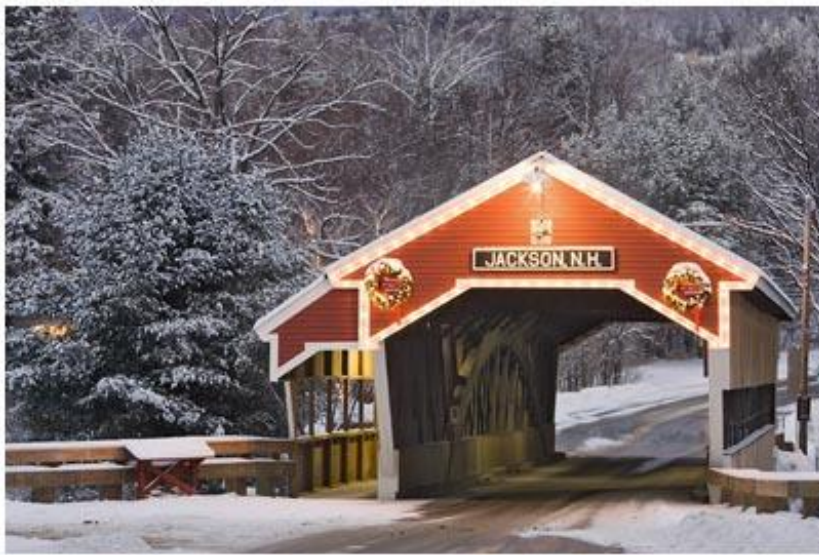


# **Jackson**

## **Hazard Mitigation**

### **Plan**

### **Update 2019**



**This plan integrates the following:**

- **Hazard Mitigation Plan Update (FEMA)**
- **Community Wildfire Protection Plan (DNCR)**

**November 14, 2019**  
**Final Plan for Adoption**

---

**Prepared for the Town of Jackson and NH Homeland Security &  
Emergency Management**

**By**  
**The Jackson Planning Team**

**With assistance from Mapping and Planning Solutions**

**J**  
**A**  
**C**  
**K**  
**S**  
**O**  
**N**

*“Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: The very definition of “emergency” is that it is unexpected, therefore it is not going to happen the way you are planning.”*

*-Dwight D. Eisenhower*

#### HAZARD MITIGATION PLAN DEFINITIONS

“A natural hazard is a source of harm or difficulty created by a meteorological, environmental, or geological event.”

“Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards (44CFR 201.2). Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.”

(Source: Local Mitigation Plan Review Guide, FEMA, October 1, 2011)



**Plan Prepared and Authored By**

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**Cover Photo: Jackson Covered Bridge**  
**Photo Credit: [ilovethelodge.com/jackson](http://ilovethelodge.com/jackson)**

## ***Table of Contents***

<b>ACKNOWLEDGEMENTS .....</b>	<b>5</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>7</b>
<b>CHAPTER 1: HAZARD MITIGATION PLANNING PROCESS .....</b>	<b>9</b>
A. AUTHORITY & FUNDING .....	9
B. PURPOSE & HISTORY OF THE FEMA MITIGATION PLANNING PROCESS .....	9
C. JURISDICTION.....	10
D. SCOPE OF THE PLAN & FEDERAL & STATE PARTICIPATION .....	10
E. PUBLIC & STAKEHOLDER INVOLVEMENT .....	11
F. INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION .....	13
G. HAZARD MITIGATION GOALS .....	14
H. HAZARD MITIGATION PLANNING PROCESS & METHODOLOGY .....	16
I. HAZARD MITIGATION BUILDING BLOCKS & TABLES .....	17
J. NARRATIVE DESCRIPTION OF THE PROCESS .....	18
<b>CHAPTER 2: COMMUNITY PROFILE .....</b>	<b>25</b>
A. INTRODUCTION .....	25
B. EMERGENCY SERVICES.....	26
C. JACKSON’S CURRENT & FUTURE DEVELOPMENT TRENDS.....	27
<i>Table 2.1: Town Statistics .....</i>	<i>28</i>
<b>CHAPTER 3: HAZARD IDENTIFICATION, RISK ASSESSMENT &amp; PROBABILITY .....</b>	<b>33</b>
A. HAZARD IDENTIFICATION .....	33
B. RISK ASSESSMENT .....	33
C. PROBABILITY.....	34
<i>Table 3.1: Hazard Identification &amp; Risk Assessment (HIRA).....</i>	<i>35</i>
D. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) STATUS.....	36
<i>Table 3.2: Historic Hazard Identification .....</i>	<i>38</i>
<b>CHAPTER 4: CRITICAL INFRASTRUCTURE &amp; KEY RESOURCES (CIKR) .....</b>	<b>49</b>
<i>Table 4.1 - Emergency Response Facilities (ERF) &amp; Evacuation .....</i>	<i>49</i>
<i>Table 4.2 – Non-Emergency Response Facilities (NERF) .....</i>	<i>50</i>
<i>Table 4.3 – Facilities &amp; Populations to Protect (FPP) .....</i>	<i>51</i>
<i>Table 4.4 – Potential Resources (PR) .....</i>	<i>51</i>
<b>CHAPTER 5: HAZARD EFFECTS IN JACKSON .....</b>	<b>53</b>
A. IDENTIFYING VULNERABLE CRITICAL INFRASTRUCTURE & KEY RESOURCES (CIKR) .....	53
B. CALCULATING THE POTENTIAL LOSS .....	54
C. NATURAL HAZARDS .....	55
D. TECHNOLOGICAL HAZARDS.....	65
E. HUMAN-CAUSED HAZARDS .....	68

<b>CHAPTER 6: CURRENT POLICIES, PLANS &amp; MUTUAL AID.....</b>	<b>71</b>
A. ANALYSIS OF EFFECTIVENESS OF CURRENT PROGRAMS .....	71
<i>Table 6.1: Current Policies, Plans &amp; Mutual Aid.....</i>	<i>71</i>
<b>CHAPTER 7: LAST MITIGATION PLAN.....</b>	<b>77</b>
A. DATE OF LAST PLAN.....	77
<i>Table 7.1: Accomplishments since the Last Plan.....</i>	<i>78</i>
<b>CHAPTER 8: NEW MITIGATION STRATEGIES &amp; STAPLEE .....</b>	<b>83</b>
A. MITIGATION STRATEGIES BY TYPE.....	83
B. POTENTIAL MITIGATION STRATEGIES BY HAZARD.....	84
C. STAPLEE METHODOLOGY.....	86
D. TEAM’S UNDERSTANDING OF HAZARD MITIGATION ACTION ITEMS.....	87
<i>Table 8.1: Potential Mitigation Action Items &amp; the STAPLEE.....</i>	<i>87</i>
<b>CHAPTER 9: IMPLEMENTATION SCHEDULE FOR PRIORITIZED ACTION ITEMS.....</b>	<b>91</b>
A. PRIORITY METHODOLOGY .....	91
B. WHO, WHEN, HOW? .....	92
<i>Table 9.1: The Mitigation Action Plan .....</i>	<i>92</i>
<b>CHAPTER 10: ADOPTING, MONITORING, EVALUATING AND UPDATING THE PLAN .....</b>	<b>99</b>
A. HAZARD MITIGATION PLAN MONITORING, EVALUATION AND UPDATES.....	99
B. INTEGRATION WITH OTHER PLANS .....	99
C. PLAN APPROVAL & ADOPTION.....	100
<b>CHAPTER 11: SIGNED COMMUNITY DOCUMENTS AND APPROVAL LETTERS .....</b>	<b>101</b>
A. PLANNING SCOPE OF WORK & AGREEMENT.....	101
B. APPROVED PENDING ADOPTION (APA) & FORMAL APPROVAL EMAILS FROM HSEM .....	105
C. SIGNED CERTIFICATE OF ADOPTION.....	107
D. FORMAL APPROVAL LETTER FEMA .....	109
E. CWPP APPROVAL LETTER FROM DNCR .....	110
F. ANNUAL REVIEW OR POST HAZARD CONCURRENCE FORMS .....	111
<b>CHAPTER 12: APPENDICES.....</b>	<b>119</b>
APPENDIX A: BIBLIOGRAPHY.....	121
APPENDIX B: TECHNICAL & FINANCIAL ASSISTANCE FOR HAZARD MITIGATION.....	123
APPENDIX C: THE EXTENT OF NATURAL HAZARDS.....	127
APPENDIX D: NH MAJOR DISASTER & EMERGENCY DECLARATIONS.....	147
APPENDIX E: ACRONYMS .....	152
APPENDIX F: POTENTIAL MITIGATION IDEAS .....	153

## Acknowledgements

This plan integrates elements to qualify it as a Community Wildfire Protection Plan (CWPP) according to the US Forest Service and the NH Department of Natural & Cultural Resources (DNCR). The plan was created through a grant from NH Homeland Security & Emergency Management (HSEM). The following organizations have contributed invaluable assistance and support for this project:

- NH Homeland Security & Emergency Management (HSEM)
- Federal Emergency Management Agency (FEMA)
- NH Office of Strategic Initiatives (OSI)
- Mapping and Planning Solutions (MAPS)
- NH Forests & Lands (DNCR)

### Record of Hazard Mitigation Plans

Jackson Multi-Hazard Mitigation Plan ..... 5/12/09  
 Jackson Hazard Mitigation Plan Update ..... 6/17/14

This plan is an update to the last Jackson Hazard Mitigation Plan, approved on June 17, 2014.

