

NATURAL HAZARDS

I. INTRODUCTION

In 1991 the Hebron Board of Selectmen appointed a Hazard Mitigation Planning Committee (HMPC) who, with the assistance of the Lakes Region Planning Commission (LRPC), worked to develop a hazard mitigation plan. The full *Hebron Hazard Mitigation Plan* was accepted in 1992 and is available at the Town Hall. The sections of the plan that relate most closely to land use are included in this chapter.

“Natural hazard mitigation planning is the process of figuring out how to reduce or eliminate the loss of life and property damage resulting from natural hazards such as floods, earthquakes, and tornadoes.”

The planning process involves understanding vulnerability (what is open to damage) and risk (possibility of loss) and creating a plan to reduce the potential for loss. Working with the list of natural hazards affecting New Hampshire, provided in *Hazard Mitigation Planning for New Hampshire Communities*, the Hebron Hazard Mitigation Planning Committee (HMPC) addressed those hazards in which the community has suffered losses in the past. Based on historical events and local knowledge of the community the HMPC identified the following hazards, which serve as the focus of this plan: 1) flooding; 2) forest fires; and 3) winter storms including both ice and snow.

The average temperature in the Hebron area varies from 19.7 degrees Fahrenheit in January to 70.0 degrees Fahrenheit in July. The average annual precipitation is 42.0 inches. New Hampshire is in a 160-mph wind zone; the majority of the southern half of the State of New Hampshire (including all of Grafton County) is located in a hurricane susceptible region. While all hazards represent a potential threat to the community, the frequency of occurrence and the potential for damage were the leading factors that ranked flooding, forest fires, and severe winter weather of greatest concern to the community.

II. TOWN OF HEBRON MITIGATION GOALS

- To improve the level of protection of the health, safety, and wellbeing of all Hebron community members.
- To maintain and improve the existing emergency response system.
- To reduce the potential impact of natural and man-made disasters on public and private property in the community.
- To gain a greater understanding of the alternatives available for the implementation of cost-effective hazard mitigation opportunities.
- To work in cooperation with the State of New Hampshire’s Hazard Mitigation goals.
- To maintain compatibility with the goals of the Master Plan.

III. NATURAL HAZARDS RISK ASSESSMENT

The NH Office of Emergency Management (OEM) has identified vulnerabilities to natural hazard events generalized on a county by county basis for the state as shown in the table below for Grafton County. The table represents the many natural hazards that may occur in any area and ranks them according to high, moderate, low, or no vulnerability. Many of these hazards impact large geographic areas and will effect multiple communities or entire regions of the State.

TABLE 4-1

Grafton County Natural Hazards Vulnerability

Natural Hazards	High	Moderate	Low	None
	Flood	Drought	Subsidence	Storm Surge
	Wildfire	Extreme Heat	Hurricane	Tsunami
	Nor'Easter	Earthquake	Avalanche	
	Heavy Snow	Landslide		
	Ice Storms	Radon		
		Downburst		
		Lightning		
		Hail		

Source: New Hampshire Office of Emergency Management

Individually, communities may incur greater losses due to hazardous events based on topography and other physical characteristics, land use, building codes, and zoning.

As a starting point for defining hazard mitigation strategies, the HMPC used the above list of Grafton County hazards in the vulnerability table to evaluate and rank the most significant hazards for the Town of Hebron. The goal was to create a more limited list of specific hazards for which the Town could begin hazard planning. The Town of Hebron Risk Assessment Matrix was developed based on historical references to hazard events, and community knowledge of the difficulties encountered in dealing with various hazards.

