

# **TOWN OF BARNSTEAD, NH**

## **Hazard Mitigation Plan Update 2019**



*2008: DARYL CARLSON/CITIZEN PHOTO A tornado that touched down between Alton and Barnstead along Rte 28 caused major damage, ripping trees down, blocking roads and caused damage to homes throughout the region.*

**Town Adoption Date: June 4, 2019**  
**FEMA Approval Date: June 18, 2019**

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### ACRONYMS

APPENDIX A	Hazard Mitigation Resources
APPENDIX B	Documentation of Planning Process
APPENDIX C	Approval Letter from FEMA

Original Edition: 2013  
2019 Update Edition: June 4, 2019

## Chapter 1 INTRODUCTION

### Authority

This Hazard Mitigation Plan was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA), Section 322, Mitigation Planning. Accordingly, this Hazard Mitigation Plan will be referred to as the “Plan”.

### Funding Source

This Plan was funded by the NH Homeland Security and Emergency Management (HSEM) through a Pre-Disaster Mitigation (PDM) grant, with matching funds by the Town of Barnstead.

### Purpose

This Hazard Mitigation Plan is a planning tool to be used by the Town of Barnstead, as well as other local, state and federal governments, in their effort to reduce the effects from natural and man-made hazards.

### Introduction

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

- Establish a national disaster hazard 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 hazard mitigation funding that will assist State 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 of receiving Hazard Mitigation Assistance (HMA) grants.** Local governments must review and if necessary, update the mitigation plan every five years to continue program eligibility. However, it is recommended that this Plan be reviewed/updated annually or after a hazard event to be consistent with Chapter 7.

### Why Develop a Mitigation Plan?

The full cost of the damage resulting from natural hazards – personal suffering, loss of lives, disruption of the economy, loss of tax base – is difficult to measure. Our State is subject to many types of natural hazards: floods, hurricanes, severe winter weather, earthquakes, tornadoes, downbursts, and wildfires, all of which can have significant economic and social impacts. Some, such as hurricanes, are seasonal and strike in predictable locations. Others, such as floods, can occur anytime of the year and almost anywhere in the State.

## Scope of the Plan

The scope of this Plan includes the identification of natural hazards affecting the town, as identified by the Hazard Mitigation Planning Committee. The hazards reviewed under the scope of this plan include the relevant hazard that are outlined in the State of New Hampshire's Multi-Hazard Mitigation Plan Update 2018. Some hazards identified in the State Plan were deemed not applicable to the Town of Barnstead (Avalanche, Extreme Cold, Infectious Disease, Landslide and Solar Storms)

**Dam Failure  
Drought  
Extreme Heat  
Earthquake**

**Flooding  
Human Caused  
Hurricane  
Lightning**

**Severe Wind  
Winter Weather  
Wild/Forest Fire**

## Methodology

During the 2019 Update, the Hazard Mitigation Planning Committee with the assistance of Hubbard Consulting LLC held a total of 5 meetings on November 7, 2018, November 19, 2018, December 19, 2018, January 9, 2019 and February 20, 2019. Public notices were posted at the Town Hall, Library and 2 Post Offices inviting members of all town departments and boards, surrounding communities, businesses, academia, State agencies and non-profit agencies. In addition, email notifications were sent to adjacent communities, the Lakes Region Planning Commission, the Chamber of Commerce and the NH HSEM. There were no members of the general public that attended the committee meetings. The Emergency Management Directors from surrounding towns were notified of the Plan Update and asked to comment on the Plan (see Appendix B). The committee analyzed and revised the following sections of the Plan and provided input to update them: Chapters 1, 2, 3, 4, 5, 6 and 7. After acceptance by the committee, the Plan was submitted to the NH HSEM for formal Approval. The Board of Selectmen formally adopted the plan on June 4, 2019. FEMA approved the plan on June 18, 2019.

The committee developed this Plan as a result of the above meetings and the following planning process.

### Step 1: Form a Hazard Mitigation Planning Committee

Prior to the first public information meeting the Emergency Management Director contacted town department heads to serve on the committee. In addition, a press release was published in the Town Office, Library, Fire Department and Police Department inviting residents, businesses, neighboring communities, academia and other private non-profit interests to participate in the planning process. Finally, an email invitation was sent to EMDs of surrounding towns, State Agencies, Regional Planning Commission and the local Chamber of Commerce (See Appendix B). The Committee Members consisted of town and school staff.

### Step 2: Set Hazard Mitigation Goals and Objectives

At the first working meeting the committee reviewed and made minor revisions to the town's Hazard Mitigation Goals. The Hazard Mitigation Goals were adapted from the State's Multi-Hazard Mitigation Plan Update 2013. This first step is extremely important in helping the committee understand the purpose of the Plan and the direction it should go. (See the end of this chapter for the "Hazard Mitigation Goals of the Town of Barnstead, NH".)

### Step 3: Hazard Identification

The Committee members identified natural hazards and human-caused hazards that have or could potentially affect the Town of Barnstead. The results of this step can be found in Chapters 2 and 3.

### Step 4: Critical Facilities Analysis

The committee members updated the Critical Facilities List for the town. The Critical Facilities List is divided into 3 sections: Facilities needed for Emergency Response; Facilities not necessary for emergency response; and places and populations to protect in the event of a disaster. The results of this step can be found in Chapter 4.

### Step 5: Capability Assessment

The committee members identified what plans and policies are already in place to reduce the effects of hazards. The results of this step can be found in Chapter 5. Many of these plans and technical reports were reviewed and incorporated during the planning process, including the Barnstead Emergency Operations Plan and the Barnstead Master Plan.

### Step 6: Develop Objectives

The Committee identified "Problem Statements" for each of the hazards identified earlier in the planning process. All of the hazards have at least one problem statement associated with them (See Problem Statement in Appendix B). These problem statements were then utilized as objectives in developing mitigation projects, as described in the next step.

### Step 7: Develop Specific Mitigation Measures

As a result of the problem statements identified in step 6, the committee brainstormed specific projects or mitigation measures to address each hazard. The Committee Members used the "*Mitigation Project Identification Worksheet*", as shown in Appendix B, to identify mitigation projects that directly address the hazards affecting the community. Finally, the committee prioritized the top priority projects and listed them in the Mitigation Action Plan found at the end of Chapter 6.

### Step 8: Adopt and Implement the Plan

After acceptance by the committee the Plan was submitted to the NH Homeland Security and Emergency Management for formal Approval. The Board of

Selectmen formally adopted the Plan on June 4, 2019. The letter of approval from FEMA can be found in Appendix C.

With respect to any ongoing mitigation projects, the lead and support agencies/people for such activity will be tasked with implementing the Plan's mitigation projects. The committee approved the "Prioritized Mitigation Projects" list, which identifies responsibility, funding/support and a timeframe for each of the prioritized projects. The Emergency Management Director should be tasked with requesting annual reports as to the progress of each project.

#### Step 9: Monitor and Update the Plan

It is important that this plan be monitored and updated annually or after a presidentially declared disaster. Chapter 7 specifically addresses this issue.

## ***Hazard Mitigation Goals Town of Barnstead, NH***

During the 2019 update, the Committee reviewed the 2013 Barnstead Hazard Mitigation Plan goals and made no revisions. The Goals were not modified for any substantial content, as there has not been any substantial change in development. The goals for the Town of Barnstead are as follows:

1. To improve upon the protection of the general population, the citizens of the Town of Barnstead and guests, from natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Barnstead's:
  - Emergency Response Capability
  - Critical Facilities
  - Infrastructure
  - Private property
  - Economy
  - Natural environment
  - Historic treasures
3. To improve the Town of Barnstead's:
  - a. Emergency preparedness and communication network.
  - b. Disaster response and recovery capability.
4. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives.
5. To work in cooperation with the State of New Hampshire's Hazard Mitigation Goals, including:
  - a. Development of a Continuity of Operations / Government Plan.
  - b. Consideration of climate change in future planning.

## Hazard Mitigation Planning Committee 2019

The Barnstead Hazard Mitigation Committee was comprised of the following individuals who met from November 2018 to February 2019.

<b>Name</b>	<b>Title/Affiliation</b>
Andrew Sylvester	Barnstead Road Agent
Brian Cochrane	SAU Superintendent
Jane Hubbard	Hubbard Consulting LLC
Jason Leavitt	Barnstead Deputy EMD
John Beland	Winnepesaukee Public Health Network
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Priscilla Tiede	Barnstead Selectman
Rick Duane	Barnstead Selectmen
Shawn Mulcahy	Barnstead Fire Department
Sean Dunn	Barnstead Selectmen
Tim Rice	Barnstead Elementary School Principal
Wayne Santos	Barnstead Emergency Management Director

The committee members listed above participated in monthly committee meetings, provided departmental information, contributed in their field of expertise, reviewed and commented on committee meeting minutes, reviewed drafts of the Plan and worked together to identify and prioritize mitigation projects.

*Many thanks to all the hard work and effort from each and every one of you.  
This plan would not exist without your knowledge and experience.*

*Thank you!*

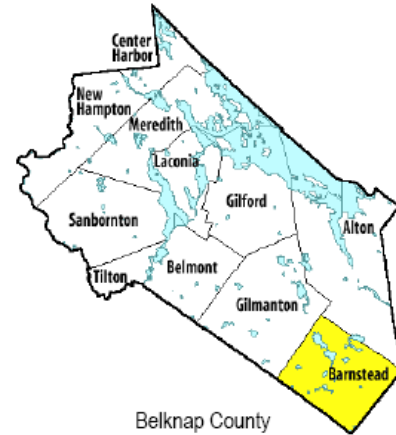


## Chapter 2 COMMUNITY PROFILE

### Community Description

The Town of Barnstead is located in Belknap County in southeastern New Hampshire. Barnstead is a community governed by a 5 member Board of Selectmen, with a population of over 4,400 people. The town is predominantly a residential community with some commercial businesses, primarily established on Route 28.

According to the NH Employment Security, "Population change for Barnstead totaled 3,743 over 50 years, from 850 in 1960 to 4,593 in 2010. The largest decennial percent change was between 1970 and 1980, when the population increased by 105 percent, more than doubling the population in those ten years. The 2017 Census estimate for Barnstead was 4,639 residents, which ranked 78<sup>th</sup> among New Hampshire's incorporated cities and towns."



### National Flood Insurance Program (NFIP)

Floodplains for this Plan are defined as the 100-year and 500-year flood hazard zones, as depicted on the April 2, 1986 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM). Barnstead has participated in the National Flood Insurance Program (NFIP) administered by FEMA, since January 10, 1979. In order to enable landowners to qualify for federally insured flood insurance, the Town, in its administration of site plan review, subdivision regulations and zoning, must regulate development in the floodplain using federal standards.

The Town's existing ordinance meets the minimum requirements of the NFIP, according to the latest Community Assistance Visit. The Town will continue to maintain procedures and regulations that are in compliance with the NFIP by conducting Community Assistance Visits (CAVs) and Community Assistance Contacts (CAC) with the Office of Strategic Initiative (OSI) and updating the Floodplain Ordinance as federal requirements are updated. The last CAV was conducted on September 20, 2005 and a workshop to review new draft NFIP maps was held on July 12, 2018. The Town will continue to hold CAVs/CACs with OSI in the future. In addition, the Town provides NFIP brochures in Town facilities frequented by the public.

Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses
Single Family	5	\$4,270	\$1,419,900	5	\$60,076
All other Residential	1	\$262	\$20,000	0	\$0
Non-Residential	0	\$0	\$0	0	\$0
<b>Total</b>	<b>6</b>	<b>\$4,532</b>	<b>\$1,439,900</b>	<b>5</b>	<b>\$60,076</b>

## Disaster Risk

Barnstead is prone to a variety of natural hazards. These include: flooding, dam breach, severe wind, wildfire, drought, earthquake, hurricane, lightning strikes, extreme heat and severe winter weather, in addition to man-made hazards. The following tables summarize the impact and probability of natural and man-made hazards.

Natural Hazards	Human Impact	Property Impact	Business Impact	Severity	Probability In 25 years	Risk <i>Severity x Probability</i>
	Probability of death or injury 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	Physical loss damage 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	Interruption of service 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	<i>Avg. of Human / Property / Business</i>	Likelihood this will occur 0: Improbable 1: Remote 2: Occasional 3: Probable 4: Frequent	0-3: Low 4-6: Moderate 7-9: High 10-12: Severe
Severe Winter Weather	2	2	2	2	4	8
Flood	1	2	2	1.7	4	6.8
Severe Wind (Tornado/ Downburst)	2	2	2	2	3	6
Lightning	1	2	1	1.3	4	5.2
Drought	1	2	2	1.7	3	4.2
Hurricane	1	2	1	1.3	3	3.9
Wild/Forest Fire	1	2	1	1.3	3	3.9
Earthquake	3	3	3	3	1	3
Dam Failure	2	2	2	2	1	2
Extreme Heat	1	0	1	.66	3	1.98

\*Probability Terms are defined as:

Improbable: Not likely to occur in any 25 year period.  
 Remote: Less than 1% probability in the next 25 year period.  
 Occasional: Between 1% and 50% probability in the next 25 year period.  
 Probable: Between 50% and 99% probability in the next 25 year period.  
 Frequent: Near 100% probability in the next year.

