components. The gradation limits of the fine drain material provided on the As-Built Drawings is very similar to that of ASTM C33 Fine Aggregate, which is typically used in modern construction as a fine filter material and is usually an adequate and compatible filter material for most soil gradations. However, the gradation limits for the coarse drain materials for both the chimney drain and outlet drains are broadly graded and may not be compatible with the fine drain material according to current standards. Therefore, fines from the fine drain material could migrate into the coarse drain material. The dam has four outlet drains at various locations along the dam in order to convey drainage from the chimney drain downstream. These outlet drains do not have outlet pipes installed to convey the drainage and rely on gravity to convey the seepage through the drain fill. Although the fine and coarse drain material for this embankment may not be fully compatible per current design standards, it is judged to be a minor concern for this embankment.

The principal spillway and lake drain conduit designs include the now discouraged practice of constructing concrete anti-seep collars within the embankment. Based on the As-Built Drawings, the chimney drain and seepage blanket that were constructed around the principal spillway conduit may meet the current filter diaphragm design requirements in NEH-628, Chapter 45; however, the potential incompatibility of the fine and coarse drain material may not provide an adequate overall filter diaphragm around the principal spillway conduit.

No seepage or slope stability analyses from the original design were available for review. As-Built Drawings indicate that the upstream slope is 3H:1V, and the downstream slope is 2.5H:1V. The table of earth fill requirements in the As-Built Drawings indicates that Zone I embankment fill consists of "SM and SC" soils. No laboratory test results were available for review.

No piezometers were observed at the dam. No discussion of liquefaction susceptibility were included in the record documents. Review comments related to the geotechnical factors in the "*Evaluation of Potential Rehabilitation Projects-Priority Ranking Spreadsheet*" are presented in Appendix F following the Priority Ranking Spreadsheet.



Because the dam is a high hazard structure, subsurface exploration including soil and rock sampling, field permeability testing and laboratory testing are recommended. The following action items are recommended.

1. Geotechnical Analyses
 - a. Shear strength testing of embankment and foundation soils
 - b. Embankment slope stability
 - c. Embankment and foundation seepage, including an evaluation of observed seepage, the potential for uncontrolled/unfiltered seepage, and groundwater influences
 - d. Filter compatibility of internal drain materials
 - e. Susceptibility of the embankment and spillway structures to liquefaction under seismic loading
2. Assess piezometer monitoring needs for the embankment and foundation. Design and install piezometers at appropriate locations, if appropriate.

Potential modifications related to the above items are not included in the rehabilitation alternatives Section 9 or the project costs contained in Section 10.

8. FAILURE AND RISK INDICES

The risk of dam failure and the potential consequences of dam failure were evaluated by completing the “Evaluation of Potential Rehabilitation Projects-Priority Ranking Spreadsheet” (Exhibit 508.1 of the NRCS-National Watershed Manual) to determine whether the dam qualifies for rehabilitation as per Section 508 Subpart E of the National Watershed Manual. Based on the completed spreadsheet shown in Appendix F, the total failure index computed for the dam is 133, with a total risk index of 15,898.

9. DESIGN CRITERIA AND POTENTIAL REHABILITATION ALTERNATIVES

Current deficiencies at the dam that are addressed by the rehabilitation alternatives are limited to overtopping of the dam and early activation of the auxiliary spillway. The rehabilitation alternatives analyzed as part of this assessment are based on the assumption that the existing top of dam elevation is at a constant elevation equal to the original top of dam design elevation.

Modifications modeled with the SITES program to meet current NRCS design criteria include combinations of modifying the principal spillway riser structure, raising the embankment, raising the auxiliary spillway crest elevation, widening the auxiliary spillway, and armoring the embankment so that it could be overtopped. Due to the depth of overtopping, armoring the embankment using articulated concrete block mats (ACBs) to provide overtopping protection appears to be viable. Table 3 provides a summary of the results of SITES runs.