TABLE 4-2

Town of Hebron Risk Assessment Matrix

Flooding	3
Woodland Fires	3
Severe Winter Weather	3
Earthquake	2
High Wind Events	2
Lightning	1
Drought	1
Radon	1
Hail	1
Extreme Heat	1

The hazards were ranked on a scale of 1-3 as follows: 1 (low risk), 2 (moderate risk), and 3 (high risk). Ranks were determined by adding a point for each of the following three criterion: magnitude, frequency and area impacted. For example, woodland fires are rated a 3 in the assessment matrix, one point for each of the three criteria. Woodland fires compared to other hazard events, are of greater magnitude (magnitude = 1 point) and occur relatively more frequently (frequency =1 point), and while massive wildfires are uncommon in Hebron, more than 80% of Hebron is wooded, thus the potential impact area is vast (area impacted = 1 point). In contrast, drought ranked only one point for the area impacted because when droughts occur in the northeast the effects are widespread. However, the Town is not dependent on water for large agricultural uses, snow making, or other high water consumption industries and, compared to other hazards the frequency of a drought event was considered to be low.

It should be noted, that the ranking of individual hazards for planning purposes should not in any way diminish the potential severity of the impact of any given hazard event. Further, hazards ranked as low risk may have the impact of increasing the risk of other hazards when they occur. For example, in the event of a drought, the risk of a woodland fire may be greater. The following describes in more detail past and potential future hazard events and the vulnerability for each of the high and moderate hazards identified in the risk table.

A. Flooding - High Risk

Specific areas of concern- Cockermouth River, Georges Brook, "The Flats", FIRM Identified Floodplain, Steep Slopes.

Hebron has participated in the National Flood Insurance Program (NFIP) since 1975. There are currently five properties located in the floodplain and four property owners in the community that carry NFIP policies. There has been one claim filed since 1978 for flood related damages, for which NFIP paid a total of \$19,816. There have been no repetitive losses in Hebron.

Both the Cockermouth River and Georges Brook have been subjected to perennial and flash flooding that has resulted in road closures, varying degrees of erosion, and loss of property use. The flooding on these watercourses can occur at any time of the year and is typically caused by periods of heavy rainfall or excessive snowmelt. The HMPC has delineated specific areas of concern on these watercourses and the locations of past flooding events, as indicated on the Potential Fire and Flooding Hazards Map (in full *Hazard Mitigation Plan* document).

Concern about flooding on the Cockermouth led to the Town purchase of land adjacent to the Braley Bridge in the 1950's. At that time, work was undertaken to restore the meandering river to its historic course. Later in 1973 the Town obtained a wetlands permit to maintain approximately 1.5 miles of the river upstream of the Braley Bridge. In the 1990's flooding increasing in frequency and in magnitude has led to the loss of road access in the area of North Shore Road called "The Flats". In periods of heavy rain and or snowmelt this low-lying section of the North Shore Road is completely covered with as much as two feet of water.

In the upper reaches of Georges Brook, the steep slopes that funnel water through the brook greatly increase the velocity of flow east of NH Route 3A. During storm events the volume of flow had been too great for the box culvert beneath NH Route 3A to handle, so the New Hampshire Department of Transportation reconstructed the culvert on NH Route 3A to handle the excess flow. A State Hazard

Mitigation Grant was used in 2001 to replace the box culvert on Georges Road. As recently as 1998, emergency response vehicles have been prevented from passing due to road flooding. Changes in the watercourse on the lower reaches of Georges Brook have resulted in loss of property use where farm fields have remained consistently wet and impassible by tractor.

B. Other Flooding Concerns

The HMPC identified areas on the Cockermouth River and Georges Brook where beaver damming has been a persistent problem for property owners. The active beavers have effectively stopped culverts, affecting drainage and stream flow, which has resulted in the change of stream course and loss of productivity of farmlands. As a result of this activity those lands remain habitually flooded. Action is being taken to trap and remove the beavers. It is suggested that after removal, the existing beaver dams should be removed. As a result of heavy rainfall over a prolonged period of time, a committee member reported that the Newfound Lake waters have recently risen five feet over the course of several hours. The result of the rapid rise was that boats were torn from their moorings and docks. Many boats were overturned, causing fuels to be introduced into the lake. Another concern expressed by HMPC members is the amount of debris that is located in the streams and along stream banks. The debris is in part a result of the beaver activity, but is also noted in areas absent of active beavers. The concern is that the debris can significantly reduce the natural capacity of the stream and increase the magnitude of flooding and the number of areas prone to flooding.