### Approval Notification Dates for 2019 Update

Approved Pending Adoption (APA): ..... November 13, 2019  
 Jurisdiction Adoption: ..... , 2019  
 CWPP Approval: ..... , 2019  
 Plan Approval Date (FEMA): ..... , 2019  
 Plan Distribution (MAPS): ..... , 2019

## TOWN OF JACKSON HAZARD MITIGATION PLANNING TEAM (HMPT)

The Town of Jackson would like to thank the following people for the time and effort spent to complete this plan. The following people have attended meetings and/or been instrumental in completing this plan:

- Tom Grieg ..... Jackson EMD
- Jay Henry ..... Jackson Fire Chief
- Gayle Dembowski ..... Jackson Grammar School
- Julie Hoyt ..... Jackson Administrative Asst.
- Julie Atwell ..... Jackson Town Administrator
- Nathan Boothby ..... Jackson Police Department
- Chris Perley ..... Jackson Police Chief
- Pat Kelley ..... Jackson Road Agent
- Richard Bennett ..... Jackson Selectboard
- Emily Benson ..... Jackson Deputy EMD
- Scott Hayes ..... Jackson Water Department
- Lichen Rancourt ..... Jackson Librarian
- Jennifer Gilbert ..... NH OSI
- Kayla Henderson ..... NH HSEM
- Heidi Lawton ..... NH HSEM
- June Garneau ..... MAPS
- Olin Garneau ..... MAPS

Many thanks for all the hard work and effort given by each and every one of you. This plan would not exist without your knowledge and experience. The Town of Jackson also thanks the Federal Emergency Management Agency and NH Homeland Security & Emergency Management as the primary funding sources for this plan.

Acronyms associated with the above list:

Asst. .... Assistant  
 EMD ..... Emergency Management Director

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## Executive Summary

The Jackson Hazard Mitigation Plan Update 2019 was compiled to assist the Town of Jackson in reducing and mitigating future losses from natural, technological or human-caused hazardous events. The plan was developed by participants of the Town of Jackson Hazard Mitigation Planning Team (HMPT), interested stakeholders, the general public and Mapping and Planning Solutions (MAPS). The plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.



This plan is an **update** to the 2014 Jackson Hazard Mitigation Plan. In an effort to produce an accurate and current planning document, the planning team used the 2014 plan as a foundation, building upon that plan to provide more timely information.

**Mitigation action items for natural hazards are the main focus of this plan.** However, in addition to natural hazards, this plan addresses technological and human-caused hazards as shown below.

### NATURAL HAZARDS

- Severe Winter Weather
- High Wind Events
- Inland Flooding
- Extreme Temperatures
- Lightning
- Wildfires
- Infectious Diseases
- Tropical & Post-Tropical Cyclones
- Drought
- Avalanches
- Earthquakes
- Solar Storm & Space Weather

### TECHNOLOGICAL HAZARDS

- Long Term Utility Outage
- Known & Emerging Contaminates
- Conflagration
- Hazardous Materials
- Aging Infrastructure

### HUMAN-CAUSED HAZARDS

- Transport Accidents
- Mass Casualty Incidents
- Terrorism & Violence
- Cyber Events

Some hazards that are listed in the 2018 NH Hazard Mitigation Plan were not included in this plan as the team felt they were extremely unlikely to occur in Jackson or not applicable. These hazards along with an explanation of why they are not included in this plan can be seen in Chapter 3, Section A.

This plan also provides a list of Critical Infrastructure & Key Resources (CIKR) categorized as follows: Emergency Response Facilities (ERF), Non-Emergency Response Facilities (NERF), Facilities and Populations to Protect (FPP) and Potential Resources (PR). In addition, this plan addresses the town’s involvement in the National Flood Insurance Program (NFIP).

Some communities, when faced with an array of hazards, are able to adequately cope with the impact of these hazards. For example, although Severe Winter Weather is often a common hazard in New Hampshire and more often than not considered to be the most likely to occur, most New Hampshire communities handle two to three foot snowstorms with little or no disruption of services. On the other hand, an unexpected ice storm can have disastrous effects on a community. Mitigation for this type of sudden storm is difficult to achieve: establishing warming and cooling centers, establishing notification systems, providing public outreach, tree trimming, opening shelters and perhaps burying overhead power lines are just a few of the action items that may be put in place.

In summary, finding mitigation action items for every hazard that affects a community is at times difficult. In addition, with today’s economic constraints, cities and towns are less likely to have the financial ability to complete some mitigation action items, such as burying power lines. In preparing this plan, the Jackson HMPT has considered a comprehensive list of mitigation action items that could diminish the impact of hazards but has also decided to maintain a list of preparedness action items for future reference and action.

To simplify the language in the plan, the following abbreviations and acronyms will be used:

Jackson Hazard Mitigation Plan Update 2019.....	the plan or this plan
Jackson.....	the town or the community
Hazard Mitigation Planning Team.....	the team or HMPT
Hazard Mitigation Plan.....	HMP
Emergency Operations Plan.....	EOP
Mapping and Planning Solutions .....	MAPS
Mapping and Planning Solutions Planner.....	the planner
NH Homeland Security & Emergency Management .....	HSEM
Federal Emergency Management Agency .....	FEMA

*For more acronyms, please refer to Appendix E: Acronyms*

**Mission Statement:**  
To make Jackson less vulnerable to the effects of hazards through the effective administration of hazard mitigation planning, wildfire hazard assessments, and a coordinated approach to mitigation policy and planning activities.

**Vision Statement:**  
The Town of Jackson will reduce the impacts of natural hazards and other potential disasters through implementing mitigation measures, public education and deliberate capital expenditures within the community. Homes and businesses will be safer and the community’s ISO rating may be improved.



## Chapter 1: Hazard Mitigation Planning Process

### A. AUTHORITY & FUNDING

The Jackson Hazard Mitigation Plan Update 2019 was prepared in accordance with the Disaster Mitigation Act of 2000 (DMA), Section 322 Mitigation Planning, signed into law by President Clinton on October 30, 2000. This hazard mitigation plan was prepared by the Jackson Hazard Mitigation Planning Team (HMPT) under contract with New Hampshire Homeland Security & Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition) and with the assistance and professional services of Mapping and Planning Solutions. This plan was funded by HSEM through grants from the Federal Emergency Management Agency (FEMA). Matching funds for team members' time were also part of the funding formula.

### B. PURPOSE & HISTORY OF THE FEMA MITIGATION PLANNING PROCESS

*The ultimate purpose of Disaster Mitigation Act of 2000 (DMA) is to:*

*"...establish a national disaster hazard mitigation program -*

- To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and*
- To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster".<sup>1</sup>*

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section "322 – Mitigation Planning" which states:

*"As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government."<sup>2</sup>*

HSEM's goal is to have all New Hampshire communities complete a local hazard mitigation plan as a means to reduce future losses from natural hazards before they occur. HSEM outlined a process whereby communities throughout the state may be eligible for grants and other assistance upon completion of this hazard mitigation plan.

The Jackson Hazard Mitigation Plan Update 2019 is a planning tool to use to reduce future losses from natural, technological and human-caused hazards as required by the Disaster Mitigation Act of 2000. This plan does not constitute a section of the town's Master Plan. However mitigation action items from this plan may be incorporated into future Master Plan updates.

The DMA places emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition to receiving Hazard Mitigation Grant Program (HMGP) project grants. Local governments must review this plan yearly and update this plan every five years to continue program eligibility.

<sup>1</sup> Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2

<sup>2</sup> Disaster Mitigation Act (DMA) of 2000, Section 322a

### C. JURISDICTION

This plan addresses one jurisdiction – the Town of Jackson, NH.

### D. SCOPE OF THE PLAN & FEDERAL & STATE PARTICIPATION

A community's hazard mitigation plan often identifies a vast number of natural hazards and is somewhat broad in scope and outline. The scope and effects of this plan were assessed based on the impact of hazards and wildfire on: *Critical Infrastructure & Key Resources (CIKR), current residential buildings, other structures within the town, future development, administrative, technical and physical capacity of emergency response services and response coordination between federal, state and local entities.*

In seeking approval as a Hazard Mitigation Plan (HMP) and a Community Wildfire Protection Plan (CWPP), the planning effort included participation of NH Homeland Security & Emergency Management (HSEM), the United States Department of Agriculture-Forest Service (USDA-FS), the NH Department of Natural & Cultural Resources (DNCR) and the NH Office of Strategic Initiatives (OSI) as well as routine notification of upcoming meetings to state and federal entities above. Designation as a CWPP may allow a community to gain access to federal funding for hazardous fuels reduction and other mitigation projects supported by the USDA-FS. By merging the two federal planning processes (hazard and wildfire), duplication is eliminated and the town has access to a larger pool of resources for pre-disaster planning.

The Healthy Forest Restoration Act (HFRA) of 2003 includes statutory incentives for the US Forest Service to give consideration to local communities as they develop and implement forest management and hazardous fuel reduction projects. For a community to take advantage of this opportunity, it must first prepare a CWPP. This hazard mitigation planning process not only satisfies FEMA's criteria regarding wildfires and all other hazards but also addresses the minimum requirements for a CWPP:

- **Collaboration:** *A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.*
- **Prioritized Fuel Reduction:** *A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.*
- **Treatment of Structural Ignitability:** *A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.<sup>3</sup>*

Finally, as required under Code of Federal Regulations (CFR), Title 44, Part 201.6(c) (2) (ii) and 201.6(c) (3) (ii), the plan must address the community's participation in the National Flood Insurance Program (NFIP), its continued compliance with the program and as part of vulnerability assessment, the plan must address the NFIP insured structures that have been repetitively damaged due to floods.

<sup>3</sup> Healthy Forest Restoration Act; HR 1904, 2003; Section 101-3-a.b.c; [http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108\\_cong\\_bills&docid=f:h1904enr.txt.pdf](http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf)

## E. PUBLIC & STAKEHOLDER INVOLVEMENT

Public and stakeholder involvement was stressed during the initial meeting and community officials were given a matrix of potential team members (page 18). Community officials were urged to contact as many people as they could to participate in the planning process, including not only residents but also officials and residents from surrounding communities. The Town of Jackson understands that natural hazards do not recognize political boundaries.