Human Caused Hazards	Human Impact	Property Impact	Business Impact	Severity	Probability* In 25 years	Risk Severity x Probability
	Probability of death or injury 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	Physical loss damage 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	Interruption of service 0: n/a 1: Low 2: Moderate 3: High 4: Catastrophic	Avg. of Human / Property / Business	Likelihood this will occur 0: Improbable 1: Remote 2: Occasional 3: Probable 4: Frequent	0-3: Low 4-6: Moderate 7-9: High 10-12: Severe
Haz Mat (Transport)	3	2	2	2.3	3	6.9
Mass Casualty (Trauma or Medical)	3	1	2	2	3	6
Utility Interruption	1	1	2	1.3	4	5.2
Armed Attack (assault, sniper)	4	2	2	2.6	2	5.2
Transport Incident (plane, bus, etc.)	1	1	1	1	3	3
Haz Mat (Fixed)	1	1	1	1	2	2
Terrorist Attack (WMD)	3	2	1	2	1	2
Biological Terrorism	3	1	1	1.6	1	1.6
Radiological Release	2	1	2	1.6	1	1.6
Urban Fire	2	2	1	1.6	1	1.6
Civil Disorder	1	1	1	1	1	1

The following Hazards as Identified in the State of NH Multi Hazard Mitigation Plan 2018 were not included in this Plan.

Avalanche: The topography of the town is not conducive to avalanche.  
 Extreme Cold: The town considers extreme cold temperatures under severe winter weather and the community has not seen extreme cold with significant impact.  
 Infectious Disease: The town is already a part of a Public Health Network which prepares, responds to and mitigates infectious disease.  
 Landslide: The topography of the town is not conducive to landslide.  
 Solar Storms: The town does not feel it can actually mitigate this hazard.

## CALCULATING POTENTIAL LOSS

It is difficult to determine the amount of damage that could be caused by natural or human-caused hazards because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. Therefore, to calculate potential economic loss, we have assumed that structures impacted by hazards could result in damage of either 1% or 5% of the assessed value.

Based on this assumption, the potential loss from any of the identified hazards would range from \$5,947,804 (1%) or \$29,739,022 (5%) based on the 2018 town valuations which lists the Town wide assessed values to be \$594,780,446 (including the tax exemptions). Human loss of life was not included in the potential loss estimates, but could be expected to occur, depending on the severity and type of the hazard.

TOWN WIDE ASSESSED VALUES			
Type	2018 Value	1% Damage	5% Damage
Land	218,112,014	2,181,120	10,905,601
Buildings	368,677,800	3,686,778	18,433,890
Electric Plants	5,410,600	54,106	270,530
Water Company	3,955,032	39,550	197,752
<b>Total</b>	<b>\$596,155,446</b>	<b>\$5,961,554</b>	<b>\$29,807,773</b>
<i>Source: NH DRA 2018 MS-1</i>			

## Development Trends

In the 2002 Master Plan a number of changes to the Zoning ordinance were proposed which have since been approved by voters. These include a separate suburban district, a village district, the addition of the former mill complex to the commercial zone, and a table of permitted uses. After 96 building permits were issued in 2001 and 75 in 2002 a growth management ordinance was voted in to limit the number of new housing units to ensure that all the town government and facilities could manage the increased population.

Barnstead is now divided into four zoning districts: a commercial district that was established along the Route 28 corridor and includes the Barnstead Business Park. There are two village districts at the Parade and in the Center. The Locke Lake Colony along with a few small other areas are zoned as suburban. The balance, which includes the majority, is zoned Residential-Agricultural.

Present ordinances allow business and industry to operate in almost anywhere in town upon site plan approval by the planning board. Since 2004 the rate of growth has first slowed and then reversed so that the year-round population has declined slightly. The number of building permits for new homes since 2013 are shown below.

Residential Building Permits Issued	
Time Period	# of Permits
2014	6
2015	15
2016	15
2017	18
2018	26

## Population

Current projections from the New Hampshire Office of Strategic Initiative show the population growth rate will increase at a low rate in Barnstead over the next twenty-five years, where the year-round population in 2040 is projected to be 5,210.

The Hazard Mitigation Planning Committee utilized the current Plans to review and incorporate development changes. However, due to no substantial changes in development, there were no changes in priorities made to the Plan. Consequently, the Town's overall vulnerability to the identified hazards has remained the same.

Barnstead Population Growth	
Year	Population
2017	4,639
2010	4,593
2000	3,914
1990	3,105
1980	2,292
1970	1,119
Source: <a href="http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Barnstead.htm">http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Barnstead.htm</a>	

Barnstead Population Projections	
Year	Population
2020	4,782
2025	4,968
2030	5,048
2035	5,128
2040	5,210

## Chapter 3 HAZARD IDENTIFICATION

### WINTER WEATHER

**Probability:** Frequent

**Definition:**

**Heavy Snow Storms:** A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period. **Ice Storms:** An ice storm involves rain that freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires and similar objects. **Blizzard:** A blizzard is a violent snowstorm with winds blowing at a minimum speed of 35 miles (56 kilometers) per hour and visibility of less than one-quarter mile (400 meters) for three hours. **Nor'Easter:** A Nor'easter is a large weather system traveling from south to north, passing along the coast. As the storm's intensity increases, the resulting counterclockwise winds impacted the coast and inland areas in a Northeasterly direction. Winds from a Nor'easter can meet or exceed hurricane force winds.

**Location:**

There is a town-wide vulnerability to severe winter weather. Nor'easters (wind), Ice Storms, Heavy Snow Accumulations and Severe Cold can occur at any place within the town and generally affect the entire town when it happens. The higher elevations are more likely to experience snow or ice before the lower terrain.

**Impact:**

Heavy snow accumulations (generally considered one that deposits six or more inches of snow in a 12-hour period) especially those associated with nor'easters can have a significant affect on the Town, including extended power outages, road closures, collapsed roofs and increased snow removal costs. During ice storms, ice forms on cold surfaces, such as trees and power lines, and may continue to form until the ice is quite deep, as much as several inches thick. Ice damage results in power outages, road closures and forest damage. Ice on the roads can be the most difficult for a rapid emergency response. Private roads are difficult for emergency response vehicles due to restricted access during winter.

**Extent:**

NOAA's National Climatic Data Center produced the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes. In addition, the

CATEGORY	RSI VALUE	DESCRIPTION
1	1-3	Notable
2	3-6	Significant
3	6-10	Major
4	10-18	Crippling
5	18.0+	Extreme

National Weather Service developed and utilizes the Sperry-Piltz Ice Accumulation Index (SPIA) to forecast the impact of an ice storm. The index below ranges from an ice storm rated as "0" which has little impact, to an index rating of 5 that has catastrophic damage to exposed utility systems.

#### Previous Occurrence:

**January of 1923:** 4 storms within a week left over 30 inches of snow.

**February 22-28, 1969:** Events Accumulations to 98" in Western Central New Hampshire, 34" in coastal areas and 2 to 3' across New Hampshire generally. The storm produced excessive amounts of snow across New England with accumulations of greater than 75 cm across large sections of eastern Massachusetts, New Hampshire, and Maine.

**January 20, 1978:** 20 inch snowstorm leaving 20' high snowdrifts

**February 5-7, 1978:** Events accumulations to 28" in northeast New Hampshire, 25" in west central New Hampshire and 33" along coastal New Hampshire. Hurricane-force winds and record-breaking snowfall made this storm one of the more intense to occur this century across parts of the northeastern United States.

**Ice Storm Disaster: January 7-9, 1998:** A severe Ice Storm hit sections of New Hampshire from January 7 through January 9 1998. The hardest hit areas in northern and central New Hampshire were generally between about 1000 and 2000 ft above sea level. Ice accreted several inches thick on trees, power lines, and other exposed surfaces causing many people in those areas to lose electrical service. Statewide, the storm knocked out power to about 55,000 customers, an estimated 125,000 people. The storm caused an estimated 30 million dollars in damages. Long-term effects from the ice storm are expected to persist for many years. The debris from tree damage will create an increase in the forest fire danger over the next several years and has blocked many fire access roads and trails.

**March 2001 Snow Emergency:** A presidential declaration covered 7 counties with record and near-record snowfall from the late winter storm that occurred March 5-7.

**February 2003 Snow Emergency:** A presidential declaration covered 5 counties with record and near-record snowfall from the snowstorm that occurred February 17-18.

**Extreme Cold Temps:** Extreme cold up to -50 wind chill in Jan 2004; Dec/Jan/Feb of 2003; Jan 2000 and Dec 98/Jan 99.

**December 11-12, 2008:** A major winter storm brought a mixture of snow, sleet, and freezing rain to New Hampshire from the morning of December 11th to the morning of December 12th. The greatest impact in the state was in southern and central New Hampshire where a significant ice storm occurred. Following the ice storm, recovery and restoration efforts were negatively impacted by additional winter weather events that passed through the state. The freezing rain and sleet continued overnight and into Friday morning before ending. Precipitation amounts across the southern and central part of the state ranged from 1 to 3 inches, ice accretion to trees and wires in these areas generally ranged from about a half inch to about an inch. The weight of the ice caused branches to snap, and trees to either snap or uproot, and brought down power lines and poles across the region. About 400 thousand utility customers lost power during the event, with some

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



customers without power for two weeks. Property damage across northern, central and southeastern New Hampshire was estimated at over \$5 million. Many residents in Barnstead were without power for two weeks. The EOC was activated for 5 days and local emergency Shelter at Barnstead Elementary School was opened for 3 days. Town personnel conducted door-to-door checks on residents.

**October 30, 2011:** The storm brought a heavy, wet snow to southern and central New Hampshire. Snow began to fall across southern New Hampshire late Saturday afternoon, became heavy during the night, and ended before 7 am Sunday morning. The snow was mixed with rain along the immediate coast. The combination of the heavy wet snow and leaves still on the trees caused numerous trees and branches to snap and fall, causing widespread power outages. About 315,000 customers lost power during the storm, mostly across the southeastern part of the state. Some customers were without electrical service for almost a week. Snowfall amounts were quite variable across the state with southern areas and the higher terrain receiving the most snow, and in some cases, record snowfall. In Belknap County, trained weather spotters reported 17.9 inches in Belmont and 17.5 inches in Tilton. The Town of Barnstead experienced heavy snowfall, debris and isolated power outages for several days.

**February 8-9, 2013 (FEMA Disaster Declaration DR-4105):** An historic winter storm deposited tremendous amounts of snow over all of southern New England from February 8 to Saturday, February 9. What made this an amazing storm was the widespread coverage of heavy snowfall. Most locations received 2 to 2.5 feet of snow! Isolated thunderstorms were common across the entire region during the height of the storm. The band of heaviest snowfall, with 3 to 5 inches per hour for several hours, extended from southwest NH to central and western CT.

**November 26, 2014:** An area of low pressure developed off the Carolina coast on the morning of the 26th and raced rapidly up the eastern seaboard during the day to Nova Scotia by the morning of the 27th. The low brought heavy snow to all of New Hampshire with a mixture of precipitation along the coast. Snowfall amounts generally ranged from 4 to 8 inches in the northern mountains to 10 to 15 inches across portions of Sullivan, Grafton, Belknap, and Carroll Counties, to 4 to 8 inches across the southeastern part of the state. The Town of Barnstead experienced several days of power outages.

**January 26-28, 2015:** An area of low pressure developed off the Delmarva peninsula on Monday, January 26th, and intensified rapidly as it moved slowly northward through the 27th. Snow spread northward across the region Monday night and became heavy on Tuesday, the 27th. Snowfall amounts ranged from 10 to more than 30 inches across much of the southeastern part of the state. Elsewhere, amounts were generally 6 to 14 inches with some lower amounts in the Connecticut River Valley. There was no major impact to the Town during this storm.

**March 14, 2017 (FEMA Disaster Declaration Disaster #4316):** The storm brought heavy snow to all of New Hampshire with high winds leading to blizzard or near blizzard conditions across much of central and southern portions of the State. High winds and/or heavy wet snow downed trees and created numerous power outages across southeastern portions of the State. Winds also increased during the afternoon leading to blizzard conditions in parts of the State. Snowfall amounts across NH ranged from about 12 to 20 inches. The heavy snow combined with the strong winds lead to whiteout conditions in many areas. Farther inland, across Belknap and Carroll Counties, the strong winds downed trees onto roads and wires leading to blocked roads and power outages. The storm also occurred during many municipal elections, some of which were cancelled, but Barnstead continued with election day. The Town received \$3,658.82 in FEMA reimbursement funds.



**March 13, 2018:** Low pressure off the Southeast U.S. coast on the morning of the 12th intensified rapidly as it moved slowly northeast to just southeast of Cape Cod by the morning of the 13th. The low continued its slow movement to Nova Scotia by the morning of the 14th. The storm brought heavy snow to the almost the entire State with the heaviest snow falling in a strip just inland from the coast. Snowfall amounts ranged from about 6 inches across Coos County to more than 24 inches across portions of Hillsborough, Rockingham, Belknap, and Carroll Counties. There was no major impact to the Town during this storm.

## FLOODING

**Probability:** Frequent

**Definition:**

Flooding is the temporary overflow of water onto land that is not normally covered by water. Flooding results from the overflow of major rivers and tributaries and/or inadequate local drainage. Flooding events considered in this Plan include 100-year and 500-year floodplain events, rapid snow pack melt and ice jams.

**Location:**

Flooding occurs in the 100-year floodplain as designated on the FEMA Flood Insurance Rate Map. These 100-year floodplain areas primarily include Suncook River and the Big River and other minor tributaries. Beyond these floodplains, flooding can occur town-wide, especially on town roads during intense rain storms. The potential is moderate, but the impact historically is minimal.

**Impact:**

The extent of damage caused by any flood depends on the depth and duration of flooding, the topography of the area flooded, velocity of flow, rate of rise, and the amount and form of development in the floodplain. Most of the past flooding events result in erosion and damage to culverts and roads throughout town.