New Hampshire Department of Environmental Services (NH DES) lists three dam sites in the town of Hebron, all of which are rated Class AA, non-hazardous structures. Class AA dams are those structures in which a dam failure would not threaten life or property. The NH DES, Water Division, on six-year intervals, inspects dams of this classification. After inspection the dam owner is requested to complete any repairs needed to maintain the dam in safe working order. The HMPC felt it important to recognize these dams and their ongoing inspections.

TABLE 4-3

Class AA Dams in Hebron

Dam Name	Height	Length	Impoundment Area
Jackson Pond Dam	6'	50'	.10 acres
Spectacle Pond South Dike	5'	110'	58 acres
Tannery Brook	12'	100'	0.30 acres

Given the prevalence of moderate and steeply sloped land in Hebron and the rate of residential development in recent years, efforts should be taken to avoid intensifying the flood potential in flood sensitive areas within the community. Both steep slopes and special flood hazard areas are currently addressed in the Town of Hebron Subdivision Regulations. Soils-based lot sizing for sloped developments and storm water management plans both have the ability to help minimize the impact of increased runoff due to development. Careful monitoring of the impacts of future development on flood sensitive areas is warranted.

C. Woodland Fires – High Risk

Specific areas of concern: Town-delineated limited access areas, future development in woodland areas.

The HMPC identified the steep wooded slopes shown on the *Potential Fire and Flooding Hazards Map* (in full *Hazard Mitigation Plan* document) as areas where the lack of road access makes fire fighting difficult. Because significant debris remains in the woods from the ice storm in 1998, fire danger is greatly increased. A 1998 lightning strike on Hobart Hill caused a four-acre fire that was fought by local fire fighters over a one-week period of time. State Grants for mitigation projects have been used to open Wade Road (to Hunt Road), Stokes Road, Veasey Road (to Hobart Hill), Cilley Road, and Tenney Lane to increase fire-fighting capacity. The Town has also used grant funding for the purchase of woodland fire-fighting equipment. These unimproved roadways represent important, and in many cases, the only access corridors for use in the event of woodland fire. A community commitment towards insuring that these access ways remain unobstructed may aid in minimizing losses associated with woodland fires by preserving fire-fighting accessibility.

Another area of potential concern are developments in close proximity to large tracts of woodland. Known as urban wildfire interface, vulnerability to fire can be greatly reduced by requiring developments to establish readily accessible water sources for fire suppression if non existent on site. Firebreaks act to prevent damage to buildings and timber stands from fire as well. Firebreaks consist of a strip of mowed grass or fire-retarding vegetation that provide a natural barrier between developed areas and timber stands. The need for added fire protection measures can be addressed through the Planning Board in the site plan review

process, by allowing the Fire Chief to provide comment on development proposals in close proximity to inaccessible or limited access timber stands.

While historically massive wildfires have been a Western phenomena, each year hundreds of woodland acres burn in New Hampshire. The greatest risk exists in the spring after the snow has melted and before the tree canopy has developed and in the late summer/early fall. Appropriate planning can significantly reduce a community's vulnerability to woodland fires.

D. Severe Winter Weather – High

Specific areas of concern: Town-wide, elderly population, critical facilities

As in all New Hampshire towns, Hebron is susceptible to extreme winter weather, including heavy snow, ice storms, and extreme cold. The Town's aging population and its rural setting put it at greater risk from extreme winter weather. A leading concern with winter storms is the potential for long periods of power outage. It was generally agreed that enhancing existing facilities could provide a greater level of community aid during winter events.

New Hampshire generally experiences one or two Nor'Easters with varying degrees of severity each year. These storms have the potential to inflict more damage than many hurricanes because high winds can last from 12 hours to 3 days, while the duration of a hurricane ranges from 6 to 12 hours. Infrastructure, including critical facilities, may be impacted and power outages and transportation disruptions are often associated with these events. In the winter months, the State may experience the additional coincidence of blizzard conditions with many of these events. The added impact of the masses of snow and/or ice upon infrastructure often affects transportation and the delivery of goods and services for extended periods of time.