Jackson is part of SAU 9 with the surrounding towns of Albany, Bartlett, Chatham, Conway, Eaton and Hart's Location. Students in grades K-6 attend the Jackson Grammar School. Middle school students in grades 7-8 attend Bartlett Middle School in Bartlett and students in grades 9-12 attend Kennett High School in Conway. The Jackson Grammar School principal was in attendance at two hazard mitigation meetings.

The town also provided excellent public and stakeholder notification. Many interested citizens and stakeholders had the opportunity to become aware of the hazard mitigation planning taking place in Jackson. A press release (see below left) was posted on the Town Hall bulletin board and on Jackson E-News. Meeting dates were also posted on the town's website (see below right).

*Mapping and Planning Solutions  
105 Union Street, Suite 1  
Whitefield, NH 03598*

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**Press Release**

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FOR IMMEDIATE RELEASE  
Updated: December, 2018

Contact: June Garneau  
603-837-7122

**TOWN OF JACKSON COMMENCES  
HAZARD MITIGATION PLANNING**

The Emergency Management Director for the Town of Jackson recently met with June Garneau, of Mapping and Planning Solutions and other Team members from Jackson, to begin work on the required five-year update to the **2014 Jackson Hazard Mitigation Plan**. As a result of this meeting, Mapping and Planning Solutions is conducting a series of meetings on the Hazard Mitigation Plan over the next few months.

Through this series of public meetings, the Team will address issues such as flooding, hurricanes, drought, landslides and wildfires, and determine efforts the Town can undertake to mitigate the effects of both natural and human-caused hazards. The Team will also examine potential shelter sites and the need for generators at those sites.

By examining critical infrastructure and key resources, along with past hazards, the team will establish priorities for future mitigation projects and steps that can be taken to increase public awareness of hazards in general.

As mandated by the Disaster Mitigation Act of 2000, all municipalities are required to complete a local Hazard Mitigation Plan in order to qualify for Federal Emergency Management Administration funding should a natural disaster occur. The planning processes are made possible by grants from FEMA.

The Hazard Mitigation Planning Team is currently being formed; Jackson citizens and any interested stakeholders are invited to participate. All interested parties should contact Tom Grieg, the Jackson Emergency Management Director, at 356-5645 if they wish to be included in the process.

The next meeting is scheduled for **Monday, January 28** from **1:00 PM to 3:00 PM** at the Jackson Town Offices. The general public is encouraged to attend all meetings, regardless of whether they are a part of the Planning Team.

More information on the hazard mitigation planning process is available from June Garneau at Mapping and Planning Solutions, 603-837-7122.

27	28	29
<b>24th ANNUAL ICE CARVING COMPETITION</b> 12:00am <b>Old Library - Interfaith Gathering</b> 7:45am to 9:15am <b>Whitney Center: Da Capo Singers</b> 4:00pm	<b>Old Library - Bridge</b> 12:30pm to 3:30pm <b>Town Hazard Mitigation Update meeting</b> 1:00pm to 3:00pm	<b>Old Library - Yoga</b> 9:30am to 10:30am

### Town Hazard Mitigation Update meeting



**Event Date:** Monday, January 28, 2019 - 1:00pm to 3:00pm

*Mapping and Planning Solutions*

*105 Union Street, Suite 1*

*Whitefield, NH 03598*

Lastly, the planner sent a monthly calendar to NH EMDs, Police Chiefs, Fire Chiefs, Rangers and other state, federal and private officials, including stake-holders for the town (example shown below).

### Upcoming Meetings

(Highlighted by "Counties" as of April 22, 2019)

Day	Date	Time	Town/Location	Plan Type	HSEM Field Rep	County
Tuesday	4/23/19	10:00 AM	Greenfield Fire Station	HMP	Liz Gilboy	Hillsboro
Thursday	4/25/19	6:30 PM	Jefferson Town Offices	EOP	Heidi Lawton	Coos
Monday	4/29/19	1:00 PM	Jackson Town Offices	HMP	Heidi Lawton	Carroll
Wednesday	5/1/19	9:00 AM	Waterville Valley Town Offices	HMP	Paul Hatch	Grafton
Wednesday	5/1/19	1:00 PM	Campton Town Offices	HMP	Paul Hatch	Grafton
Thursday	5/2/19	2:00 PM	Conway Fire Station	HMP	Heidi Lawton	Carroll

It was noted that team composition is expected to be lower in smaller communities because of the small population base and the fact that many people "wear more than one hat". It is often very difficult to attract individual citizens to participate in town government and those that do generally hold full-time jobs and work as volunteers in a variety of town positions. With small populations, the percent of interested citizens in a town's planning processes is extremely small due to the availability of jobs and other economic factors, the town's relatively high elderly population and a dwindling amount of young people with interest in politics.

Jackson had good participation in the development of this plan. In addition to the Emergency Management Director (EMD) and the Assistant EMD, members of the Jackson Fire, Police, Water and Highway Departments participated in meetings. The Town Administrator, the Administrative Assistant, a member of the Selectboard, the Jackson School Principal and the Jackson Public Library Director also took part in meetings. Comments made by all team members who attended were integrated into the narrative discussion and were incorporated into the essence of the document. No individual citizens of the community attended meetings; therefore no comments from the public were incorporated into the plan.

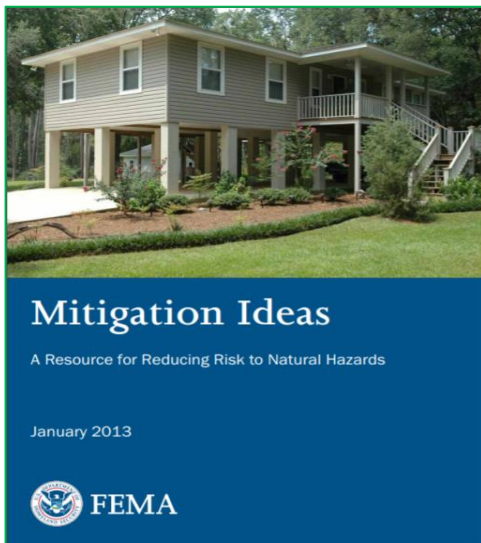
§201.6(b) requires that there be an open public involvement process in the formation of a plan. This process shall provide an opportunity for the public to comment on the plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing plans, studies, reports, and technical information and incorporation of those in the plan, to assist in the development of a comprehensive approach to reducing losses from natural disasters.

## F. INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

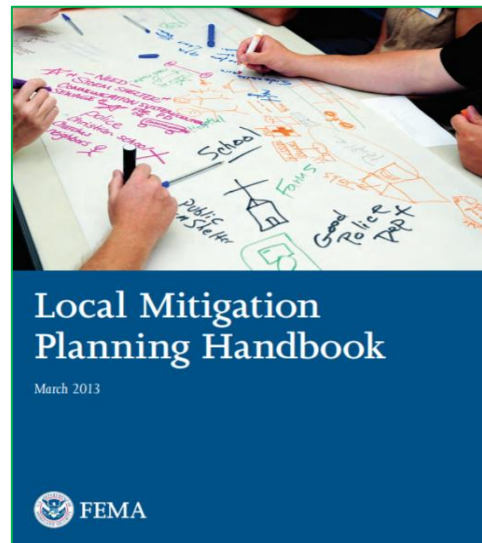
The planning process included a complete review of the Jackson Hazard Mitigation Plan of 2014 for updates, development changes and accomplishments. In addition, as noted in the Bibliography and in footnotes located throughout the plan many other documents were used to create this mitigation plan. Some, but not all, of those plans and documents are listed as follows:

The Jackson Hazard Mitigation Plan of 2014 .....	Compare & Contrast
Jackson Master Plan (2016) .....	Community Information
Jackson Annual Report (2018) .....	Fire Report & Development
Other Hazard Mitigation Plans (Tamworth, Franconia, Albany) .....	Formats & Mitigation Ideas
The Jackson Land Subdivision Regulations (2015) .....	New Development Regulations
The Jackson Zoning Ordinance (2019) .....	Town Regulations
Flood Plain Development Ordinance (part of Zoning Ordinance).....	Floodplain Regulations
Census 2010 Data .....	Population Data
The NH DRA Summary of Inventory of Valuation MS-1 2018 for Jackson .....	Structure Evaluation
The Economic & Labor Market Information Bureau, Community Profile .....	Population Trends
The American Community Survey (ACS 2013-2017) .....	Population Trends
Mitigation Ideas, FEMA, January 2013 .....	Mitigation Strategies
NH Department of Cultural Resources (DNCR-Forest Forests & Lands) .....	DNCR Fire Report
NH Office of Strategic Initiatives (OSI) .....	Flood Losses
The NH Department of Revenue property tax valuation.....	Property Information

Other technical manuals, federal and state laws as well as research data were combined with these elements to produce this integrated hazard mitigation plan. Please refer to the Bibliography in *Appendix A: Bibliography* and the plan's footnotes.



<https://www.fema.gov/media-library/assets/documents/30627>



<https://www.fema.gov/media-library/assets/documents/31598>

## **G. HAZARD MITIGATION GOALS**

Before identifying new mitigation action items, the team reviewed and agreed to the goals in the State of New Hampshire Multi-Hazard Mitigation Plan, Update 2018. These goals are detailed below.