**Extent:**

FEMA defines flood hazards by the 100-year and 500-year flood events. A 100-year flood event is defined as flood event having a 1% chance of being equaled or exceeded in any given year. The 500-year flood event is defined as flood event having a .2% chance of being equaled or exceeded in any given year. The Town of Barnstead Flood Insurance Rate Maps (FIRM) identify both an A and AE zones. A zones are subject to the 100-year flood, however because there have been no detailed hydraulic studies, there is no Base Flood Elevation (BFE) determined for these zones. The AE zones are subject to the 100-year flood and have BFEs delineated on the FIRM.

**Previous Occurrence:**

**March 11-21, 1936:** Double flood; first due to rains and snowmelt; second, due to large rainfall.

**July - Aug.10, 1986 FEMA DR-771-NH:** Severe summer storms with heavy rains, tornadoes; flash flood and severe winds.

**April 16, 1987:** Severe Storms & Flooding. FEMA DR-789-NH

**August 7-11, 1990:** FEMA DR-876-NH: A series of storm events from August 7-11, 1990 with moderate to heavy rains produced widespread flooding in New Hampshire.

**August 19, 1991:** FEMA DR-917-NH: Hurricane Bob struck New Hampshire causing extensive damage in Rockingham and Stafford counties, but the effects were felt statewide.

**January 3, 1996:** FEMA DR-1077-NH – Storms and flooding October 29, 1996 FEMA DR-1144-NH – Severe storms and flooding July 2, 1998: FEMA DR-1231-NH – Severe storms and flooding

**Sep.16-18, 1999:** A southeast flow of tropical moisture developed over New Hampshire late Wednesday, September 15 as Hurricane Floyd moved slowly northeastward along the East Coast of the United States. Minor flooding occurred along the Pemigewasset and Saco Rivers. Strong winds accompanied the storm and then increased again on the back side of the storm during the day on Friday as high pressure pushed into the area. The winds knocked down tree limbs onto power lines causing power outages that affected about 10,000 customers. Some of the stronger winds gusts reported in the state included 44 mph in Concord and 41 mph in Laconia. Rainfall totals from the event generally ranged from about 4 to 7 inches statewide, with some locally higher amounts.

**October 8, 2005 FEMA DR- 1610** The interaction between a cold frontal boundary and the remnants of Tropical Storm Tammy resulted in tremendous amount of rainfall throughout most of central and southern New Hampshire. Rainfall ranged from just under 2 inches in far northern New Hampshire to 9 inches at Gilford in Belknap County. An unofficial report was received of 12.75 inches near Gunstock Ski area. There was a tremendous amount of damage to roads and bridges, and to the infrastructure in general due to flooding of small rivers and streams. Homes and businesses were damaged. Tragically, two young people lost their lives in the town of Unity in Sullivan County when they attempted to drive over a bridge that had already been washed away.

**May 12, 2006:** FEMA – DR 1643 Flooding occurred along the Suncook River from the outlet of Lower Suncook dam through to the town line with evacuation in center Barnstead along Rt.126 and Parade Road and Depot Street. The shelter was opened for 2 days at Town hall.

**April 15-23, 2007:** An area of low pressure intensified rapidly as it moved slowly from the southeastern United States on the morning of Sunday, April 15th to near New York City by the morning of Monday, April 16th. The intense low over New York City in combination with high pressure over eastern Canada produced a very intense pressure gradient across the area which caused strong east to northeast winds to develop across the region. Over land, the strong winds downed numerous trees. The downed trees caused widespread power outages, especially near the coast, and numerous road closures. The storm brought heavy rain to the region which, when combined with snow melt, produced widespread flooding across much of the region. The flooding of small rivers and streams was worst in southern and coastal areas and led to numerous road closures. In the mountains, the rain was preceded by heavy snow. Flooding was minor on most mainstem rivers. The U.S. Geological Survey in New Hampshire reported that 5 river basins recorded all-time record flows and 9 river basins in southern and southeast New Hampshire recorded peak flows that were equal to or greater than the 100-year recurrence interval. Of these nine river basins in New Hampshire, seven had recorded record flows just 11 months earlier during the Mother's Day flood. Damage to infrastructure was severe (roads, bridges, waste water treatment plants, public buildings). Homes and businesses were also damaged.

**August 7, 2008:** An area of slow-moving showers and thunderstorms produced up to 6 inches of rain in 3 hours resulting in flash flooding in several towns in southeast New Hampshire. Numerous roads were inundated by small streams and many were washed

out. Several cars were trapped in rising water in Laconia and several homes were also damaged. Damage was also extensive in Meredith and New Hampton.

**September 3, 2011:** Tropical Storm Irene brought over 4 inches of rain to Wilmot and higher amounts throughout New Hampshire. The eye of the storm traveled up the Connecticut River valley, resulting in lower rainfall amounts than originally predicted for the Wilmot area. Many roads in Barnstead were washed out. Downed trees and power lines caused sporadic power outages but was completely restored within several days.

**October 30, 2017 (FEMA Declare Disaster #4355):** An area of low pressure over the southeastern United States on the morning of Sunday, October 29th, intensified rapidly Sunday night and Monday, October 30, as it moved northward and moisture and energy from the remnants of Tropical Storm Philippe merged with the storm. The combined system brought high winds to much of New Hampshire Sunday night into Monday morning, with the highest winds in southern and central sections of the State. In addition, heavy rain accompanied the high winds over New Hampshire leading to both flash flooding and main-stem river flooding. The highest rainfall amounts were observed in the White Mountains. While the high winds and heavy rain ended during the morning of the 30th, flooding persisted into the late afternoon of November 1st. Rainfall amounts generally ranged from 2 to 5 inches across New Hampshire. Most of this rain fell within a 10-hour period from late Sunday evening through early Monday morning. By Wednesday evening, November 1st, all flooding had subsided. Power restoration efforts in the hardest hit areas across New Hampshire persisted for much of the week. Erosion on town and State roads caused the majority of damage in Town. State Route 28 was closed in neighboring Town of Alton, causing transportation access problems for emergency responders. The Town received \$35,997.73 in FEMA reimbursement funds.

## SEVERE WIND / TORNADO

**Probability:** Probable

**Definition:**

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. These events are spawned by thunderstorms and occasionally by hurricanes. They may also occur singularly or in multiples. 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: Microburst which covers an area less than 2.5 miles in diameter; and Macrobust which covers an area at least 2.5 miles in diameter.

**Location:**

Severe wind events (downburst, tornadoes or high winds associated with thunderstorms) can occur anywhere in Barnstead. Generally, the higher elevations are more susceptible as well as more vulnerable due to the fact that they are home to emergency response/mutual aid towers. Due to the sporadic nature of tornados and severe wind events, they could occur anywhere in the Town of Barnstead.

**Impact:**

Depending on the size and location of these events, the destruction to property may be devastating. Several of the more significant and recent events within southern New Hampshire have caused several millions of dollars in damage and at least 5 fatalities. An

F-2 Tornado, according to the Fujita scale, maintains wind speeds from 13-157 mph. A tornado occurring in Barnstead would cause considerable damage. Roofs could be torn off frame houses; mobile homes demolished; large trees snapped or uprooted; and light object missiles would be generated as a result of an F-2 Tornado.

**Extent:**

According to the Enhanced Fujita scale, which rates tornado intensity, an EF-2 tornado maintains wind speeds from 111-135 mph and can cause considerable damage.

EF 0	65-85 mph
EF 1	86-110 mph
EF 2	111-135 mph
EF 3	136-165 mph
EF 4	166-200 mph
EF 5	Over 200 mph

**Previous Occurrence:**

**July 6, 1999** Severe thunderstorm winds caused damage statewide as downed trees blocked roads and caused power outages. The winds also damaged several buildings. In Sanbornton, a 60 foot pine tree fell on a car killing the driver. An F2 tornado touched down in Pittsfield, moved through Barnstead, and then into Strafford before lifting off the ground, snapping and uprooting hundreds of trees, and damaging several homes.

**July 27, 2005** A severe thunderstorm knocked down trees in the town of Barnstead. The tornado occurred on Grey Road which damaged the roof, broke windows and made the house uninhabitable. In February 2006 a series of severe wind was wide spread throughout the State. Barnstead opened up the local shelter for a 60 hour period to assist those that needed heat and electricity.

**June 5, 2007:** Widespread severe thunderstorm activity produced very large hail and damaging winds across portions of southern New Hampshire. A severe thunderstorm produced .75 inch hail in Alton

**July 24, 2008:** An E-F2 tornado moving north northeast out of Rockingham County entered Belknap County about 2 miles southwest of South Barnstead near Province Road. The storm traveled almost 12 miles before crossing into Strafford County resulting in E-F0 to E-F2 damage. There were numerous houses and buildings that were damaged or destroyed by the tornado or by falling trees. In addition, there were thousands of downed trees and numerous power lines down along the path of the storm.

**November 24, 2013:** Strong winds developed behind an arctic cold front during the afternoon of the 24th. Winds gusted to between 40 and 50 mph across much of New Hampshire. Snapped trees and branches caused power outages throughout the region. Power companies reported that about 30,000 customers lost electrical service. In Laconia, one tree company worker was struck and killed by a tree as he was working to remove another tree from a roadway. In Concord where winds gusted to 58 mph, a large fiber communications cable fell across I-93 blocking the interstate highway for three hours.

**August 5, 2014:** A weak cold front produced some scattered convection as it dropped south through the region. One isolated cell became severe producing damaging winds in Belknap County. A severe thunderstorm downed trees and wires in Center Barnstead.

**July 19, 2015:** A cold front approaching from the west initiated afternoon convection across Eastern New York and Western New England on the afternoon of the 19th. High instability and increasing shear helped to develop more organized supercells and lines of thunderstorms. Large hail and damaging winds were prevalent with these storms. A severe thunderstorm produced 1 inch hail in Barnstead.

**July 23, 2016:** A cold front pushed southeast through the region on the afternoon of the 23rd.. Numerous reports of wind damage were received during the afternoon and evening hours across southern and central New Hampshire. A severe thunderstorm downed trees and wires on Beauty Hill Road in Barnstead.

## LIGHTNING

**Probability:** Frequent

**Definition:**

By definition, all thunderstorms contain lightning. 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 50,000 F, considerably hotter than the surface of the Sun.

**Location:**

The entire town is at moderate risk to lightning hazard. The higher elevation areas have an increased probability, however lightning strikes can occur anywhere in the Town.

**Impact:**

Residents and visitors to the New Hampshire area are more vulnerable to being struck by lightning because of the activities with which they are involved, particularly on those warm summer days when lightning is most likely to occur. Often, many people are outside enjoying the variety of recreational activities that attract people to New England during the summer when the vulnerability to lightning strike is highest. More likely to be affected are structures and utilities, often resulting in structure fires and power outages.

**Extent:**

The National Oceanographic Atmospheric Administration (NOAA) defines the extent of lightning activity with a LAL scale as shown in the table below.

LAL 1	No Thunderstorms
LAL 2	Isolated thunderstorms. Light rain will occasionally reach the ground. Lightning is very infrequent. 1 to 5 cloud ground strikes in a 5-minute period.
LAL 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.
LAL 4	Scattered thunderstorms. Moderate rain is commonly produced. Lightning is frequent, 11 to 15 cloud to ground strikes in a 5-minute period.
LAL 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.
LAL 6	Dry lightning (same as LAL 3 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.

**Previous Occurrence:**

Barnstead experiences annually lightning events. There are no official records on lightning events but there have been several structure fires as a result of lightning strikes with in the last 20 years. The Barnstead Elementary School has been struck by lightning over the last several years which caused about \$7,000 damage each occurrence to door access and electric panel.

## HURRICANE

**Probability:** Probable

**Definition:**

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually 20-30 miles wide and the storm may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage. The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures.

**Location:**

When hurricane events occur in Barnstead they affect the entire town. Certainly, the heavy rainfall associated with hurricanes will impact the 100-year floodplain, but the high winds can have an impact on the whole town.

**Impact:**

New Hampshire's exposure to direct and indirect impacts from hurricanes is real, but modest, as compared to other states in the region. That being said, the probability of hurricanes occurring in Barnstead is possible. The largest impact is on the floodplain areas due to heavy rains. High winds cause trees to fall thereby causing power outages, structural damage to buildings, road closures and debris management issues.

**Extent:**

Wind speeds within hurricanes may reach 250 miles per hour in a Category 5 hurricane, as measured on the Saffir-Simpson Hurricane Scale. Tropical depressions are considered to be of hurricane force when winds reach 74 miles per hour. Damage resulting from winds of this force can be substantial, especially considering the duration of the event, which may last for many hours.

Category	Wind Speed (mph)	Damage at Landfall
1	74-95	Minimal
2	96-110	Moderate
3	111-130	Extensive
4	131-155	Extreme
5	> 155	Catastrophic

**Previous Occurrence:**

**September 21, 1938** - The Great New England Hurricane: Statewide there were 13 Deaths, 1,363 families received assistance. Disruption of electric and telephone services for weeks. 2 Billion feet of marketable lumber blown down. Flooding occurred throughout the State, in some cases equaling and surpassing the Flood of 1936. Total Direct Losses - \$12,337,643

**August 31, 1954** - Hurricane Carol: Extensive amount of trees blown down and property damage. Large crop loss. Localized flooding.

**September 12, 1960** - Hurricane Donna: Heavy flooding in Massachusetts and Southern New Hampshire

**October 7, 1962** - Tropical Storm Daisy: Heavy ocean swells, and flooding Coastal New Hampshire.

**August 28, 1971** - Tropical Storm Doria: Doria's center passed over New Hampshire resulting in heavy rain and damaging winds.