Table 3. Potential Modifications to Bring the Dam into Compliance with NRCS Class C Structure Design Criteria⁽¹⁾

Alternative	Alternative Description	Increase PSW Orifice Width (Feet)	Raise ASW Crest (Feet)	ASW Width (Feet)	Raise Dam Embankment (Feet)	Overtopping Depth (Feet)
1	Modify PSW Riser and Raise Embankment	0.75	0	450	0.88	0
2	Modify PSW Riser and Widen ASW	0.75	0	603	0	0
3	Modify PSW Riser and Armor Embankment	0.75	0	450	0	0.39
4	Raise ASW and Raise Embankment	0	0.45	450	1.29	0
5	Raise ASW and Widen ASW	0	0.45	700	0	0
6	Raise ASW and Armor Embankment	0	0.45	450	0	0.55

(1) Modifications are based on existing top of dam at design Elevation 1248.2.

10. COST ESTIMATES FOR REHABILITATION ALTERNATIVES

Based on preliminary information, planning level cost estimates were prepared for the six rehabilitation alternatives listed in Table 3 and are presented in Table 4. Decommissioning or breaching the dam was included as an alternative in Table 4. The cost estimates presented in Table 4 are based on approximate quantities and construction prices from similar projects.

Combinations and permutations of the alternatives presented in Table 3, and other alternatives can be explored and refined during subsequent planning phases for this project to obtain the most cost effective solution. Substantial cost reductions could be realized by more detailed investigations or further refinement. For example, a combination of widening the auxiliary spillway and raising the dam to achieve a balance of materials can be evaluated. A detailed survey of the top of dam will likely show that it has not settled as much as anticipated by the overbuild, resulting in less fill needed to raise the dam. The 25-foot-wide crest of the dam is wider than normal and may accommodate a minor raising of the embankment. As an alternative to raising the dam embankment, a concrete curb wall could be considered to achieve the required 0.88-foot or 1.29-foot increase in dam height.



Table 4. Planning-Level Cost Estimates for Modifications to Bring Dam into Compliance with NRCS Class C Design Criteria⁽¹⁾

Alternative	Alternative Description	Estimated Total Project Cost
1	Modify PSW Riser ⁽²⁾ and Raise Embankment	\$500,000
2	Modify PSW Riser ⁽²⁾ and Widen ASW	\$2,700,000
3	Modify PSW Riser ⁽²⁾ and Armor Embankment with ACBs	\$6,200,000
4	Raise ASW and Embankment	\$1,000,000
5	Raise ASW and Widen ASW	\$6,100,000
6	Raise ASW and Armor Embankment with ACBs	\$6,500,000
7	Decommission/Breach Dam	\$1,300,000

- (1) Section 3 provides a description of recommended maintenance items at the dam and Section 7 provides a description of design features at the dam that require further evaluation to determine compliance with current NRCS design criteria. The above items and features are not included in the rehabilitation alternatives or project costs.
- (2) In lieu of modifying the PSW riser structure, obtaining a variance from the NRCS for the 10-day drawdown criteria could be pursued. This would result in minimal reductions in the estimated total project costs provided in Table 4.

11. ENVIRONMENTAL CONSIDERATIONS

Permits for this type of dam rehabilitation project may include and not be limited to the following:

1. New Hampshire DES Wetlands Permit
2. New Hampshire DES Dam Permit (required for construction or reconstruction)
3. New Hampshire DES Section 401 WQC Permit
4. United States Army Corps of Engineers (USACE) Section 404 Permit (Programmatic General Permit [PGP] for Minor/Major Impact Projects or an Individual Permit)
5. United States Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Construction Storm Water Permit

Besides wetlands/waterways, dam, and NPDES/storm water issues, coordination with the New Hampshire Fish and Game Department (NHFWD), New Hampshire Natural Heritage Bureau (NHNHB), and U.S. Fish and Wildlife Service (USFWS) will be required during the permitting process to identify any potential impacts to state or federally-listed threatened or endangered



species. Coordination with the New Hampshire State Historical Preservation Officer (SHPO) is also required as part of the permitting process to identify any potential impacts to known archeological or historical resources within the project area.