### **OVERARCHING GOALS**

The following are the five overarching goals of this plan:

- *Minimize loss and disruption of human life, property, the environment and the economy due to natural, technological and human-caused hazards through a coordinated and collaborative effort between federal, state and local authorities to implement appropriate hazard mitigation measures.*
- *Enhance protection of the general population, citizens and guests of the community before, during and after a hazard event through public education about disaster preparedness and resilience and expanded awareness of the threats and hazards which face the community.*
- *Promote continued comprehensive hazard mitigation planning at local levels to identify, introduce and implement cost effective hazard mitigation measures.*
- *Address the challenges posed by climate change as they pertain to increasing the risk and impacts of the hazards identified within this plan.*
- *Strengthen Continuity of Operations and Continuity of Government across at the local level to ensure continuation of essential services*

### **NATURAL HAZARD OBJECTIVES**

- *Reduce long-term flood risks through assessment, identification and strategic mitigation of at risk/vulnerable infrastructure (dams, stream crossings, roadways, coastal levees, etc.).*
- *Minimize illnesses and deaths related to events that present a threat to human and animal health.*
- *Assist communities with plan development, outreach and public education in order to reduce the impact from natural disasters.*
- *Ensure mitigation strategies consider the protection and resiliency of natural, historical and cultural resources.*

### **TECHNOLOGICAL HAZARD OBJECTIVES**

- *Ensure technological hazards are responded to appropriately and to mitigate the effect on citizens.*
- *Build upon state and local capabilities to identify and respond to emerging contaminants.*
- *Effectively collaborate between federal, state and local agencies as well as private partners, Non-Governmental Organizations (NGOs) and Volunteer Organizations Active in Disasters (VOADs).*



- Enhance public education of technological hazards to assist in the prevention and mitigation of hazard impacts on the population.
- Ensure HAZMAT teams are properly equipped and trained to respond, contain and mitigate incidents involving technological hazards.
- Reduce the possibility of long-term utility outages by planning, training and exercising on utility failure events.
- Lessen the effects of technological hazards on communications infrastructure by building more resilient voice and data systems.

### HUMAN-CAUSED HAZARD OBJECTIVES

- Ensure that grant related funding processes allow for expedient and effective actions to take place at the community and state-level.
- Identify Critical Infrastructure & Key Resources (CIKR) risks or vulnerabilities and protect or harden infrastructure against hazards.
- Improve the ability to respond and mitigate Cyber Events through increased training, exercising, improved equipment and utilizing the latest technologies.
- Foster collaboration between federal, state and local agencies on training, exercising and preparing for mass casualty incidents and terrorism.
- Ensure that state and community assets (i.e. hospitals, state agencies, non-profits, universities, nursing homes, prisons, etc.) are prepared for all phases of emergency management including training and exercising on reunification.

### Did You Know?



Money spent on reducing the risk of natural hazards is a wise investment. FEMA administers three grant programs that provide funding for eligible mitigation planning and projects: the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

*FEMAE-Brief, April 12, 2017*

## H. HAZARD MITIGATION PLANNING PROCESS & METHODOLOGY

The planning process consisted of twelve specific steps; some steps were accomplished independently while other areas were interdependent. Many factors affected the ultimate sequence of the planning process such as the number of meetings, community preparation, attendance and other community needs. The planning process resulted in significant cross-talk regarding all types of natural, technical and human-caused hazards by team members.



All steps were included but not necessarily in the numerical sequence listed. The list of steps is as follows:

### PLANNING STEPS

Step 01: Team formation, orientation and goals

Step 02: Identify hazards and their risk and probability

*Table 3.1 – Hazard Identification & Risk Assessment (HIRA)*

Step 03: Profile and list historic and potential Hazards

*Table 3.2 – Historic and Potential Hazards*

Step 04: Profile, list and establish risk for Critical Infrastructure & Key Resources (CIKR)

*Tables 4.1 to 4.4 – Critical Infrastructure & Key Resources*

Step 05: Assess community's participation in National Flood Insurance Program (NFIP)

*Chapter 3, Section D*

Step 06: Prepare an introduction to the community, discuss emergency service capabilities and development trends and review statistical information about the town

*Chapter 2, Sections A, B and C and Table 2.1, Town Statistics*

Step 07: Review current plans, policies & mutual aid & brainstorm to identify improvements

*Table 6.1 – Current Plans, Policies and Mutual Aid*

Step 08: Examine the mitigation actions items from the last plan

*Table 7.1 – Accomplishments since the Last Plan*

Step 09: Evaluate and categorize potential mitigation action items

*Tables 8.1 - Potential Mitigation Strategies & the STAPLEE*

Step 10: Prioritize mitigation action items to determine and action plan

*Table 9.1 – The Mitigation Action Plan*

Step 11: Review the plan before submission to HSEM/FEMA for APA (Approved Pending Adoption)

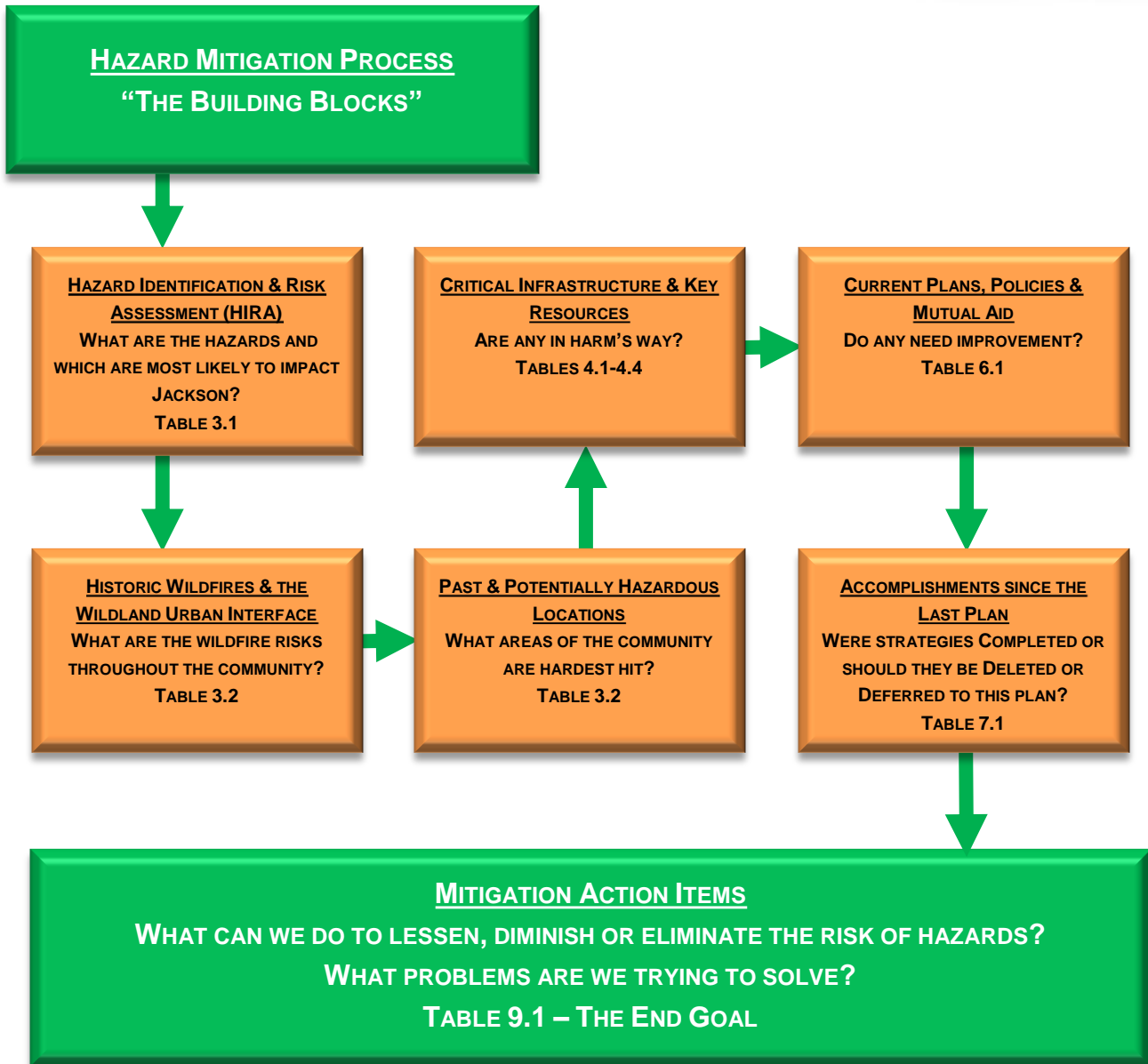
Step 12: Adopt and monitor the plan



## I. HAZARD MITIGATION BUILDING BLOCKS & TABLES

Using a “building block” approach, the base, or foundation, for the mitigation plan update was the last plan. Each table that was completed had its starting point with the last hazard mitigation plan completed by the community.

Ultimately, the “building blocks” lead to the final goal, the development of prioritized mitigation “action items” that when put into an action plan, would lessen or diminish the impact of natural hazards on the town.



## J. NARRATIVE DESCRIPTION OF THE PROCESS

The plan was developed with substantial local, state and federal coordination. Completion of this new hazard mitigation plan required significant planning preparation. All meetings were geared to accommodate brainstorming, open discussion and an increased awareness of potential hazardous conditions in the town.

The planning process included a complete review of the 2014 Jackson Hazard Mitigation Plan. Using the 2014 plan as a base, each element of the old plan was examined and revised to reflect changes that had taken place in development and in the priorities of the community. In addition, referring to the 2014 plan, strategies from the past were reassessed and improved upon for the future.

The following narrative explains how the 2014 Jackson Hazard Mitigation Plan was used during each step of the planning process to make revisions that resulted in this plan.