Other areas of concern regarding snow and ice are the ledges on West Shore Road. Here the road narrows as it passes by the Lake and some very prominent rock ledge. This stretch of road has been subjected to falling snow pack and ice in the past. West Shore Road serves as a primary access route in Hebron. The ledges represent a potential hazard for motorists passing by and the potential exists that the roadway could become blocked as it has in the past.

Given the relative frequency of severe winter weather in the Northeast, great pride is taken in the availability of equipment and manpower to clean up after these

events. Equally as important as an expeditious recovery from severe winter events is the need for adequate safety during and after the event. Safety factors include the identification/provision of emergency fuel supplies, adequate power generation and structurally sound critical facilities, and the ability to communicate among all Town departments and to residents in the more remote areas in the community.

IV. EXISTING POLICIES AND REGULATIONS

The Town of Hebron has a variety of mitigation policies and regulations in place that protects people and property from natural hazards.

1. **Zoning Ordinance:** National Flood Insurance Program (NFIP) requirements have been adopted in the Town’s zoning ordinance. The current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) were revised May 18, 1998.
2. **Emergency Preparedness Plan:** The Town maintains an Emergency Preparedness Plan.
3. **Permits System:** The Town has an “intent to build” permit system that is administered by the Board of Selectmen. Though no official building codes have been adopted, application review affords the Town the ability to take hazards into consideration prior to construction.
4. **Emergency Power Generation:** Emergency power generation exists in the fire station; this source additionally supplies emergency power to the Congregational Church. Both facilities have been identified as critical facilities.
5. **Hazard Mitigation Grant Program:** The Town has applied for and received past Hazard Mitigation Program Grants.
6. **Subdivision Regulations:**
 - Contain soil-based lot size requirements for subdivision of sloped land, which aids in minimizing the impact of development in terms of storm water management, erosion, and potential flooding.
 - Identify and further restrict the subdivision of land in the delineated special flood hazard area.
 - Limit the grade of roads to 10 percent, unless the Board of Selectmen and the Planning Board grant approval.
7. **Site Plan Regulations:**
 - Require the site plans to contain surface water locations and surface and subsurface drainage facilities. This information can be useful in making determinations regarding on-site and off-site flooding issues and the availability of fire protection measures.

V. HMPC RECOMMENDATIONS

Hazard mitigation planning should be ongoing in Hebron. The following long-term recommendations will require additional study:

1. Coordination with the State to gain a better understanding of water level controls on Newfound Lake and early warning measures that could be taken to minimize property and environmental damage caused by rapid rises in water levels.
2. Identification of actions that could be taken by the Town and owners on property in the floodplain that would reduce the potential for property and environmental damage caused by future hazard events.
3. Monitoring and further assessment of the impacts and solutions for flooding that causes road closures in the areas identified in the flood hazard section of this plan.
4. Coordination with the Planning Board to ensure all opportunities to address erosion control, fire access and prevention measures, and storm water management are being addressed for future development occurring in sloped and woodland areas.
5. Consideration given to the benefits of establishing a building code as it relates to reductions in potential future property damage caused by natural hazards.
6. Further analysis of building vulnerability to hazards which may include a critical facilities snow load assessment and general safety assessment addressing such issues as the placement of propane tanks, outdoor electrical wires, etc.
7. Creation of a natural hazards chapter in the Master Plan. Adoption of this plan by the Planning Board could provide the basis for a Master Plan mitigation chapter that would support planning efforts as future development occurs.
8. Subdivision regulations and zoning ordinances can be enhanced to include fire and flood hazard mitigation requirements.
9. Implementation of this Plan's mitigation goals could possibly be linked to the costs of future development through the Town's Capital Improvements Program (CIP) and impact fee schedule. For example, with an impact fee schedule, the improvement of a class VI road for fire fighting accessibility that has been identified in the CIP, increases the potential to collect for off-site improvements.