An on-site pre-application meeting is strongly recommended by New Hampshire DES, EPA, and the USACE to review and discuss the proposed project with the appropriate regulatory agencies and the project team. The Sullivan County Conservation District, Goshen Town Conservation Commission, and Goshen Town Clerk should be invited to attend the pre-application meeting. To facilitate the review process, the regulatory agencies should be provided with a packet of information prior to the meeting. The packet should include project activities, anticipated impacts, and a summary of environmental reports prepared for the proposed project. The meeting will provide the regulatory agencies and project team with an opportunity to do the following:

1. Review the project study area
2. Discuss the proposed project and any potential environmental impacts
3. Review the requirements for project authorization
4. Provide time to address any new issues or challenges that were not anticipated
5. Provide a record of action

12. CONCLUSIONS AND RECOMMENDATIONS

1. ***Operations and Maintenance.*** Recommended maintenance items include mowing the upstream slope, downstream slope and auxiliary spillway; removing woody vegetation growing in the riprap on the upstream slope, downstream gutters, auxiliary spillway slopes, and auxiliary spillway rock dike; filling and seeding the eroded footpath on left downstream slope; repairing the broken stem guide; repairing the fence surrounding the plunge pool; and repairing cracks and exposed reinforcement on the principal spillway conduit outlet and concrete cradle. Seepage through Outlet Drain 2 should be monitored. Removing debris from the principal spillway riser structure and trash racks should continue on a routine basis. It is recommended that video inspection of the interior of the principal spillway conduit be performed.
2. ***Hazard Classification Evaluation.*** Based on the inundation mapping prepared as part of this study and the downstream reconnaissance of the area within the inundation zone, it is recommended that the dam remain classified as a high hazard structure. Sudden failure of the dam during the FBH event impacts considerable downstream dwellings, road crossings/bridges, commercial buildings and other structures, and meets both the loss of life and property damage criteria for a high hazard dam.
3. ***Design Deficiencies.*** Sugar River Site D-2 Dam does not meet current NRCS design criteria for a Class C (*high hazard*) structure. Design deficiencies identified during this



assessment show that the dam would be overtopped by 0.39 feet during passage of the 6-hr Freeboard Hydrograph and the auxiliary spillway crest needs to be raised 0.45 feet in order to meet Principal Spillway Hydrograph criteria. Other deficiencies may exist related to geotechnical issues with the embankment or features that were not inspected.

4. ***Failure and Risk Indexes.*** Based on the completed Evaluation of Potential Rehabilitation Projects-Priority Ranking Spreadsheet shown in Appendix F, the total failure index computed for the dam is 133, with a total risk index of 15,898.
5. ***Rehabilitation Project and Recommended Additional Investigations.*** Modifications appear to be needed to bring the dam into compliance with current NRCS high hazard dam design criteria. Current deficiencies at the dam that are addressed by the rehabilitation alternatives are limited to overtopping of the dam and early activation of the auxiliary spillway. Of the alternatives listed in Table 4, a combination of modifying the principal spillway riser structure and raising the dam appears to offer the best value. A planning level total project cost to make structural modifications to the dam to meet current NRCS design criteria without compromising current flood control benefits is estimated at \$500,000. It is anticipated that cost reductions could be realized by more detailed investigations or further refinement of the rehabilitation alternatives. The rehabilitation alternatives presented in this report do not address other potential dam safety deficiencies that may exist at the site, which are described in Section 7, along with recommended additional investigations and analyses.

APPENDIX G:

FEMA Approvals and Town Adoption of Hazard Mitigation Plan

**Town of Goshen, New Hampshire
Board of Selectmen
A Resolution Adopting the Goshen Hazard Mitigation Plan Update 2026**

WHEREAS, the Town of Goshen 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 April-July 2026 and then presented to the Board of Selectmen for review and discussion on _____, 2026; and

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

WHEREAS, the Board of Selectmen held a public meeting on _____ 2026 to formally approve and adopt the Goshen Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Goshen Board of Selectmen adopt the Goshen Hazard Mitigation Plan Update 2026.

TOWN OF GOSHEN BOARD OF SELECTMEN

Chair

Member

Member

Member