### MEETING 1, DECEMBER 3, 2018

The first full meeting of the Jackson Hazard Mitigation Team was held on December 3, 2018. Meeting attendance included Tom Grieg (Emergency Management Director), Jay Henry (Fire Chief), Gayle Dembowski (Jackson Grammar School Principal), Julie Hoyt (Administrative Assistant), Julie Atwell (Town Administrator), Nathan Boothby (Police Officer), Chris Perley (Police Chief), Pat Kelley (Road Agent), Richard Bennett (Selectboard), Emily Benson (Deputy Emergency Management Director), Heidi Lawton (NH Homeland Security & Emergency Management), Olin Garneau (Mapping & Planning Solutions) and June Garneau (Mapping & Planning Solutions).

To introduce the team to the planning process, June reviewed the evolution of hazard mitigation plans, the funding, the 12 Step Process (handout), the collaboration with other agencies and the "Goals" (handout). June also explained the need to sign-in, track time (handout) and to provide public notice to encourage community involvement.

Work then began on *Table 2.1, Town Statistics*. Most of the work on this table was complete at this meeting with the exception of a few items that June would either determine through GIS or get at a later date. There was some discussion about the seasonal population change in Jackson with summer and winter homes and visitors. It was determined that Jackson has a major influx of seasonal tourists in both winter and summer.

#### HAZARDS MITIGATION POTENTIAL TEAM MEMBERS

##### FEDERAL

USDA Forest Service

##### STATE

Department of Transportation (DOT)

Department of Natural & Cultural  
Resources (DNCR)

Office of Strategic Initiatives (OSI)

##### LOCAL

Selectmen (Past/Present)

Town Manager/Administrator

Town Planner

Police Chief

Fire Chief

Emergency Management Director (EMD)

Emergency Services

Fire Warden

Health Services

Education/School

Recreation Directors

Public Works Director

Road Agent

Water Management

Public Utilities

Waste Management

Dam Operators

Major Employers

##### LOCAL - SPECIAL INTEREST

Land Owners

Home Owners

Forest Management

Timber Management

Tourism & Sportsman's Groups

Developers & Builders

##### EXPERTS

GIS Specialists

Next on the Agenda were hazard identification and the completion of *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*. Using the town's last HMP and the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018, the team was able to assess which hazards could affect the community. After the hazards had been identified, the team then assessed the risk severity and probability by ranking each hazard on a scale of 1-5 (5 being very high or catastrophic) based on the following:

The Human Impact..... Probability of Death or Injury  
 The Property Impact..... Physical Losses and Damages  
 The Business Impact..... Interruption of Service  
 The Probability ..... Likelihood of this occurring within 25 years

The rankings were then calculated to reveal the hazards which pose the greatest risks to the community. Twelve natural hazards, five technological hazards and four human-caused hazards were identified. After analyzing the natural hazards in Table 3.1, Severe Winter Weather, High Wind Events and Inland Flooding were designated the "High Risk" natural hazards for the town.

Having completed Table 3.1, the team started working on descriptions of each hazard and how they could, or do impact the community. In order to gain more knowledge of the impact of these hazards, June asked the team to describe each hazard as it relates to Jackson. For example, some of the questions asked were:

- *How often do these hazards occur?*
- *Do the hazards damage either the roads or structures?*
- *Have the hazards resulted in loss of life?*
- *Are the elderly and functional needs populations particularly at risk?*
- *What has been done in the past to cope with the hazards?*
- *Was outside help requested?*
- *Are the hazards further affected by an extended power failure?*
- *What mitigation actions can we take to eliminate the hazard or diminish its impact?*

In addition to bringing more awareness to the hazards, these questions provided information to further analyze the impact of the hazards on the community. June noted that these descriptions would be used in Chapter 5.

With time running out the descriptions were not completed. June thanked the team for their work and assigned "homework" to team members, including requesting that the Road Agent prepare a list of road/culvert projects that would need to be completed within the next five years. June also asked the team to think about Critical Infrastructure & Key Resources (CIKR) and past events that have affected the town. The next meeting was scheduled for Monday, January 28, 2019.

#### Meeting 1 – December 3, 2018

##### **1) Introduction**

- a) Evolution of Hazard Mitigation Plans & Community Wildfire Protection Plans
- b) Reasons for Hazard Mitigation and Update
- c) Community involvement to solicit input on how to mitigate the effects of hazards
- d) Devise a plan that lessens, diminishes or completely eliminates the threat of hazards to the town

##### **2) The Process**

- a) Funding
- b) Review of 12 Step Process & The Team (handout)
- c) Collaboration with other Agencies (HSEM, WMNF)

##### **3) Meetings**

- a) Community Involvement - Public Notice, Press Release
- b) Stakeholders
- c) Signing In, Tracking Time, Agendas, Narrative (handout)

##### **4) Today's Topics**

- a) Table 2.1, Town Information
- b) Table 3.1, Hazard Identification & Analysis
- c) Hazard Descriptions
- d) Table 4.1-4.4, Critical Infrastructure & Key Resources
- e) Table 3.2, Historic Hazard Identification (time allowing)

##### **5) Homework**

- a) Homework – Critical Infrastructure & Key Resources
- b) Digital Photos – contributions welcome

##### **6) Future Meetings**

- a) \_\_\_\_\_

**MEETING 2, JANUARY 28, 2019**

Meeting attendance included Tom Grieg, Jay Henry, Julie Hoyt, Julie Atwell, Nathan Boothby, Chris Perley, Pat Kelley, Richard Bennett, Emily Benson, Kayla Henderson (NH Homeland Security & Emergency Management), Olin Garneau and June Garneau.

The meeting began with a review of the work that was done at the previous meeting. June reviewed *Table 2.1, Town Statistics* to ensure that the town data was accurate; no changes were made. June then reviewed *Table 3.1, Hazard Identification & Risk Assessment (HIRA)* to be certain the team felt the hazards were in the correct order for the town.

Next on the agenda was the completion of the hazard descriptions that were started at the previous meeting. While doing the hazard descriptions, development trends were also discussed.

The team then began work on *Table 3.2, Historic Hazard Identification*, which lists past and potentially hazardous locations and/or events. First, they looked at the hazards that were listed in the last plan and determined which they would like to see kept in this plan. Next, the team examined the record of Major Disaster and Emergency Declarations that have taken place in recent years.

With time running out June reviewed what would take place at the next meeting and thanked the team. The next meeting was set for Monday, February 25, 2019.

**MEETING 3, FEBRUARY 25, 2019**

Meeting attendance included Tom Grieg, Jay Henry, Julie Atwell, Nathan Boothby, Chris Perley, Pat Kelley, Emily Benson, Scott Hayes (Water Department), Lichen Rancourt (Librarian), Heidi Lawton and June Garneau.

First on the agenda was a review of the last meeting, including a review of *Table 3.2, Historic Hazard Identification*. While reviewing Table 3.2, June took the opportunity to explain the Wildland Urban Interface (WUI); this area is determined to be the area in which the urban environment interfaces with the wildland environment and the area that is most prone to the risk of wildfires. In Jackson, it was noted that the WUI, if determined using the 1320 foot buffer method, would cover much of the village. Therefore, the entire town was thought to be in the WUI. Mitigation strategies were discussed to protect structures and to educate the town's citizens about the risk of wildfire.

**Meeting 2 – January 28, 2019****1) Last Meeting**

- a) Reviewed planning process, purpose, funding & collaboration.
- b) Reviewed of community involvement and stakeholders
- c) Worked on Table 2.1, Town Information
- d) Worked Table 3.1, Hazard Identification & Analysis
- e) Worked on Hazard Descriptions

**2) Today's Topics**

- a) Review....
  - i) Table 2.1, Town Statistics
  - ii) Table 3.1, Hazard Threat Analysis
- b) Finish Hazard Descriptions
  - i) Development
  - ii) Roads
- c) Work on....
  - i) Table 3.2, Historic Hazard Identification
  - ii) Table 4.1-4.4, Critical Infrastructure & Key Resources
  - iii) Table 6.1, Current Plans, Policies & Mutual Aid (time allowing)
  - iv) Table 7.1, Accomplishments since the prior plan (time allowing)

**3) Homework**

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

**4) Future Meetings**

- a) \_\_\_\_\_

**Meeting 3 – February 25, 2019****1) Last Meeting**

- a) Reviewed....
  - i) Table 2.1, Town Information
  - ii) Table 3.1, Hazard Identification & Analysis
- b) Finished....
  - i) Hazard Descriptions
- c) Worked on....
  - i) Table 3.2, Historic Hazard Identification

**2) Today's Topics**

- a) Work on....
  - i) Table 4.1-4.4, Critical Infrastructure & Key Resources
  - ii) Table 6.1, Current Plans, Policies & Mutual Aid
  - iii) Table 7.1, Accomplishments since the prior Plan

**3) Homework**

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

**4) Future Meetings**

- a) \_\_\_\_\_

Next on the agenda were *Tables 4.1–4.4, Critical Infrastructure & Key Resources (CIKR)*. The Emergency Response Facilities, the Non-Emergency Response Facilities, the Facilities & Populations to Protect and the Potential Resources from the 2014 plan were examined and a few minor adjustments were made for this plan. In addition, the evacuation routes, helicopter landing zones and bridges on the evacuation routes were identified. Lastly, each of the Critical Infrastructure & Key Resources were analyzed for their “Hazard Risk”.

The team then began working on *Table 6.1, Current Plans, Policies & Mutual Aid*. Like other tables, this table was also pre-populated with information from the 2014 plan. Looking closely at the existing policies from the last plan and current mechanisms that are in place, the team determined if each plan, policy or mutual aid system should be designated as “No Improvements Needed” or “Improvements Needed” based on the “Key to Effectiveness” found in Chapter 6.

It was explained to the team that those items that needed improvement would become new “Action Items” for this plan and be discussed again and re-prioritized when we got to our final table, *Table 9.1, The Mitigation Action Plan*.