**September 16-18, 1999** - Tropical Storm Floyd: This was originally a Hurricane that heavily impacted North Carolina and dumped heavy rains on New England resulting in a Presidential Declaration of Disaster in NH; FEMA DR-1305-NH in Belknap, Grafton and Cheshire Counties.

**August 28, 2011** - Tropical Storm Irene: The center of Irene was located just to the southwest of New Hampshire at 5 pm Sunday evening August 28 and then travelled up the Connecticut River Valley to the northern border of New Hampshire by 11 pm. The storm brought a prolonged period of strong and gusty winds and heavy rain to the state. The high winds snapped or uprooted numerous trees throughout the state causing more than 160,000 customers to lose electrical and/or communication services. The heavy rains caused rivers and streams throughout the state to flood causing damage to bridges, roads, and property. Rainfall amounts across the state ranged from 1.5 to 3 inches across southeastern New Hampshire with 3 to 6 inches across most of the remainder of the State, except in the White Mountains where 5 to 8 inches of rain fell. Rainfall was elevation dependent with the highest elevations receiving the greatest amounts. Much of the higher terrain in central and southern New Hampshire received between 4 and 6 inches of rain.

**October 29, 2012 (FEMA Declared Disaster #4095 on 11/28/12):** Hurricane Sandy remnant winds across much of the State generally gusted from 40 to 70 mph Monday and Monday night. These strong and persistent winds combined with the powerful gusts to down numerous trees throughout the State and caused widespread power outages, especially across southern New Hampshire. The most significant hydrological impact from the storm was due to the band of heavy rain that fell between Monday afternoon and Tuesday morning. Across the State, this band produced 1 to 3 inches of rain in about a 6- to 12-hour period. This amount of heavy rain in the short duration caused some road washouts in the State. High winds associated with the remnants of Sandy knocked down trees and branches and caused widespread power outages causing an estimated \$200,000 in damages. There was no major impact to the Town during this storm.

Since Hurricane Sandy in 2012, the Town has not experienced any significant impact from hurricanes or tropical storms.

## WILDFIRE

**Probability:** Probable

**Definition:**

Any free burning uncontrollable wild land fire not prescribed for the area which consumes the natural fuels and spreads in response to its environment.

**Location:**

The Ice Storms of 1998 and 2008 left a significant amount of woody debris in the forests of the region and may fuel future Wildfires similar to the debris caused by the Hurricane of 1938. Fires in New Hampshire are predominantly human-caused, and roughly half of the total fire activity is in the most populous three southern counties. The proximity of many populated areas to the forested lands exposes these areas and their populations to the potential impact of wildfire. The outer edge of the Town and the surrounding communities of Barnstead are heavily forested and are therefore vulnerable to this hazard, particularly during periods of drought.

**Impact:**

Fires in New Hampshire are predominantly human-caused, and roughly half of the total fire activity is in the most populous three southern counties. The proximity of many populated areas to the forested lands exposes these areas and their populations to the potential impact of wildfire. The estimated impact to structures could be derived from the information included in the critical facilities in Chapter 4.

**Extent:**

The extent of damage to structures and the general populations will vary depending on climate, warning, and the time of year. Even the time of day could affect the extent, as there is an increase of recreational hikers and tourists during the daytime. The National Wildfire Coordinating Group (NWCG) classifies a wildfire into one of several ranges of fire, based upon the number of acres burned. The following list provides NWCG's scale for wildfire values:

Value	Description
A	Up to .25 acres
B	0.26 to 9.9 Acres
C	10.0 to 99.9 Acres
D	100 to 299 Acres
E	300 to 999 Acres
F	1000 to 4999 Acres
G	5000 to 9999 Acres
H	10000 to 49999 Acres
I	50000 to 99999 Acres
J	100000 to 499999 Acres
K	500000 to 999999 Acres
L	1000000 + Acres

**Previous Occurrence:**

In 1947 there was a significant that affected North Barnstead and spread to the coast of Maine. Almost annually, the town will experience forest fires totaling about 5 acres in size. No additional significant wildfires have impacted the community since the previous plan update.

## EARTHQUAKE

**Probability:** Remote

**Definition:**

An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale.

**Location:**

According to the State of New Hampshire Multi-Hazard Mitigation Plan Update 2013, New Hampshire is considered to lie in an area of "Moderate" seismic activity with respect to other areas of the United States and is bordered to the North and Southwest by areas of "Major" activity. Generally, the entire Town is at risk to earthquakes.

**Impact:**

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, and avalanches. It is assumed that all the buildings in the Town have not been designed to withstand seismic activity. More specifically, the older historic buildings that are constructed of non-reinforced masonry are especially vulnerable to any moderate sized earthquake. In addition, utilities (water, sewer, etc.) are susceptible to earthquake damage. Barnstead has experienced the effect of small to moderate earthquakes that had minor to no effect on the town's infrastructure.





**Extent:**

Earthquakes with a magnitude of 2.0 to 4.9 on the Richter scale are considered minor to light, and those 5.0 to 6.9 are considered moderate to strong. However, if a large (6+ on the Richter Scale) occurred in or around the town, it is assumed that structural damage would be moderate to severe.

<b>Richter Scale</b>	<b>Magnitude Earthquake Effects</b>
2.5 or less	Usually not felt but can be recorded by seismograph.
2.5 to 5.4	Often felt, but only causes minor damage.
5.5 to 6.0	Slight damage to buildings and other structures.
6.1 to 6.9	May cause a lot of damage in very populated areas.
7.0 to 7.9	Major earthquake. Serious damage.
8.0 or greater	Great earthquake. Can totally destroy communities near the epicenter.

**Previous Occurrence:**

The Town of Barnstead has not experienced any significant earthquakes. The following table summarizes earthquakes of 2.5 magnitude or greater that have occurred in New Hampshire and New England:

<u>Location</u>	<u>Date</u>	<u>Magnitude</u>
Ossipee, NH	December 20, 1940	5.5
Ossipee, NH	December 24, 1940	5.5
Dover-Foxcroft, ME	December 28, 1947	4.5
Kingston, RI	June 10, 1951	4.6
Portland, ME	April 26, 1957	4.7
Middlebury, VT	April 10, 1962	4.2
Near NH Quebec Border, NH	June 15, 1973	4.8
West of Laconia, NH	Jan. 19, 1982	4.5
Ontario-Quebec Border	June 23, 2010	5.0
Boscawen, NH	September 26, 2010	3.1
Virginia	August 23, 2011	5.8
Southern Maine	October 16, 2012	4.0
Contoocook, NH	March 21, 2016	2.9
East Kingston, NH	February 15, 2018	2.7

## DAM FAILURE

**Probability:** Remote

**Definition:**

According to the NH Department of Environmental Services (DES), a dam is any artificial barrier which impounds or diverts water which: has a height of 6 feet or more; or is located at the outlet of a great pond, regardless of height or storage; or is an artificial barrier which impounds liquid Industrial or liquid commercial wastes, or septage or sewage, regardless of height or storage.

**Location:**

Suncook Lake Dam and Barnstead Parade Dam are classified as High Hazard dams and Locke Lake, Upper Recreation Pond, Lower Recreation, Wong Wildlife Pond and Adams

Pond dams are all classified as Low Hazard, which if breached would impact culverts, roads or structures.

**Impact:**

A dam failure or breach could occur due to extreme rainfall amounts and/or a human caused incident. A failure or breach would result in rapid loss of water that is normally held by the dam resulting in an inundation downstream.

**Extent:**

NH Department of Environmental Services categorizes Dams into one of four classifications, which are differentiated by the degree of potential damages that a failure of the dam is expected to cause. The classifications are designated as non-menace, low hazard, significant hazard and high hazard. A **High Hazard structure** is 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.; or the release of a quantity and concentration of material, which qualify as "hazardous waste" as defined by RSA 147-A:2 VII. A **Low Hazard structure** means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in any of the following: No possible loss of life; Low economic loss to structures or property; Structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services; the release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than two-acre-feet and is located more than 250 feet from a water body or water course; or Reversible environmental losses to environmentally-sensitive sites.

**Previous Occurrence:**

There is no history of significant dam failures in Barnstead.

## DROUGHT

**Probability:** Probable

**Definition:**

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people.

**Location:**

Droughts are difficult to define geographically. Due to their widespread nature a drought would affect the entire Town. However, a drought can affect fire suppression in those areas that do not have access to water for fire suppression.

**Impact:**

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. Droughts are not as damaging to the Town as floods or winter weather. However, a severe drought can affect public water supply, increase the probability of fires, and impede fire suppression. Those areas with minimal fire protection are at a higher risk because of a prolonged drought.

**Extent:**

The Palmer Drought Severity Index (PDSI) was devised in 1965 and was the first drought indicator to assess moisture status comprehensively. It uses temperature and precipitation data to calculate water supply and demand, incorporates soil moisture, and is considered most effective for un-irrigated cropland. It primarily reflects long-term drought and has been used extensively to initiate drought relief. It is more complex than the SPI and the Drought Monitor.

**PDSI Legend**

-4 or less (Extreme drought)
-4 to -3 (Severe drought)
-3 to -2 (Moderate drought)
-2 to -1 (Mild drought)
-1 to -0.5 (Incipient dry spell)
-0.5 to 0.5 (Near normal)
0.5 to 1 (Incipient wet spell)
1 to 2 (Slightly wet)
2 to 3 (Moderately wet)
3 to 4 (Very wet)
4 or more (Extremely wet)

**Previous Occurrence:**

According to the State of New Hampshire Multi-Hazard Mitigation Plan Update 2013, the southern portion of NH experienced droughts in 1957, 1963, 1965, 1966, 1970, 2001, and 2010. The statewide drought of 2001/02 had a minimal impact on water sources for fire protection in Barnstead. Most recently, according to [www.drought.gov](http://www.drought.gov), almost 45% of the State of New Hampshire was in a severe drought at the beginning of 2017. During the 2017 drought, the Town of Barnstead's Lock Lake community depleted its water supply which affected 94 homes. In addition, some small agri-business had to have water trucked in.

## EXTREME HEAT

**Probability:** Probable

**Definition:**

A Heat Wave is a "Prolonged period of excessive heat, often combined with excessive humidity." Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

**Location:**

Extreme heat events are difficult to define geographically. Due to their widespread nature, a period of extreme heat would affect the entire town.

**Impact:**

A heat wave is defined as 3 or more consecutive days of 90 degrees or higher. Extreme heat conditions may impact the health of residents and visitors. Facilities without generators and air-conditioners that house the elderly and disabled are very susceptible to human health issues. Utilities are also vulnerable as the demand for air-condition rises. Prolonged high temperature has also been associated with civil unrest.

**Extent:**

According to OSHA, the risk of heat-related illness becomes greater as the weather gets hotter and more humid. This situation is particularly serious when hot weather arrives suddenly early in the season, before workers have had a chance to adapt to warm weather. This table provides guidelines for the risk related to extreme heat.

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91° to 103°F	Moderate	Implement precautions and heighten awareness
103° to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

**Previous Occurrence:**

The summer of 1999 was one of the hottest summers on record. As of 7/27/99, there had been 13 days with temperatures recorded above 90 degrees, 5 days above 95 degrees and 2 above 97 degrees. There was a large increase in emergency response calls, however there were no deaths associated with this event. A cooling center was opened in 2011, due to extended period of extreme heat during the summer. Since the 2013 update, the Town hasn't experienced extreme heat events that impacted the Town.

## Chapter 4 CRITICAL FACILITIES

### Introduction

The Critical Facilities List for the Town of Barnstead has been identified by the Barnstead Hazard Mitigation Planning Committee. A critical facility is defined as a building, structure or location which is: vital to the emergency response; maintains an existing level of protection from hazards within the community and would create a secondary disaster if a hazard were to impact it. The Critical Facilities List for the Town of Barnstead has been identified using the following categories:

#### CATEGORY 1 (Facilities needed for Emergency Response)

- Fire
- Emergency Medical Services (EMS)
- Police
- Hospital
- Shelter
- Town Hall
- Emergency Operations Center (EOC)
- Public Works
- Communications
- Water Supply/Treatment
- Sewer Treatment
- Emergency Fuel



*Fire Station*

#### CATEGORY 2 (Facilities NOT necessary during an emergency event)

- Public Utilities
- Transportation
- Evacuation Routes

#### CATEGORY 3 (Populations & Places to Protect)

- Schools
- Daycares
- High Concentration Populations
- Elderly Facilities
- Healthcare Facilities
- Recreation areas
- Historic Resources