June adjourned the meeting and promised to write statements to support the concepts and ideas that were expressed for Table 6.1. The next meeting was scheduled for Monday, April 8, 2019.

#### **MEETING 4 – APRIL 8, 2019**

Meeting attendance included Tom Grieg, Jay Henry, Gayle Dembowski, Julie Hoyt, Julie Atwell, Pat Kelley, Emily Benson, Heidi Lawton, Olin Garneau and June Garneau.

June led the team through a review of the work that was done at the last meeting, including a review of the Critical Infrastructure & Key Resources that were listed in Tables 4.1–4.4. The review also included a complete review of Table 6.1 to ensure that the comments and ideas expressed by the team were fully represented. Work on this table resulted in 13 new “Action Items” for this plan, six of which are also in Table 7.1.

*Table 7.1, Accomplishments since the Last Plan*, also pre-populated with data from the 2014 Plan, was the next agenda item. June led the team through each strategy to determine which of these was “Completed” should be “Deleted” or should be “Deferred” to this plan as a new mitigation action item. Some of the action items from the 2014 plan had been completed or partially completed by the town while some were deleted as they were felt to be no longer useful or considered to be emergency preparedness, not mitigation. Still others were “deferred” for consideration as new “Action Items” for this plan.

June then provided the team with handouts detailing a comprehensive list of possible mitigation action items (see Chapter 8, Section A & B and Appendix F). June also encouraged team members to explore the link on their agendas for the FEMA Mitigation Idea booklet to see if any of the strategies in this book would be useful in Jackson (see right).

#### **Meeting 4 – April 8, 2019**

##### **1) Last Meeting**

- a) Worked on....
  - i) Table 4.1–4.4, Critical Infrastructure & Key Resources
  - ii) Table 6.1, Current Plans, Policies & Mutual Aid

##### **2) Today's Topics**

- a) Review....
  - i) Table 6.1, Current Plans, Policies & Mutual Aid
- b) Work on....
  - i) Table 7.1, Accomplishments since the prior Plan
  - ii) Start thinking about mitigation ideas

##### **3) Homework**

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

##### **4) Future Meetings**

- a) \_\_\_\_\_

#### **Link to explore:**

#### **FEMA Mitigation Ideas**

[https://www.fema.gov/media-library-data/20130726-1904-25045-0186/fema\\_mitigation\\_ideas\\_final508.pdf](https://www.fema.gov/media-library-data/20130726-1904-25045-0186/fema_mitigation_ideas_final508.pdf)

Next the team began work on *Table 8.1, Potential Mitigation Action Items & the STAPLEE* and *Table 9.1, The Mitigation Action Plan*. June explained to the team that these tables were combined for the purpose of the meeting, but that they would become separate tables in the final plan. Having pre-populated the tables with the action items that had been deferred from Tables 6.1 and 7.1, the team looked carefully at each “Action Item” to assign responsibility, the time frame for completion, the type of funding that would be required and the estimated cost of the action (see Chapter 9, Section B).

Documentation for the planning process, including public involvement, is required to meet DMA 2000 (44CFR§201. (c) (1) and §201.6 (c) (1)). The plan must include a description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated. A description of the planning process should include how the planning team or committee was formed, how input was sought from individuals or other agencies who did not participate on a regular basis, what the goals and objectives of the planning process were, and how the plan was prepared. The description can be in the plan itself or contained in the cover memo or an appendix.

Work on this table included the STAPLEE process as shown in Chapter 8. Using handouts provided by the planner, the team was able to go through the STAPLEE process for the action items that had been identified. The STAPLEE analysis would then become *Table 8.1, Potential Mitigation Action Items & the STAPLEE*. Most importantly, the STAPLEE process enabled the team to consider the cost-benefit of each action item.

Although most of Tables 8.1 and 9.1 were complete, there were a few action items to discuss at the next meeting as well as the “ranking” and “prioritizing” of each action item. June provided the team with one last handout that would be used during the next meeting, an explanation of the Ranking & Prioritizing method (Chapter 9, Section A).

The next meeting was scheduled for April 29, 2019.

### MEETING 5 – APRIL 29, 2019

Meeting attendance included Tom Grieg, Julie Atwell, Chris Perley, Heidi Lawton, Olin Garneau and June Garneau.

To begin the meeting, June walked the team through a complete review of Table 7.1. Having translated her notes from the last meeting into paragraphs, June reviewed each item in Table 7.1 to see if the concepts and ideas of the team remained intact and to verify the accuracy of the information. With this review a few changes were made leaving seven additional items from Table 7.1 (that were not also in Table 6.1) deferred to become new mitigation action items for this plan. Although several strategies from the last plan were determined to be emergency preparedness and not mitigation, the team decided to keep some of them in the plan as reminders to get these important action items completed.

### Meeting 5 – April 29, 2019

#### **1) Last Meeting**

- a) Reviewed....
  - i) Table 6.1, Current Plans, Policies & Mutual Aid
- b) Worked on....
  - i) Table 7.1, Accomplishments since the prior Plan
  - ii) Table 9.1, Mitigation Action Plan (did not finish)
  - iii) STAPLEE (did not finish)

#### **2) Today's Topics**

- a) Review....
  - i) Table 7.1, Accomplishments since the prior Plan
- b) Finish....
  - i) Table 9.1, Mitigation Action Plan
  - ii) STAPLEE

#### **3) Homework**

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

#### **4) Future Meetings**

- a) \_\_\_\_\_

Next, the team started where they had left off in Tables 9.1 & 8.1. After we had considered each strategy that was forwarded from Tables 6.1 & 7.1, the team considered additional mitigation items, some June had suggested from other plans. After much discussion and a careful review, ultimately, the team settled on 22 “Mitigation Action Items” that they felt were achievable and that would help to diminish the impact of natural hazards in the future.



Once all of the mitigation action items had been determined and the STAPLEE was completed for each, the team was now ready for the ranking & prioritizing of the action items that had been identified.

Prior to the meeting, June had pre-ranked the action items based on the time frame, the town's authority to get the strategy accomplished, the type of strategy and the STAPLEE score and placed them in four categories as shown in Chapter 9, Section A. A handout with all of the identified action items was made for the team. Using this handout the team was able to see all of the action items clearly and to determine any changes that needed to be made, including the "rank".

Then within each rank, the team assigned a priority. For example, if seven action items were ranked "1" then the priority rank was 1-7. In this fashion, the team was able to determine which action items were the most important within their rankings and in which order the action items would be accomplished.

With Tables 8.1 and 9.1 completed, the team's work was complete, with the exception of the final review. June agreed to put the final "draft" plan together and email a copy for the town's review. June explained the process from this point forward and thanked the team for their hard work. No additional meeting was scheduled.



*The Jackson Fire Station*  
*Photo Credit: MAPS*

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## Chapter 2: Community Profile

### A. INTRODUCTION

Jackson is a beautiful community located in Carroll County in the eastern part of New Hampshire. Jackson is bordered to the east by Chatham, to the south by Bartlett, to the north by Bean's Purchase (unincorporated place) and to the west by Pinkham's Grant (unincorporated place) and Sargent's Purchase (unincorporated place). As a community in the "White Mountains" tourism region of New Hampshire, Jackson is located near the largest mountains of New Hampshire.

Jackson  
New Hampshire



### TOWN GOVERNMENT

A three-member Selectboard governs the Town of Jackson with a Town Administrator overseeing the day-to-day operations. The town's departments include, but are not limited to, Fire, Police, Highway, Planning, Zoning, School and Library. The largest employers in Jackson are the Black Mountain Ski Area followed by Christmas Farm Inn and Eagle Mountain House.

### DEMOGRAPHICS & HOUSING

Over the last 30 years, the population of Jackson has increased. The population change from 1980 (642) to 2010 (816) showed an increase of 174 according to US Census 2010. This represents a growth rate of approximately 27.10%. Jackson's population in 2017 was estimated to be 823.<sup>4</sup>

The American Community Survey (2013-2017) estimates a total of 999 housing units, most of which are single family (843). Multiple-family structures total 156 and mobile homes and other housing units number 0. The median household income is estimated to be \$62,875 and the median age is 60 years.<sup>5</sup> Census 2010 estimates that of the 610 vacant housing units, 570 are used for recreational, seasonal or occasional use thus confirming the presence of second home and seasonal residents.

### EDUCATION & CHILD CARE

Jackson students in grades K-6 attend Jackson Grammar School in Jackson. Students in grades 7-8 attend Bartlett Middle School in the neighboring town of Bartlett. Students in grades 9-12 attend Kennett High School in Conway. There are no colleges or universities in Jackson, nor are there any childcare facilities.

#### Incorporated: 1800

**Origin:** Once consisting of several large land grants given by Governor John Wentworth, the town was first named New Madbury, after the seacoast town. In 1800, the town was incorporated as Adams, in honor of President John Adams, who was then in office. The name Adams stuck until 1829, when General Andrew Jackson was inaugurated as President. Governor Benjamin Pierce, a staunch backer of President Jackson, was influential in changing the name of the town to Jackson. Jackson is the location of the Honeymoon Bridge, a scenic covered bridge built in 1876 that is popular with newlyweds for wedding photographs.

**Villages and Place Names:** Black Mountain Cabin, Ducks Head, Dundee, Jackson Falls, Panno Place

**Population, Year of the First Census Taken:** 180 residents in 1800

**Population Trends:** Population change for Jackson totaled 508 over 57 years, from 315 in 1960 to 823 in 2017. The largest decennial percent change was a 59 percent increase between 1970 and 1980. The 2017 Census estimate for Jackson was 823 residents, which ranked 193rd among New Hampshire's incorporated cities and towns.

**Population Density and Land Area, 2017 (US Census Bureau):** 12.3 persons per square mile of land area. Jackson contains 66.8 square miles of land area and 0 square miles of inland water area.

*Source: Economic & Labor Market Information Bureau, NH Employment Security, July 2019; Received 6/4/2018*

<sup>4</sup> Economic & Labor Market Information Bureau, NH Employment Security, July 2019. Community Response 6/4/18.

<sup>5</sup> American Community Survey, 2013-2017; the Census Bureau

## **NATURAL FEATURES**

The Town of Jackson covers approximately 66.8 square miles of land area and 0 square miles of inland water. The community is dominated by the hills and mountains the White Mountains of New Hampshire. The highest peak is Wildcat Ridge at 3,870' above sea level. The lowest elevation in town is approximately 758' above sea level near the center of town. Vegetation is typical of northern New England including both deciduous and conifer forests, open fields, swamp and riverine areas.

## **TRANSPORTATION**

There is only one major roadway which runs through Jackson, NH Route 16. NH Route 16 travels north-south from Bartlett in the south, through Jackson, into Pinkham's Grant and eventually travelling into Gorham in the north. NH Route 16A and NH Route 16B make loops in the center of Jackson, but do not travel outside of the town. Other smaller and less travelled roadways lend access to other areas of the town.

## ***B. EMERGENCY SERVICES***

### **EMERGENCY OPERATIONS CENTER & EMERGENCY MANAGEMENT DIRECTOR**

The Town of Jackson has a designated Emergency Management Director (EMD) and a designated Deputy EMD. The EMD maintains an Emergency Operations Center (EOC) as part of the town's emergency preparedness program. The EOC is where the EMD, department heads, government officials and volunteer agencies gather to coordinate their response to a major emergency or disaster event. In Jackson the designated EOC is the Fire Station.

### **JACKSON FIRE RESCUE & EMS**

The Jackson Fire Department is a municipal fire department providing quality fire services to the residents and visitors of Jackson 24 hours a day, 365 days a year. The department staffs a full-time Chief, 30 paid call firefighters and operates one station within the community. The Jackson Fire Department participates in the Mount Washington Valley Mutual Aid along with other area departments. Emergency medical services and transportation is provided by Bartlett-Jackson Ambulance.

### **JACKSON POLICE DEPARTMENT**

The Jackson Police Department is a full-time department providing quality law enforcement services to the residents and visitors of Jackson. The department staffs a full-time Chief, two full-time and two part-time officers. The Jackson Police Department has mutual aid understandings with surrounding towns, NH State Police and the Carroll County Sheriff's Office.

### **JACKSON HIGHWAY DEPARTMENT**

The Jackson Highway Department operates on a year-round, 24-hour basis as needed. The department staffs a full-time Road Agent and three full-time employees. The Highway Department's mission is to support the citizens of Jackson through the safe operation, proper maintenance and future development of highway, supporting infrastructure and utilities in a manner that is cost conscious without sacrificing quality. The department belongs to the NH Public Works Mutual Aid Association.

## MEDICAL FACILITIES

Jackson's closest medical facility is Memorial Hospital in Conway (7 miles, 25 beds). If the need arises, alternative medical facilities could include Androscoggin Valley Hospital in Berlin and Littleton Regional Healthcare in Littleton.

## EMERGENCY SHELTER(S)

The primary shelter is the location to which evacuees are directed at the time of an emergency. In Jackson, the designated primary shelter is the Whitney Community Center which offers a large sleeping area, restrooms, showers and kitchen facilities and is generated. The designated secondary shelters for the town are Jackson Library and the Jackson Community Church.

## **C. JACKSON'S CURRENT & FUTURE DEVELOPMENT TRENDS**

Over the last 10 years development in Jackson has been consistent with development trends in the rest of New Hampshire. Nearly every community in New Hampshire experienced a significant drop in new home construction in the late 2000s.

In Jackson, as shown in the chart to the right from City-Data.com, single-family new home construction dropped steeply in 2007 with a slight recovery in 2013-14<sup>6</sup>. However, it appears from this data that new home construction has still not recovered to pre-2007 levels, although housing prices seem to have recovered.

The Planning Board stated in the 2018 Jackson Town Report that *"Other Planning Board activity in 2018 was light. Most notable in the approval of one subdivision was the lack of clarity in the Zoning Ordinance as to what constitutes a private road."*<sup>7</sup> The Annual Report also discusses the Planning Board's role in encouraging "housing diversity" and the establishment of the Jackson Housing Opportunity Matters committee.

The Jackson planning team indicated that small subdivisions and a few single family homes have been developed. In addition, two "conversion" projects have recently taken place turning separate lodging facilities into 12 apartments each. The identified hazard in one of these locations would be inaccessibility should NH Route 16 be washed out. However, no major subdivisions have been requested and no large-scale development is anticipated in the near future. No development has occurred in hazard prone areas or has impacted the town's hazard vulnerability.

The Planning Board and the Selectboard will monitor growth in Jackson using existing regulatory documents such as the Flood Plain Management Ordinance, the Zoning Ordinance, the Subdivision Regulations and the Jackson Master Plan. Building Permits are required in Jackson and as a small community, Planning Board and Selectboard members along with other town officials are almost always aware of building that is taking place.

### **Single-family new house Construction building permits**

- 1997: 11 buildings, average cost: \$165,000
- 1998: 8 buildings, average cost: \$251,000
- 1999: 9 buildings, average cost: \$251,000
- 2000: 12 buildings, average cost: \$231,500
- 2001: 8 buildings, average cost: \$236,700
- 2002: 11 buildings, average cost: \$156,200
- 2003: 13 buildings, average cost: \$234,700
- 2004: 13 buildings, average cost: \$355,800
- 2005: 13 buildings, average cost: \$343,600
- 2006: 8 buildings, average cost: \$388,800
- 2007: 1 building, cost: \$325,000
- 2008: 12 buildings, average cost: \$236,400
- 2009: 1 building, cost: \$78,000
- 2010: 3 buildings, average cost: \$766,700
- 2011: 5 buildings, average cost: \$320,800
- 2012: 5 buildings, average cost: \$291,700
- 2013: 11 buildings, average cost: \$243,500
- 2014: 10 buildings, average cost: \$276,500
- 2015: 6 buildings, average cost: \$418,100
- 2016: 3 buildings, average cost: \$350,000
- 2017: 6 buildings, average cost: \$318,900

<sup>6</sup> City-Data.com; <http://www.city-data.com/city/Jackson-New-Hampshire.html>

<sup>7</sup> Town of Jackson, New Hampshire, 2018 Annual Report, Jackson Planning Board, page 67

The Planning Board will follow town building and subdivision regulations to ensure that any building in hazardous areas will be built to minimize vulnerability to the hazards identified in this plan. The town recognizes the importance of growth, but also understands the impact that hazards can have on new facilities and homes if built within hazardous areas of the community. Town officials will continue to monitor any new growth and development, including new critical facilities, with regards to potentially hazardous events.

**TABLE 2.1: TOWN STATISTICS**

Table 2.1 - Town Statistics				
Census Population Data	2010	2000	1990	1980
Jackson, NH - Census Population Data	816	840	680	642
Carroll County	47,818	43,918	35,526	27,929
Population Estimate for 2017 (Census 2017)	823			
Elderly Population-% over 65 (*ACS 2013-2017)	43.4%			
Median Age (*ACS 2013-2017)	60			
Median Household Income (*ACS 2013-2017)	\$62,875			
Individuals below the poverty level (*ACS 2013-2017)	12.9%			
Change in Population - Summer Weekend	400%			
Change in Population - Winter Weekend	400%			
Housing Statistics (2010 Census)				
Total Housing Units	1,009			
Occupied Housing Units	399 (309 Owner Occupied; 90 Renter Occupied)			
Vacant Housing Units	610 (570 for Seasonal, Recreation, Occasional Use; 19 All Other Vacants)			
Assessed structure value (2018-MS1)	Value		1% Damage	5% Damage
Residential	\$237,752,700		\$2,377,527	\$11,887,635
Manufactured Housing	\$87,100		\$871	\$4,355
Commercial	\$30,985,700		\$309,857	\$1,549,285
Discretionary Preservation Easement	\$0		\$0	\$0
Tax Exempt	\$4,911,200		\$49,112	\$245,560
Utilities	\$2,143,800		\$21,438	\$107,190
Totals	\$275,880,500		\$2,758,805	\$13,794,025
*Chart above indicates the value of structures only and the likely loss value based on either a loss of 1% or 5% of structures. MS1 numbers received from the town, January, 2019.				
Regional Coordination				
County	Carroll			
Tourism Region	White Mountains			
Municipal Services & Government				
Town Administrator	Yes			
Board of Selectmen	Yes, elected (3 member)			
Planning Board	Yes, appointed			
School Board	Yes, elected			
Zoning Board of Adjustment	Yes, appointed			