*Elementary School*

<b>Barnstead, NH</b> <b>Inventory of Critical Facilities and Assets</b>								
Facility	Name/Location	Owner	Category 1	Category 2	Category 3	Assessed Value	Hazard Vulnerability	Comments
			✓	✓	✓			
Town Hall	Town Hall, 108 South Barnstead Road St.	Municipal	✓			\$670,100	Hurricane, Severe Wind, Human Caused Hazards	Fixed Generator
EOC	Station 1 Fire Dept, 305 Parade Road (Primary)	Municipal	✓			368,100	Hurricane, Severe Wind, Human Caused Hazards	Fixed Generator
	Police Station, 24 Shackford Corner Road (Secondary)	Municipal	✓			283,400	Earthquake, Hurricane, Severe Wind, Drought	Fixed Generator
Police Station	Barnstead Police, 24 Shackford Corner Road	Municipal	✓			415,500	Earthquake, Hurricane, Severe Wind, Human Caused Hazards	No Generator
Fire Station	Barnstead Fire Station #2, 106 South Barnstead Rd.	Municipal	✓			278,900	Earthquake, Hurricane, Severe Wind, Drought	Fixed Generator
	Station #1, 305 Parade Rd.	Municipal	✓			362,500	Earthquake, Hurricane, Severe Wind, Drought	Fixed Generator
Hospital	Concord, Lakes Region, Frisbee, Huggins and Douglas Wentworth	Private	✓			n/a	n/a	
Shelters	Barnstead Elementary, 91 Maple St.	SAU 86	✓			5,140,400	Earthquake, Winter Weather, Hurricane, Severe Wind, Human Caused Hazards	
	Prospect Mountain High School, Alton, NH	SAU 301	✓			n/a	n/a	Fixed Generator
	Town Hall, 108 South Barnstead Road (warming center only)	Municipal	✓			368,100	Hurricane, Severe Wind, Human Caused Hazards	
Public Works	Highway Garage, 23 Beauty Hill Road East	Municipal	✓			298,400	Hurricane, Severe Wind, Human Caused Hazards	Fixed & Portable Generator
Public Utilities	Town Repeater (American Tower)	Mixed		✓		n/a		Fixed Generator
	NH Elec. Coop Substation 168 Garland Road	Private		✓		55,000	Human Caused Hazards	
	TDS Telephone: North Barnstead Rd. and Shackford Corner Rd., Douglas Dr.	Private		✓		4,357,200	Human Caused Hazards	

Barnstead, NH Inventory of Critical Facilities and Assets								
Facility	Name/Location	Owner	Category 1	Category 2	Category 3	Assessed Value	Hazard Vulnerability	Comments
			✓	✓	✓			
	Cell Tower, Hartshorn Rd.	Private		✓		200,400	Winter Weather, Severe Wind, Hurricane	Fixed Generator
Transportation	Marston Bus Company Butler Bus Company	Private		✓		n/a	Winter Weather	MOU with Butler
Emergency Fuel	Highway Garage – Diesel Only (1800 gal)	Municipal		✓		n/a	Earthquake, Hurricane, Severe Wind, Human Caused Hazards	Fixed Generator
Water Supply	Locke Lake Water Supply 1mil gallon storage tank at intersection of Peacham and Varney Road	Pennichuck		✓		3,955,032	Drought, Human Caused	
Schools	Elementary (warming center, if power)				✓	5,325,800		No generator
	Prospect Mountain High School, Alton, NH	SAU 301			✓	n/a	n/a	
	SAU 86 Office, 1 Suncook Valley Road	SAU 86			✓			
High Population Areas	Locke Lake	Private			✓	Varies	Flood	
	Birchwood Hideaway, Pinkham Pond	Private			✓	Varies	High Wind, Winter Weather	
	Beaver Estates, Beaver Ridge Road	Private			✓	Varies	High Wind, Winter Weather	
	Barnstead Parade	Mixed			✓	Varies	High Wind, Winter Weather	
	Center Barnstead	Mixed			✓	Varies	High Wind, Winter Weather	
Recreation Areas	Upper Suncook Lake	Mixed			✓	Varies	Flood	
	The Narrows	Mixed			✓	Varies	Flood	
	Lower Suncook Pond	Mixed			✓	Varies	Flood	
	Recreational fields at School	SAU 51			✓	n/a	Lightning, Severe Wind	
	2 baseball fields on 126	Private			✓	n/a	Lightning, Severe Wind	
	2 Boy Scout Camps (Storr & Wild Goose)	Private			✓	1,717,300	Lightning, Severe Wind	
	Camp Fatima, Stage Road	Private			✓			Seasonal High Population
	Harris Property Conservation Land	Private			✓	1,270,800	-	
Historic	Sellin Farm, 305 Gilmanton Road (State Historic Site)	Private			✓	274,122	Earthquake, Human Caused Hazards	



Barnstead, NH Inventory of Critical Facilities and Assets								
Facility	Name/Location	Owner	Category 1	Category 2	Category 3	Assessed Value	Hazard Vulnerability	Comments
			✓	✓	✓			
Historic Cont.	Oscar Foss Memorial Library, 111 S. Barnstead Rd. (National Historic Site)	Municipal			✓	832,700	Earthquake, Human Caused Hazards	
	No. Barnstead Cong. Church	Private			✓	293,100	Earthquake, Human Caused Hazards	
	Center Barnstead Bandstand	Municipal			✓	1,500	Severe Wind, Winter Weather, Human Caused Hazard	
	American Legion Hall	Private			✓	194,200	Severe Wind, Winter Weather, Human Caused Hazard	
Other	South Barnstead Congregational Church	Private			✓	177,500	Severe Wind, Winter Weather, Human Caused Hazard	
	Higher Ground Christian Fellowship Church	Private			✓	308,300	Severe Wind, Winter Weather, Human Caused Hazard	
	Center Barnstead Christian Church	Private			✓	343,600	Severe Wind, Winter Weather, Human Caused Hazard	
	Barnstead Parade Cong. Church (1779)	Private			✓	217,900	Severe Wind, Winter Weather, Human Caused Hazard	
	Maple Street Church	Private			✓		Severe Wind, Winter Weather, Human Caused Hazard	
	Suncook Lake Dam	State			✓		Severe Wind, Winter Weather, Human Caused Hazard	
	Barnstead Parade Dam	State			✓		Severe Wind, Winter Weather, Human Caused Hazard	
	Bosco Bell (gas station) Rt 28	Private			✓		Severe Wind, Winter Weather, Human Caused Hazard	
	Blueberry (gas Station) Rt. 28	Private			✓		Severe Wind, Winter Weather, Human Caused Hazard	No generator

## **Chapter 5**

### **CAPABILITY ASSESSMENT**

The following table is a list of current policies and regulations adopted by the Town of Barnstead that protect people and property from natural and man-made hazards. The table includes a description of the policy/regulation, the responsible agent, the policy's effectiveness and recommended strategies to improve mitigation efforts.

#### **Integration of Mitigation Priorities into Planning and Regulatory Tools**

The Town should conduct periodic review of these regulations and this Hazard Mitigation Plan. Reviewing these plans on a regular basis will ensure the integration of mitigation strategies. This review will continue to be a priority of the Barnstead Emergency Management Director and will likely include yearly requests in the annual budget process. Moreover, as suggested in the onset of this document, this *Plan* is a planning tool to be used by the Town of Barnstead, as well as other local, state, and federal governments, in the effort to reduce future losses from natural and/or man-made hazardous events before they occur. Under the Prioritized Mitigation Projects *Action Plan* (found in Chapter 6), all parties listed under the Responsibility/Oversight category shall also review this listing annually and consider the listed (and updated) mitigation projects within their annual budget requests.

Existing Protection Matrix Barnstead, NH				
Existing Protection	Description	Responsible Agent	Effectiveness <i>Poor/Average/Exc.</i>	Status
Emergency Operations Plan	The Town maintains an EOP that meets the recommendations by the NH Homeland Security Emergency Management. This plan identifies the response procedures and capabilities of the Town of Barnstead in the event of a natural or man-made disaster.	EMD	Excellent	Update in 2020
Building Code	The town complies with the State of New Hampshire Building Code which incorporates the IBC, IPC and NFPA.	Building Inspector / Code Enforcement Officer	Average	Continue to enforce Building Code Regulations.
Floodplain Ordinance	The minimum National Flood Insurance Program (NFIP) requirements have been adopted as part of the Town's Zoning Ordinance. This regulates all new and substantially improved structures located in the 100-year floodplain, as identified on the FEMA Flood Maps.	Planning Board / Zoning Board / Building Inspector	Excellent	Continue to enforce floodplain regulations, including substantially improved structures; and amend regulations as necessary per federal requirements.
Elevation Certificates Maintained	Elevation certificates are maintained for new and substantially built structures in the 100-year floodplain.	Building Inspector	Excellent	Code Enforcement continues to administer, enforce, and ensure that Elev. Cert. are properly filed, certified and implemented.
Emergency Warning System	The town is part of the Statewide Emergency Notification System (ENS) with the E-911 system. Supplementing the ENS are PA systems in all Fire & Police vehicles. School District has notification system (School Messenger).	Police/Fire	Excellent	Encourage the public to sign up for NH Alerts.
Subdivision Regulations	The purpose of Barnstead's subdivision regulations is to provide for the orderly present and future development of the town by promoting the public health, safety, convenience and welfare of the town's residents.	Planning Board	Excellent	Review and update annually.

Existing Protection Matrix Barnstead, NH				
Existing Protection	Description	Responsible Agent	Effectiveness <i>Poor/Average/Exc.</i>	Status
Road Design Standards	Barnstead Subdivision and Site Plan Regulations include road design standards that control the amount and retention of storm water runoff.	Planning Board / Road Agent	Excellent	Subdivision regulations to include provisions for emergency vehicle access.
Bridge Maintenance Program	There is currently one bridge (Hanna Nutter to be replaced in 2019) on the state Red List. Inspection and clean-up occur annually. The state inspects all bridges and maintains State bridges.	Road Agent/State DOT	Average	Develop a bridge maintenance plan.
Storm Drain / Culvert Maintenance	Culverts and drainage basins are cleaned on occasion. Culverts are replaced as needed.	Road Agent	Average	Many haven't been cleaned in years. GPS location of all culverts.
Wetlands Protection	The Zoning Ordinance contains wetland buffer regulations.	Planning Board / Conservation Commission	Excellent	Update as required by state standards.
Shoreland Protection Program	Establishes standards beyond the minimum state requirement for future subdivision, use, and development of shore lands within 250' of the state's public waters (4th Order or higher). (State Shoreline Protection)	Planning Board	Excellent	Update as required by state standards.
Hazardous Materials Plan / Team	There are no substantial Hazardous Material facilities that warrant a Hazardous Material Plan. There is also a regional HazMat response team that serves the town.	Fire Chief	Excellent	Continue to participate in the Central NH Mutual Aid Hazardous Response Team.
Public Education Programs	The Fire Department annually conducts a Fire Prevention Week and Awareness. The Police Department conducts periodic safety programs. EMD public awareness at Town meeting and library.	Fire / Police	Excellent	Implement additional public education programs.

Existing Protection Matrix Barnstead, NH				
Existing Protection	Description	Responsible Agent	Effectiveness <i>Poor/Average/Exc.</i>	Status
Master Plan	The Master Plan serves as the guiding document for future development in Barnstead. It also serves as the guiding document to assist the Planning Board as it updates the Town Zoning Ordinance, Subdivision and Site Plan Review Regulations and other regulations that fall under its jurisdiction.	Planning Board	Average	To be updated in 2024
Capital Improvement Program	A decision-making tool used to plan and schedule town improvements over at least a six-year period. The CIP provides a suggested timeline for budgeting and implementing needed capital improvements.	Planning Board	Average	Reviewed and updated annually.
Winnepesaukee Public Health Region	The Winnepesaukee Public Health Network works to assure coordinated and comprehensive delivery of essential public health services and serves as a local liaison with state agencies involved in the public's health and safety.	PHN Coordinator	Average	EMD and Health Officer involved in public health issues.
School Emergency Response Plans	September 2018	Principal / SAU	Excellent	Reviewed and updated annually.

## Chapter 6 MITIGATION PROJECTS

### Hazard Identification

The Committee utilized the *Hazard Identification Worksheet*, as shown in Appendix B, to identify potential hazards, the historical occurrence, locations, assets at risk and the probability of each hazard. The results of this process can be found in Chapters 2 and 3.

### Problem Statements

From the Hazard Identification process the Committee developed a list of Problem Statements for each Hazard (see Appendix B). Based on the hazards and risks within the town, the Committee summarized the ‘problems’ associated for every hazard identified. These problem statements allowed the Committee to identify mitigation alternatives during the project identification step described below.

### Goals Identified

During the 2019 update, the Committee reviewed the 2013 Barnstead Hazard Mitigation Plan goals and made no revisions. The Goals were not modified for any substantial content, as there has not been any substantial change in development.

### Project Identification

Using the *Mitigation Project Identification Worksheet* (see Appendix B) as a guide, the Committee members identified mitigation projects for each problem Statement. Specific objectives included: Prevention, Property Protection, Public Education, Natural Resource Protection, Emergency Services and Structural Projects.

This process resulted in the *Mitigation Project Identification Matrix*. For illustrative purposes the table below is an excerpt from the *Matrix* included in Appendix B. In this *Matrix*, the committee was able to determine a basic benefit/cost by using the STAPLEE method. For each project identified, the committee considered the STAPLEE Criteria (Social, Technical, Administrative, Political, Legal, Economic and Environmental) to guide their decision in prioritizing the projects. One component of STAPLEE is the Economic criteria which aided the committee in determining whether the benefits outweigh the costs.

Hazard	Problem Statement	Mitigation Project (Objectives: Prevention /Property Protection/ Public Educ./ Nat.Resource /Emerg. Serv / Structural)	Social	Technical	Administrative	Political	Legal	Economic	Environments
Lightning	Critical facilities are at risk to lightning strikes.	Install/Upgrade lightning protections systems (grounding, lightning rods, surge protectors, etc.) on Critical Facilities.	+	+	+	+	+	-	+

### Completed Projects since 2013

The Town of Barnstead completed the latest version of this plan in 2013. Since that time, the town has completed the projects listed below. These completed projects are not included in the 2019 edition of the Hazard Mitigation plan. In addition, the Committee added new projects to the Mitigation Action Plan, all of which are included in the Action Plan.

Completed Projects since 2013	
Investigate soil stabilization along Suncook River. (A fluvial study of the Suncook River was completed in 2017 by the Lakes Region Planning Commission)	
Site Survey/selection/property acquisition to place a tower and antenna system. (A repeater was installed)	
GPS the location of all culverts and initiate a maintenance and clean-up program.	
Hard line phone lines added to the Town Hall and Fire Station 2.	
Deleted Projects since 2013	
None	
Continuing Projects since 2013	
<i>(Note: these projects were identified by the committee as either on-going or annual projects that they wanted to maintain or were just simply not completed since the last plan.)</i>	
Continue to enforce Building Code Regulations.	
Implement public education programs on mitigation activities.	
Continue to enforce fire permits and regulations.	
Update Flood maps and produce on GIS maps. (Waiting for new maps from FEMA.)	
Continue to enforce floodplain regulations, including substantially improved structures; and amend regulations as necessary per federal requirements.	
Install phone lines for EOC Fire Station 1.	
Purchase generator for the Elementary School to be used as a shelter.	
Hazardous Materials awareness training for Police and Highway personnel.	

### 2019 Prioritized Mitigation Projects:

In 2019, each committee member reviewed the updated list of Mitigation Projects. After careful evaluation, the committee ranked the projects by voting for half of the projects. The project that received the most votes was ranked as the highest priority and the project receiving the least amount of votes received the lowest priority. (See Prioritized Mitigation Projects in Appendix B.) The committee was able to determine a basic benefit/cost by using the STAPLEE method. For each project identified, the committee considered the STAPLEE Criteria (Social, Technical, Administrative, Political, Legal, Economic and Environmental) to guide their decision in prioritizing the projects. The prioritized projects are identified in the Mitigation Action Plan.

There have been no significant changes to mitigation priorities for the Town of Barnstead. The Town has not experienced any changes in resources, new hazard impacts, or development patterns that merit changes to mitigation priorities. The Hazard Mitigation Committee identified new projects as described below and prioritized them as discussed above.

### **Incorporating Mitigation Into Local Planning**

In order for the requirements of this plan to be effective, it is essential that the Town of Barnstead incorporate the strategies and actions into its planning process. Educating employees working within the Town Agencies along with members of the various Boards on the provisions of the plan is critical for ensuring that disaster preparedness and risk mitigation become part of their planning process when holding discussions, making decisions, and developing plans and Standard Operating Procedures (SOPs). As noted above, information outreach is a high priority action item that will impact more than just Town employees and Board members. Since interested citizens attend various Town meetings where decisions are made, having a community base that understands the importance of disaster mitigation planning will also assist in ensuring that future plans and actions integrate the requirements found in this plan.

The Board of Selectmen will instruct the Town Agency Heads to review their SOPs and ensure that where appropriate, the requirements of this plan are integrated into those procedures. They will also coordinate with both the Zoning Board and the Planning Board to ensure that risk mitigation planning continues to be a part of their recommendation/decision process in order to fulfill the goals and objectives outlined in this plan.

Since the last update of this Plan in 2013, the Town incorporated Hazard Mitigation Planning into the following documents:

- Barnstead Emergency Operations Plan (EOP) – The EOP is designed to allow the Town to respond more effectively to disasters as well as mitigate the risk to people and property. The EOP was updated in 2015 and was reviewed to ensure that where appropriate, specific mitigation actions outlined in the HMP were also addressed in the EOP.

### **Mitigation Action Plan**

The projects identified in 2013 included preparedness projects as well as mitigation projects. During the 2019 update, the committee separated mitigation projects from preparedness projects (a.k.a Non-Mitigation). Both mitigation and non-mitigation projects are compiled in the Mitigation Action Plan found on Page 6-4 which identifies Responsibility, Funding, Time frame, Hazards Addressed and the Priority for each mitigation project.



Mitigation Action Plan - Barnstead, NH						
Mitigation Action	Responsibility/ Oversight	Funding/ Support	Timeframe*	Hazards Addressed	Estimated Cost	Priority
1. Install new cisterns and dry hydrants, per the Rural Water Supply study.	Fire Department	Town Budget / Grants	Ongoing	Drought, Wildfire	\$80-100,000 / cistern \$5-8,000 / hydrant	High
2. Increase capacity of culverts on North Barnstead, Narrows Road and 4 culverts on Gray Road.	Road Agent	Town Budget & Grants	Medium	Flooding, Hurricane	\$120,000 N. Barn. Road / \$20-120,000 per culvert	High
3. Install/Upgrade lightning protections systems (grounding, lightning rods, surge protectors, etc.) on Critical Facilities.	Board of Selectmen	Town Budget / Department Budget	Short	Lightning	\$5-10,000	High
4. Educating homeowners of their location inundation pathway for the High Hazard Dams.	Assessing Office	Staff Time	Short	Dam Failure	\$100	Medium
5. Install security window film for glass doors, additional security cameras, and door locks at the Elementary School.	School	School Budget	Short	Earthquake, Human Caused	\$5-50,000	Medium
6. Continue to enforce Building Code Regulations.	Building Inspector	Staff	Ongoing	All Hazards	\$0	Medium
7. Investigate soil stabilization along Suncook River.	EMD	Staff Time / NH DES	Short	Flooding, Hurricane	\$0	Medium
8. Update Flood maps and produce on GIS maps.	Board of Selectmen / Planning Board	FEMA	Short	Flooding	\$0	Medium
9. Continue to enforce fire permits and regulations.	Fire Warden	Staff Time	Ongoing	Wildfire	\$0	Medium
10. Implement public education programs on mitigation activities for All Hazards.	EMD	Staff Time / Town Budget	Ongoing	All Hazards	\$500	Low

Mitigation Action Plan - Barnstead, NH						
Mitigation Action	Responsibility/ Oversight	Funding/ Support	Timeframe*	Hazards Addressed	Estimated Cost	Priority
11. Continue to enforce floodplain regulations, hold Community Assistance Visits with Office of Strategic Initiatives and educate the public on the NFIP regulations.	Planning Board / Building Inspector	Staff Time / FEMA	Ongoing	Flooding	\$0	Low
12. Educate property owners and town personnel on how to reduce the risk of wildfire and improving forest management.	Fire Warden & Fire Dept.	Staff	Ongoing	Wildfire	\$0	Low
NON-MITIGATION PROJECTS						
1. Purchase generator for the Elementary School to be used as a shelter.	SAU & School Board	School Board & Grants	Medium	Hurricane, Lightning, Severe Wind, Winter Weather	\$200,000	High
2. Install a hardline phone at the EOC at Parade Fire Station.	Fire Department	Town Budget	Short	Hurricane, Lightning, Severe Wind, Winter Weather	\$1,000	High
3. Hazardous Materials awareness training for Police and Highway personnel.	Fire Department	Div. of Fire Standards & Training	Short	Human Caused	\$1,000	High
4. Purchase a fuel tank for DPW	Road Agent	Town Budget	Medium	All Hazards	\$20-30,000	High
5. Replace the town repeater for day to operations and during disasters.	EMD	Town Budget	Medium	All Hazards	\$6-8,000	Medium
6. Purchase shelter supplies for use at the Elementary School.	EMD	Town Budget & Grants	Ongoing	All Hazards	\$3-5,000	Low
7. Improve air conditioning for cooling centers at the Elementary School & Town Hall.	School / SAU / Board of Selectmen	School & Town Budgets	Medium	Extreme Heat	\$8,000 Town Hall / \$50,000 School	Low

\*Timeframe: Short Term=1 year or less, or ongoing Medium Term=2-3 years Long Term=4-5 years

\* Ongoing: Projects that are reviewed and implemented on a daily, monthly or annual basis.

## **Chapter 7**

### **ADOPTION, IMPLEMENTATION, MONITORING**

#### **Adoption**

The Barnstead Selectmen by majority vote officially adopted the *Barnstead Hazard Mitigation Plan 2019 Update* on June 4, 2019. This plan identified Mitigation Actions to be implemented as outlined in Chapter 6.

#### **Implementation**

There were 12 mitigation projects and 7 non-mitigation projects that were prioritized by the Committee. For each project the Committee identified who, when and how they would be implemented. Please refer to the “Action Plan” in Chapter 6 for a description of the timeframe and persons or departments responsible for implementation of the Prioritized Projects.

It will be the future responsibility of the Emergency Management Director to ensure implementation of these Prioritized Projects.

#### **Monitoring & Updates**

The *Barnstead Hazard Mitigation Plan 2019 Update* must be reviewed, evaluated and updated at least once every five years. The Emergency Management Director is responsible for initiating this review and needs to consult with members of the Barnstead Emergency Management Committee, in order to track progress and update the Prioritized List in Chapter 6. The EMD will ensure the following:

- The Hazard Analysis will be evaluated for accuracy.
- Projects completed will be evaluated to determine if they met their objective.
- Projects not completed since the last updated will be reviewed to determine feasibility of future implementation.
- New projects will be identified and included in future updates as needed.
- The public, members of the Committee and State and non-profit agencies, will continue to be invited and involved during this process.
- In keeping with the process of adopting the 2019 Barnstead Hazard Mitigation Plan, a public hearing to receive public comment will be held. This will require the posting of two public notices, and where appropriate by posting a notice on the town’s Web Site.
- Updates to the *Plan* may be adopted subsequent to a public meeting or hearing by the Barnstead Board of Selectmen.
- Once every five years, the EMD will submit an updated plan to HSEM for approval.

<b>Annual Hazard Mitigation Plan Update, Monitor &amp; Evaluate Schedule and Public Involvement</b>			
<b>Meeting Schedule</b>	<b>Task</b>	<b>Town of Barnstead Responsibilities</b>	<b>Public Involvement (neighboring communities)</b>
Annually or as needed	Assess current status of funding for mitigation projects. Discuss any new projects/plans that should be obtained for your community.	Dept. heads and Board of Selectmen to locate and apply for sources of funding and implement the proposed strategies and plans.	Residents, businesses, and neighboring / watershed communities.
Annually or as needed	Meet to discuss the Hazard Mitigation Plan content and any updates needed for the plan	Department Heads or other agencies.	Residents, businesses, and neighboring / watershed communities.
Annually or as needed	Discussion and evaluation of Training Programs and public outreach efforts. New public outreach methods discussed.	Department Heads or other agencies.	Residents, businesses, and neighboring / watershed communities.

## CERTIFICATION OF ADOPTION

**TOWN OF BARNSTEAD, NH**  
**108 S Barnstead Rd, Center Barnstead, NH 03225**  
**June 4, 2019**

### **A RESOLUTION ADOPTING THE TOWN OF BARNSTEAD, NH HAZARD MITIGATION PLAN UPDATE 2019**

WHEREAS, the Town of Barnstead, NH has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of - only those natural hazards profiled in the plan (i.e. *flooding, thunderstorm, high wind, winter storms, earthquakes, and dam failure*), resulting in loss of property and life, economic hardship, and threats to public health and safety; and

WHEREAS, the Town of Barnstead, NH, has developed and received conditional approval from the NH Homeland Security and Emergency Management for its Hazard Mitigation Plan Update 2019 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held between November 2018 and February 2019 regarding the development and review of the Hazard Mitigation Plan Update 2019; and

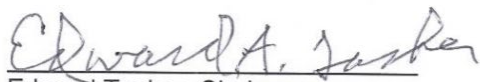
WHEREAS, the Plan specifically addresses hazard mitigation strategies and Plan maintenance procedure for the Town of Barnstead, NH; and

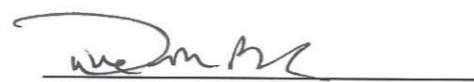
WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Barnstead, NH, with the effect of protecting people and property from loss associated with those hazards; and


WHEREAS, adoption of this Plan will make the Town of Barnstead, NH eligible for funding to alleviate the impacts of future hazards; now therefore be it RESOLVED by the Board of Selectmen: The Plan is hereby adopted as an official plan of the Town of Barnstead, NH

1. The respective official identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them;
2. Future revisions and Plan maintenance required by 44 CFR 201.6, FEMA and NH HSEM are hereby adopted as part of this resolution for a period of five (5) years from the date of this resolution.
3. An annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen by April 1<sup>st</sup> of each year.

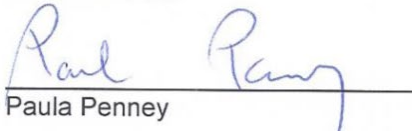
Adopted, this 4<sup>th</sup> day of June, 2019.

  
Edward Tasker, Chairman

  
Diane Beijer, Vice-Chair

  
Richard Duane

  
Lori Mahar

  
Paula Penney

## ACRONYMNS

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**BMP – Best Management Practices**  
**CDBG - Community Development Block Grant**  
**CRS – Community Rating System**  
**DES – Department of Environmental Services**  
**DHS – Department of Homeland Security**  
**DMA – Disaster Mitigation Act**  
**DOT – Department of Transportation**  
**EAP – Emergency Action Plan**  
**EMD – Emergency Management Director**  
**EMPG – Emergency Management Performance Grant**  
**EMS – Emergency Medical Services**  
**EOC – Emergency Operations Center**  
**EOP – Emergency Operations Plan**  
**FEMA – Federal Emergency Management Agency**  
**FIRM – Flood Insurance Related Maps**  
**FMA – Flood Mitigation Assistance Program**  
**GIS – Geographic Information System**  
**HAZMAT – Hazardous Material**  
**HMGP – Hazard Mitigation Grant Program**  
**HSEM – Homeland Security and Emergency Management**  
**ICC – International Code Council**  
**NFIP – National Flood Insurance Program**  
**NH HSEM – NH Homeland Security and Emergency Management**  
**PDM – Pre-Disaster Mitigation**  
**OEP – Office of Energy Planning**  
**RC&D – Resource Conservation and Development**  
**USGS – United State Geological Survey**

## **APPENDICES**

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Appendix A  
Appendix B  
Appendix C

Hazard Mitigation Resources  
Documentation of Planning Process  
Approval Letter from FEMA

## **APPENDIX A**

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### **Hazard Mitigation Resources**



## ◆ HAZARD MITIGATION GRANT PROGRAM - "Section 404 Mitigation"

*The Hazard Mitigation Grant Program (HMGP) in New Hampshire is administered in accordance with the 404 HMGP Administration Plan which was derived under the authority of Section 404 of the Stafford Act in accordance with Subpart N. of 44 CFR.*

The program receives its funding pursuant to a Notice of Interest submitted by the Governor's Authorized Representative (or GAR, i.e. the Director of NH HSEM) to the FEMA Regional Director within 60 days of the date of a Presidentially Declared Disaster.

The amount of funding that may be awarded to the State/Grantee under the HMGP may not exceed 15% of (over and above) the overall funds as are awarded to the State pursuant to the Disaster Recovery programs as are listed in 44 CFR Subpart N. Section 206.431 (d) (inclusive of all Public Assistance, Individual Assistance, etc.). Within 15 days of the Disaster Declaration, an Inter-Agency Hazard Mitigation Team is convened consisting of members of various Federal, State, County, Local and Private Agencies with an interest in Disaster Recovery and Mitigation. From this meeting, a Report is produced which evaluates the event and stipulates the State's desired Mitigation initiatives.

Upon the GAR's receipt of the notice of an award of funding by the Regional Director, the State Hazard Mitigation Officer (SHMO) publishes a Notice of Interest (NOI) to all NH communities and State Agencies announcing the availability of funding and solicits applications for grants. The 404 Administrative Plan calls for a State Hazard Mitigation Team to review all applications. The Team is comprised of individuals from various State

### ***Eligible Subgrantees include:***

- State and Local governments,
- Certain Not for Profit Corporations
- Indian Tribes or authorized tribal organizations
- Alaskan corporations not privately owned.

### **Minimum Project Criteria**

- Must conform with the State's "409" Plan
- Have a beneficial impact on the Declared area
- Must conform with:
  - NFIP Floodplain Regulations
  - Wetlands Protection Regulations
  - Environmental Regulations
  - Historical Protection Regulations
- Be cost effective and substantially reduce the risk of future damage
- Not cost more than the anticipated value of the reduction of both direct damages and subsequent negative impacts to the area if future disasters were to occur i.e., min 1:1 benefit/cost ratio
- Both costs and benefits are to be computed on a "net present value" basis
- Has been determined to be the most practical, effective and environmentally sound alternative after a consideration of a range of options
- Contributes to a long-term solution to the problem it is intended to address
- Considers long-term changes and has manageable future maintenance and modification requirements

Agencies.

**Eligible Projects** may be of any nature that will result in the protection to public or private property and include:

- Structural hazard control or protection projects
- Construction activities that will result in protection from hazards
- Retrofitting of facilities
- Certain property acquisitions or relocations
- Development of State and local mitigation standards
- Development of comprehensive hazard mitigation programs with implementation as an essential component
- Development or improvement of warning systems

## ◆ FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM

New Hampshire has been a participant in the Flood Mitigation Assistance Program (FMA or FMAP) since 1996/97. In order to be eligible, a community must be a participant in the National Flood Insurance Program.

In 1997, the State was awarded funds to assist communities with Flood Mitigation Planning and Projects. A Planning Grant from the 1996/97 fund was awarded to the City of Keene in 1998. In preparation for the development of the Flood Mitigation Plan, the Planning Department of the City of Keene created a digital data base of its floodplain including the digitizing of its tax assessing maps as well as its Special Flood Hazard Areas in GIS layers. The Plan Draft was submitted to FEMA for review and approval in March of 2000. The Plan includes a detailed inventory of projects and a "model" project prioritization approach.

In 1998, the FMAP Planning Grant was awarded to the Town of Salem. Given the complexity of the issues in the Spicket River watershed, the Town of Salem subcontracted a substantial portion of the development of its Flood Mitigation Planning to SFC Engineering Partnership of Manchester, NH, a private engineering firm. Salem submitted a Plan and proposed projects to the State and FEMA in May of 1999 which were approved by FEMA. This made Salem the first community in NH to have a FEMA/NFIP approved Flood Mitigation Plan.

### Flood Mitigation Assistance Program

- NFIP Funded by a % of Policy Premiums
- Planning Grants
- Technical Assistance Grants to States (10% of Project Grant)
- Project Grants to communities
- Communities must have FEMA approved Flood Mitigation Plan to receive Project Funds

## *Eligible Projects*

*(44 CFR Part 78)*

- Elevation of NFIP insured residential structures
- Elevation and dry-proofing of NFIP insured non-residential structures
- Acquisition of NFIP insured structures and underlying real property
- Relocation of NFIP insured structures from acquired or restricted real property to sites not prone to flood hazards
- Demolition of NFIP insured structures on acquired or restricted real property
- Other activities that bring NFIP insured structures into compliance with statutorily authorized floodplain management requirements
- Beach nourishment activities that include planting native dune vegetation and/or the installation of sand-fencing.
- Minor physical mitigation projects that do not duplicate the flood prevention activities of other Federal agencies and lessen the frequency of flooding or severity of flooding and decrease the predicted flood damages in localized flood problem areas. These include: modification of existing culverts and bridges, installation or modification of flood gates, stabilization of stream banks, and creation of small debris or flood/storm water retention basins in small watersheds (not dikes, levees, seawalls etc.)

## ◆ PRE-DISASTER MITIGATION PROGRAM (PDM)

FEMA has long been promoting disaster resistant construction and retrofit of facilities that are vulnerable to hazards in order to reduce potential damages due to a hazard event. The goal is to reduce loss of life, human suffering, economic disruption, and disaster costs to the Federal taxpayer. This has been, and continues to be accomplished, through a variety of programs and grant funds.

Although the overall intent is to reduce vulnerability before the next disaster threatens, the bulk of the funding for such projects actually has been delivered through a "post-disaster" funding mechanism, the Hazard Mitigation Grant Program (HMGP). This program has successfully addressed the many hazard mitigation opportunities uniquely available following a disaster. However, funding of projects "pre-disaster" has been more difficult, particularly in states that have not experienced major disasters in the past decade. In an effort to address "pre-disaster mitigation", FEMA piloted a program from 1997-2001 entitled "Project Impact" that was community based and multi-hazard oriented.

Through the Disaster Mitigation Act of 2000, Congress approved creation of a national Pre-disaster Hazard Mitigation program to provide a funding mechanism that is not dependent on a Presidential disaster declaration. For FY2002, \$25 million has been appropriated for the new grant program entitled the ***Pre-Disaster Mitigation Program (PDM)***. This new program builds on the experience gained from Project Impact, the HMGP, and other mitigation initiatives.

Eligible projects include:

- State and local hazard mitigation planning
- Technical assistance [e.g. risk assessments, project development]
- Mitigation Projects
  - Acquisition or relocation of vulnerable properties
  - Hazard retrofits
  - Minor structural hazard control or protection projects
- Community outreach and education [up to 10% of state allocation]

The funding is 75% Federal share, 25% non-Federal, except as noted below. The grant performance periods will be 18 months for planning grants, and 24 months for mitigation project grants. The PDM program is available to regional agencies and Indian tribes. Special accommodation will be made for "small and impoverished communities", who will be eligible for 90% Federal share, 10% non-Federal.

## ◆ COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM

*These Federal funds are provided through the U.S. Department of Housing and Urban Development (HUD) and are administered by the CDBG Program of the New Hampshire Office of State Planning.*

Some CDBG disaster related funding has been transferred to FEMA recently and the SHMO is scheduled to receive guidance as to which specific funds and, new program management criteria.

The specific CDBG funds designated for hazard mitigation purposes are made available to address "unmet needs" pursuant to a given Disaster Declaration to States which request them. For these funds, project selection guidance is provided by NH HSEM and NHOSP administers the grant.

Pursuant to Declaration DR-1144-NH, \$557,000.00 was made available to the State and pursuant to DR-1199-NH, the grant award is targeted at \$1,500,000.00.

In October of 1998, HUD announced the program guidelines for the expenditure of the DR-1144-NH related funding and the community of Salem applied for, and has received preliminary approval for funding to acquire a 19 unit trailer park in the Floodplain.

### **Community Development Block Grant**

- *U.S. Dept. of Housing and Urban Development*
- *Funds for a Declared Disaster's "Unmet Needs"*
- *Projects must meet one of three National Objectives*
- *Provide a direct benefit to low and moderate income persons or households*
- *Prevent or eliminate slums and blight*
- *Eliminate conditions which seriously and immediately threaten the public health and welfare*

*Additional conditions with respect to the expenditure of these funds includes the provision that at least 50% of the grant award must be expended in a manner which benefits individuals who earn 80% or less than the area's (county's) median income.*

WEBSITES FOR MITIGATION RESOURCES	
American Planning Association	<a href="http://planning.org">http://planning.org</a>
Community Rating System	<a href="http://www.fema.gov/national-flood-insurance-program-community-rating-system">http://www.fema.gov/national-flood-insurance-program-community-rating-system</a>
FEMA Mitigation Planning	<a href="http://www.fema.gov/multi-hazard-mitigation-planning">http://www.fema.gov/multi-hazard-mitigation-planning</a>
FEMA Public Assistance Program	<a href="https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit">https://www.fema.gov/public-assistance-local-state-tribal-and-non-profit</a>
Flood Mitigation Assistance Program	<a href="http://www.fema.gov/flood-mitigation-assistance-program">http://www.fema.gov/flood-mitigation-assistance-program</a>
Hazard Mitigation Grant Program	<a href="http://www.fema.gov/hazard-mitigation-grant-program">http://www.fema.gov/hazard-mitigation-grant-program</a>
HAZUS and HAZUS–MH	<a href="https://www.fema.gov/hazus">https://www.fema.gov/hazus</a>
Mitigation Success Stories	<a href="http://www.fema.gov/mitigation-best-practices-portfolio">http://www.fema.gov/mitigation-best-practices-portfolio</a>
National Flood Insurance Program	<a href="http://www.fema.gov/nfip">http://www.fema.gov/nfip</a>
National Hurricane Program	<a href="http://www.fema.gov/hazards/hurricanes/nhp.shtm">http://www.fema.gov/hazards/hurricanes/nhp.shtm</a>
NOAA Storm Events	<a href="http://www.ncdc.noaa.gov/stormevents/">http://www.ncdc.noaa.gov/stormevents/</a>
NH Homeland Security & Emergency Management	<a href="http://www.nh.gov/safety/divisions/hsem/">http://www.nh.gov/safety/divisions/hsem/</a>
Pre-Disaster Mitigation Program	<a href="https://www.fema.gov/pre-disaster-mitigation-grant-program">https://www.fema.gov/pre-disaster-mitigation-grant-program</a>
Small Business Administration	<a href="http://www.sba.gov/disaster">http://www.sba.gov/disaster</a>
U.S. Army Corps of Engineers	<a href="http://www.usace.army.mil">http://www.usace.army.mil</a>
U.S. Department of Agriculture (USDA)	<a href="http://www.usda.gov/da/disaster/nda.htm">http://www.usda.gov/da/disaster/nda.htm</a>
USDA , Natural Resources Conservation Service	<a href="http://www.nrcs.usda.gov">http://www.nrcs.usda.gov</a>
U.S. Department of Housing and Urban Development	<a href="http://portal.hud.gov/hudportal/HUD">http://portal.hud.gov/hudportal/HUD</a>

## **APPENDIX B**

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### **Documentation of Planning Process**

#### **Including:**

**Agendas  
Attendance Sheets  
Public Notices / Email Notices  
Problem Statements  
Mitigation Project Identification Matrix  
Prioritized Mitigation Projects**

## Barnstead, NH Hazard Mitigation Plan

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### November 7, 2018 Committee/Public Meeting AGENDA

1. Introductions
2. Review/Update Goals
3. Review/Update Hazard History
4. Review/Update Risk Matrix
5. MISC:
  - a. Any significant changes in development since fall of 2010, especially in hazard prone areas?
  - b. Participation/activities in NFIP since 2010?
  - c. Was the HMP incorporated into other planning mechanisms? If not, why?
6. Review for next meeting:
 

Update Critical Facilities (Chap. 4)  
 Update Capability Assessment (Chap.5)  
 Distribute Sample Mitigation Projects

#### ATTENDEES

Name	Title/Affiliation
Andrew Sylvester	Barnstead Road Agent
Brian Cochrane	SAU Superintendent
Jane Hubbard	Hubbard Consulting LLC
Jason Leavitt	Barnstead Deputy EMD
John Beland	Winnepesaukee Public Health Network
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Priscilla Tiede	Barnstead Selectman
Rick Duane	Barnstead Selectmen
Sean Dunn	Barnstead Selectmen
Tim Rice	Barnstead Elementary School Principal
Wayne Santos	Barnstead Emergency Management Director

## Barnstead, NH Hazard Mitigation Plan

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November 19, 2018

### Committee/Public Meeting AGENDA

1. Update Critical Facilities Chapter
2. Update Existing Mitigation Strategies Chapter
3. Distribute Sample Mitigation Projects
4. Review for next meeting:

Identify NEW Mitigation Projects

### ATTENDEES

Name	Title/Affiliation
Brian Cochrane	SAU Superintendent
Jane Hubbard	Hubbard Consulting LLC
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Rick Duane	Barnstead Selectmen
Sean Dunn	Barnstead Selectmen
Tim Rice	Barnstead Elementary School Principal
Wayne Santos	Barnstead Emergency Management Director



## Barnstead, NH Hazard Mitigation Plan

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December 19, 2018

### Committee/Public Meeting AGENDA

1. Identify NEW Mitigation Projects  
*Using the 'ProblemStatementsToProjects' form  
STAPLEE Worksheet*
2. Review for next meeting:  
  
Prioritize Projects  
Complete the Mitigation Action Plan

### ATTENDEES

Name	Title/Affiliation
Andrew Sylvester	Barnstead Road Agent
Brian Cochrane	SAU Superintendent
Jane Hubbard	Hubbard Consulting LLC
Jason Leavitt	Barnstead Deputy EMD
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Shawn Mulcahy	Barnstead Fire Department
Sean Dunn	Barnstead Selectmen
Wayne Santos	Barnstead Emergency Management Director

## Barnstead, NH Hazard Mitigation Plan

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January 9, 2019

### Committee/Public Meeting AGENDA

1. Prioritize Mitigation Projects
2. Complete the Mitigation Action Plan
3. Review for next meeting:

Review Draft of Hazard Mitigation Plan

### ATTENDEES

Name	Title/Affiliation
Andrew Sylvester	Barnstead Road Agent
George Krause	Barnstead Fire Warden
Jane Hubbard	Hubbard Consulting LLC
Jason Leavitt	Barnstead Police Chief
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Priscilla Tiede	Barnstead Selectman
Wayne Santos	Barnstead Emergency Management Director

## Barnstead, NH Hazard Mitigation Plan

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February 20, 2019

### Committee/Public Meeting AGENDA

1. Review Draft of Hazard Mitigation Plan

#### ATTENDEES

Name	Title/Affiliation
Andrew Sylvester	Barnstead Road Agent
Brian Cochran	School Superintendent
Jason Leavitt	Barnstead Police Chief
Jane Hubbard	Hubbard Consulting LLC
John Drew Jr.	Barnstead Deputy Fire Chief
Nancy Carr	Barnstead Planning Board Chair
Shawn Mulcahy	Barnstead Fire Chief
Tim Rice	Barnstead Elementary School Principal
Wayne Santos	Barnstead Emergency Management Director

## **PUBLIC NOTICE TO THE RESIDENTS OF BARNSTEAD, NH**

**PUBLIC NOTICE  
November 7, 2018 6:30 – 8:30pm  
Location: Barnstead Fire Department  
Barnstead, NH**

The Town of Barnstead, with the local Hazard Mitigation Planning Committee, is working to update Barnstead's *Hazard Mitigation Plan*. The *Plan* identifies potential natural and man-made hazards throughout the town and various projects and/or strategies to mitigate their effects. The President signed into law, the Disaster Mitigation Act of 2000 (DMA). The Act requires all local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition of receiving Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) project grants.

All residents, neighboring communities, businesses, and interested parties are formally invited to participate in the plan update process.

For more information, please contact Jane Hubbard at [jhubb\\_99@yahoo.com](mailto:jhubb_99@yahoo.com)

The above notice was posted at the Town Office, Library, Fire Department and Police Department. In addition, email notices were sent to neighboring towns, chamber of commerce and the regional planning commission, as shown below.

The following was emailed on 10/10/18, 11/9/18 and 12/14/18:

The Town of Barnstead, NH is in the process of updating its Hazard Mitigation Plan. This Plan is a tool to be used by the Town, as well as other local, state and federal governments, to reduce the effects of natural and man-made hazards. Our communities and organizations share common hazards which do not respect governmental boundaries. Therefore, we are personally inviting you to participate in the planning process to update the Town's Hazard Mitigation Plan.

We encourage you to attend the first Committee meeting on March 28, 2018 at 10:00am at the Barnstead Town Office. If you are unable to attend this meeting you may access a copy of the planning documents and/or comment on hazard mitigation issues by emailing Jane Hubbard with Hubbard Consulting LLC at [jhubb\\_99@yahoo.com](mailto:jhubb_99@yahoo.com) or at 603-848-8801.

For further information on mitigation planning, we are attaching a fact sheet. We look forward to hearing your ideas on how to mitigate future hazards for the community.

Thank you, on behalf of the Town of Barnstead,  
Jane Hubbard

Alton Police Chief/EMD  
Ryan Heath  
[police@alton.nh.gov](mailto:police@alton.nh.gov)

Gilmanton Fire Chief/EMD  
Joe Hempel  
[FireChief@gilmantonnh.org](mailto:FireChief@gilmantonnh.org)

Pittsfield EMD  
Rob Freese  
[robf@globefiresuits.com](mailto:robf@globefiresuits.com)

Strafford Fire Chief/EMD  
Scott Whitehouse  
[townclerk@strafford.nh.gov](mailto:townclerk@strafford.nh.gov)

Lakes Region Planning Commission  
Jeffrey Hayes  
[jhayes@lakesrpc.org](mailto:jhayes@lakesrpc.org)

SAU #86  
Brian Cochrane  
[bcochrane@mybes.org](mailto:bcochrane@mybes.org)

Lakes Region Public Health Network  
John Beland  
[jbeland@ppnh.org](mailto:jbeland@ppnh.org)

Shawna Leigh Morton  
NH HSEM Field Rep  
[shawnaleigh.morton@dos.nh.gov](mailto:shawnaleigh.morton@dos.nh.gov)

Jennifer Gilbert, NFIP Coord.  
Office of Energy & Planning  
[jennifer.gilbert@nh.gov](mailto:jennifer.gilbert@nh.gov)

Hazard	Problem Statements	<b>Projects</b> <i>RED is NOT Mitigation</i> <b>BOLD are existing projects from last edition of plan</b>	Social	Technical	Administrative	Political	Legal	Economic	Environment
<b>Dam Failure</b>	1. The Suncook Lake Dam (Valley Dam) and Parade Dam, if breached, would have a moderate human, property and business impact.								
	2. Homeowners generally are unaware of the location of the inundation pathways of these dams.	Educating homeowners of their location inundation pathway for the High Hazard Dams.	+	+	+	+	+	+	+
<b>Drought</b>	3. An extended drought increases the probability of fires and may hinder fire suppression.	Install new cisterns and dry hydrants, per the Rural Water Supply study.	+	+	+	+	+	-	+
<b>Earthquake</b>	4. Structures, including the elementary school and library, made of un-reinforced masonry are susceptible to earthquake damage.	<b>Continue to enforce Building Code Regulations.</b>	+	+	+	+	+	+	+
<b>Extreme Heat</b>	5. Educate elderly and special populations about health dangers associated with extreme heat.	<i>Improve air conditioning for cooling centers at the Elementary School and Town Hall.</i>	+	+	+	+	+	+	+
		<b>Implement public education programs on mitigation activities for All Hazards.</b>	+	+	+	+	+	+	+
<b>Flood</b>	6. Heavy rains and heavy snow melt cause flooding and erosion in and around undersized culverts and poorly drained roads.	<b>Investigate soil stabilization along Suncook River.</b>	+	-	+	+	+	-	-
		Increase capacity of culverts on North Barnstead, Narrows Road and 4 culverts on Gray Road.	+	+	+	+	+	-	-
	7. Suncook River and Big River are the primary sources of riverine flooding events.	<b>Update Flood maps and produce on GIS maps.</b>	+	+	+	+	+	+	+
		<b>Continue to enforce floodplain regulations, hold Community Assistance Visits with Office of Strategic Initiatives and educate the public on the NFIP regulations.</b>	+	+	+	+	+	+	+
<b>Hurricane</b>	8. Power outages from downed utilities, minor structural damage and flooding can affect the town as a result of a hurricane.	Install security window film for glass doors and windows at the Elementary School.	+	+	+	+	+	+	+
		(See Education project in Extreme Heat)							

Hazard	Problem Statements	<b>Projects</b> <i>RED is NOT Mitigation</i> <b>BOLD are existing projects from last edition of plan</b>	Social	Technical	Administrative	Political	Legal	Economic	Environment
<b>Lightning</b>	9. Structural and forest fires can result from frequent lightning strikes.	Install/Upgrade lightning protections systems (grounding, lightning rods, surge protectors, etc.) on Critical Facilities.	+	+	+	+	+	-	+
	10. Lightning protection								
<b>Severe Wind</b> (Tornado/ Downburst)	11. Wind damage can result in downed utilities causing power outages.								
	12. Severe winds can cause structural damage to critical facilities and other structures	See Hurricane projects							
	13. High population camps (recreational & lakes) areas are at high risk in severe wind events.								
<b>Wild/Forest Fire</b>	14. There is a strong potential for forest fire due to the heavy fuel load from ice storms and tornados.	<b>Continue to enforce fire permits and regulations.</b>	+	+	+	+	+	+	+
		Educate property owners and town personnel on how to reduce the risk of wildfire and improving forest management.	+	+	+	+	+	+	+
		(See Dry Hydrant project in Drought)	+	+	+	+	+	+	+
<b>Winter Weather</b>	15. All structures are susceptible to collapse due to heavy snow loads.								
	16. Resulting power outages result in increased emergency response calls and could require opening the shelter.	<b>Purchase generator for the Elementary School to be used as a shelter.</b>	+	+	+	+	+	-	+
		Purchase shelter supplies for use at the Elementary School.	+	+	+	+	+	-	+
<b>Human / Technological Caused</b>	17. Transportation related Hazardous Material incidents are highly probably and will result in moderate human, property & business impact.	<b>Hazardous Materials awareness training for Police and Highway personnel.</b>	+	+	+	+	+	+	+
		Purchase a fuel tank for DPW	+	+	+	+	+	+	+
	18. Utility interruptions are a common occurrence but have minimal impact unless it is for a prolonged duration.	Install a hardline phone at the EOC at Parade Fire Station.	+	+	+	+	+	+	+
		Replace the town repeater for day to operations and during disasters.	+	+	+	+	+	+	+

Hazard	Problem Statements	<b>Projects</b> <i>RED is NOT Mitigation</i> <b>BOLD are existing projects from last edition of plan</b>	<b>S</b> ocial	<b>T</b> echnical	<b>A</b> dministrative	<b>P</b> olitical	<b>L</b> egal	<b>E</b> conomic	<b>E</b> nvironment
	19. Special populations are at risk during prolonged power outages.	See Education Project in Extreme Heat							



For purposes of prioritizing the mitigation projects listed in the table below, each committee member should **vote for half of the projects (total of 6)** by **placing a check mark in the "# of votes" column.** The projects will be prioritized based upon the total number of votes received for each project.

<b><i>PRIORITIZED MITIGATION PROJECTS</i></b>	<b><i># OF VOTES</i></b>
1. Educating homeowners of their location inundation pathway for the High Hazard Dams.	4
2. Install new cisterns and dry hydrants, per the Rural Water Supply study.	3
3. <b>Continue to enforce Building Code Regulations.</b>	3
4. <b>Implement public education programs on mitigation activities for All Hazards.</b>	2
5. <b>Investigate soil stabilization along Suncook River.</b>	3
6. Increase capacity of culverts on North Barnstead, Narrows Road and 4 culverts on Gray Road.	7
7. <b>Update Flood maps and produce on GIS maps.</b>	3
8. <b>Continue to enforce floodplain regulations, hold Community Assistance Visits with Office of Strategic Initiatives and educate the public on the NFIP regulations.</b>	2
9. Install security window film for glass doors and windows at the Elementary School.	4
10. Install/Upgrade lightning protections systems (grounding, lightning rods, surge protectors, etc.) on Critical Facilities.	6
11. <b>Continue to enforce fire permits and regulations.</b>	3
12. Educate property owners and town personnel on how to reduce the risk of wildfire and improving forest management.	2

For purposes of prioritizing the NON-mitigation projects listed in the table below, each committee member should **vote for half of the projects (total of 4)** by **placing a check mark in the "# of votes" column.**

<b><i>PRIORITIZED NON-MITIGATION PROJECTS</i></b>	<b><i># OF VOTES</i></b>
1. Improve air conditioning for cooling centers at the Elementary School & Town Hall.	0
2. <b>Purchase generator for the Elementary School to be used as a shelter.</b>	7
3. Purchase shelter supplies for use at the Elementary School.	2
4. <b>Hazardous Materials awareness training for Police and Highway personnel.</b>	6
5. Purchase a fuel tank for DPW	6
6. Install a hardline phone at the EOC at Parade Fire Station.	7
7. Replace the town repeater for day to operations and during disasters.	4

## **APPENDIX C**

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### **Approval Letter from FEMA**



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

**FEMA**

June 18, 2019

Alexxandre Monastiero, State Hazard Mitigation Officer  
NH Department of Safety, Homeland Security and Emergency Management  
33 Hazen Drive  
Concord, New Hampshire 03303

Dear Ms. Monastiero:

As outlined in the FEMA-State Agreement for FEMA-DR-4316, your office has been delegated the authority to review and approve local mitigation plans under the Program Administration by States Pilot Program. Our Agency has been notified that your office completed its review of the Town of Barnstead, NH Hazard Mitigation Plan Update 2019 and approved it effective **June 12, 2019** through **June 11, 2024** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

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

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

Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Melissa Surette at (617) 956-7559 or [Melissa.Surette@fema.dhs.gov](mailto:Melissa.Surette@fema.dhs.gov).

Sincerely,

Capt. W. Russell Webster, (Ret.), CEM  
Regional Administrator  
FEMA Region I

WRW:ms

cc: Fallon Reed, Chief of Planning, New Hampshire