**Table 2.1 - Town Statistics**

<i>Conservation Committee</i>	Yes, appointed
<i>Master Plan</i>	Yes, 2003/2016
<i>Emergency Operation Plan (EOP)</i>	Yes, 2016
<i>Hazard Mitigation Plan (HMP)</i>	Yes, 2014
<i>Zoning Ordinances</i>	Yes, 2006/2012/2017/2019
<i>Subdivisions Regulations</i>	Yes, 1975/2015 (annually as needed)
<i>Capital Improvement Plan (CIP)</i>	Yes
<i>Capital Reserve Funds (CRF)</i>	Yes
<i>Building Permits Required</i>	Yes
<i>Town Web Site</i>	Yes, <a href="http://www.jackson-nh.org">www.jackson-nh.org</a>
<i>Floodplain Ordinance</i>	Yes, 2013 (in zoning)
<i>Member of the National Flood Insurance Program (NFIP)</i>	July 2, 1979
<i>Digital Flood Insurance Rate Maps (DFIRMS)</i>	March 19, 2013
<i>Flood Insurance Rate Study (FIS)</i>	March 19, 2013
<b>Percent of Local Assessed Valuation by Property Type-2017 (NH Department of Revenue)</b>	
<i>Residential Buildings</i>	90.0%
<i>Commercial Land &amp; Buildings</i>	9.5%
<i>Other (including Utilities)</i>	0.6%
<b>Emergency Services</b>	
<i>Town Emergency Warning System(s)</i>	NH Emergency Notification System (ENS), Enhanced 911, Siren (warning horn - 3 blasts means emergency)
<i>School Emergency Warning System(s)</i>	"Blackboard Connect"
<i>Social Media</i>	Facebook (Police, Fire and School), Twitter (Police)
<i>Emergency Page</i>	Yes
<i>ListServ</i>	Jackson E-News (privately operated)
<i>Local Newspapers</i>	Conway Daily Sun
<i>Public Access TV</i>	No
<i>Local TV Stations</i>	WMUR, Channel 9
<i>Local Radio</i>	WMWV, 93.5 FM, Magic 104.5 FM, WGIR, 101.1 FM; WEVJ 99.5 FM, NPR, 99.5 FM
<i>Police Department</i>	Yes full-time, full-time Chief, 2 full-time, 2 part-time
<i>Police Dispatch</i>	Carroll County Dispatch
<i>Police Mutual Aid</i>	Surrounding towns, NH State Police & Carroll County Sheriff's Office
<i>Animal Control Officer</i>	Police Department
<i>Fire Department</i>	Yes full-time, full-time Chief, 30 paid call firefighters
<i>Fire Dispatch</i>	Carroll County Dispatch
<i>Fire Mutual Aid</i>	Mount Washington Valley Mutual Aid
<i>Fire Stations</i>	One
<i>Fire Warden</i>	Yes
<i>Emergency Medical Services</i>	Yes, Bartlett-Jackson Ambulance (generator)
<i>EMS Dispatch</i>	Carroll County Dispatch

**Table 2.1 - Town Statistics**

<i>Emergency Medical Transportation</i>	Bartlett-Jackson Ambulance
<i>HazMat Team</i>	Carroll County HazMat Team
<i>Established EMD</i>	Yes
<i>Established Deputy EMD</i>	Yes
<i>Public Health Network</i>	Carroll County Coalition for Public Health
<i>Health Officer</i>	Yes
<i>Building Inspector</i>	Yes
<i>Established Public Information Officer (PIO)</i>	Fire Department PIO
<i>Nearest Hospital(s)</i>	Memorial Hospital, Conway (7 miles, 25 beds)
<i>Local Humane Society or Veterinarians</i>	Conway Humane Society, North Country Animal Hospital, True North Veterinarian
<i>Primary EOC</i>	Fire Station (portable generator)
<i>Secondary EOC</i>	Town Building Complex (generator)
<i>Primary Shelter</i>	Whitney Community Center (generator)
<i>Secondary Shelter</i>	Jackson Library (no generator), Jackson Community Church (possible shelter, no generator)
<b>Utilities</b>	
<i>Town Sewer</i>	Private Septic
<i>Highway Department</i>	Yes, full-time Road Agent, 3 employees
<i>Public Works Mutual Aid</i>	Yes
<i>Water Supply</i>	Jackson Water Precinct (20% of town, 150 residential, 50+ commercial units) & private wells
<i>Waste Water Treatment Plant</i>	No
<i>Electric Supplier</i>	NH Electric Coop
<i>Natural Gas Supplier</i>	None
<i>Cellular Telephone Access</i>	Yes
<i>Pipelines</i>	No
<i>High Speed Internet</i>	Yes
<i>Telephone Company</i>	Spectrum & Consolidated Communications
<b>Transportation</b>	
<i>Primary Evacuation Routes</i>	NH Route 16, 16A (Main Street) & 16B
<i>Secondary Evacuation Routes</i>	Dundee Road & Thorn Hill Road
<i>Nearest Interstate</i>	I-93, Exit 35 (42 miles) & Exit 23 (62 miles)
<i>Nearest Airstrips</i>	Gorham Airport (2,800 ft. turf runway)
	Eastern Slope Airport (Fryeburg, ME) (4,200 ft. paved runway)
<i>Nearest Commercial Airport(s)</i>	Portland International Jetport, Portland, ME (70 miles)
	Manchester-Boston Regional, Manchester (110 miles)
	Logan International Airport, Boston, MA (144 miles)
<i>Public Transportation</i>	No
<i>Railroad</i>	No

**Table 2.1 - Town Statistics****Education & Childcare**

<i>Elementary School</i>	Jackson Grammar School (grades K-6)
<i>Middle School</i>	Grades 7-8 are tuitioned to Bartlett
<i>High School</i>	Grades 9-12 are tuitioned to Conway
<i>School Administrative Unit</i>	SAU 9
<i>Licensed Childcare Facilities</i>	0 facilities, 0 capacity

**Conserved Land as a Percent of Land in the Community (GIS Analysis, 2019 Conservation Files, Granit, UNH)**

	<b>Square Miles</b>	<b>Percent of Town Land</b>
<i>Approximate Square Miles in Community</i>	66.80	100.0%
<i>Approximate Total Un-Conserved Land</i>	13.33	20.0%
<i>Approximate Total Conserved Land</i>	53.47	80.0%
<i>Municipal/County Land (1)</i>	1.49	2.2%
<i>Federal Owned Land (2)</i>	49.98	74.8%
<i>State Owned Land (3)</i>	0.00	0.0%
<i>Quasi Private(4)</i>	0.00	0.0%
<i>Private Land (5)</i>	1.99	3.0%

**Fire Statistics (NH Division of Forests & Lands, Fire Warden Report, 2017 and the town)**

<i>Wildfire Fires (2017 &amp; 2018)</i>	No wildfires 1+ acres reported in 2017 or 2018
<i>Carroll County Fire Statistics (2018)</i>	11 fires, 12 acres
<i>State Forest Fires Statistics (2018)</i>	53 fires, 46 acres

\*ACS: American Community Survey, 5-year average of randomly mailed long-form surveys, Census Bureau

Information found in Table 2.1, unless otherwise noted, was derived from the Economic & Labor Market Information Bureau, NH Employment Security, July 2019. Community Response Received 6/04/18; <https://www.nhes.nh.gov/elmi/products/cp/profiles-pdf/jackson.pdf>

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## Chapter 3: Hazard Identification, Risk Assessment & Probability

### A. HAZARD IDENTIFICATION

The first step in hazard mitigation is to identify hazards. The team determined that 12 natural hazards have potential to affect the community. *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*, provides estimates of the level of impact that each listed hazard could have on humans, property and business and averages them to establish an index of “severity”. The estimate of “probability” for each hazard is multiplied by its severity to establish an overall “relative threat” factor.

The NH State Hazard Mitigation Plan includes many of the same potential hazards that have been identified in Jackson. Several of the state’s hazards however were excluded from this plan. These include the following:

<u>State Hazard</u>	<u>Reason for exclusion from this plan</u>
Coastal Flooding .....	Distance away from the sea
Landslides .....	No known areas of erosion, mudslide or landslide in the town
Dam Failure .....	No dams that will affect the town
Radiological .....	Distance away from any radiological sites

Specific hazards that have affected the town, the region and the state in the past are detailed in *Table 3.2, Historic Hazard Identification* and Chapter 5.

### B. RISK ASSESSMENT

The hazards listed in Table 3.1 were then classified based upon the “Relative Threat” score as calculated in Column F; these were then separated into three categories using Jenks’ Optimization, which is also known as natural breaks classification.<sup>8</sup> The “Relative Threat” score was then labelled into three categories, *High Risk, Medium Risk and Low Risk* as shown in Table 3.1, Column G. These categories are also indicated in Chapter 5, Sections B-D. By using this grouping process, the plan demonstrates each hazard’s likelihood of occurrence in combination with its potential effect on the town. This process illustrates a comprehensive hazard statement and assists the town with understanding which hazards should receive the most attention.



***Flooding during Tropical Storm Irene, August 2011***  
***Photo Credit: Town of Jackson***

In addition to the relative threat analysis determined in Table 3.1, the team used *Tables 4-1-4.4, Critical Infrastructure & Key Resources (CIKR)*, to identify and analyze the potential hazard risk based on a scale of 1-3 for each CIKR.

<sup>8</sup> The natural breaks classification process is a method of manual data classification partitions data into classes based upon natural groups within the data distribution; ESRI, <http://support.esri.com/en/knowledgebase/GISDictionary/term/natural%20breaks%20classification>

### C. PROBABILITY

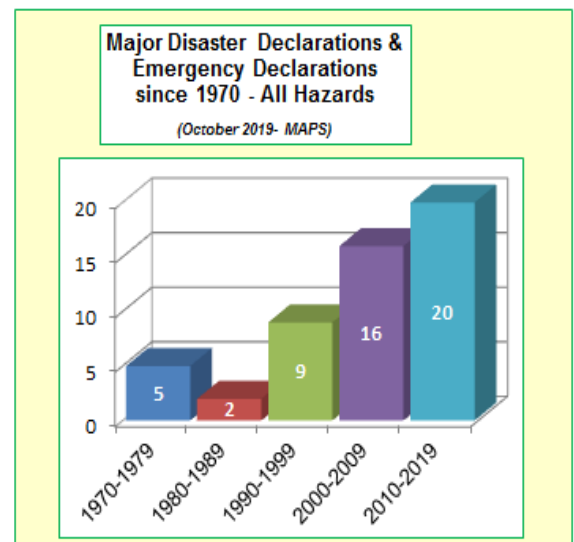
The determination of the probability of occurrence is contained within Column D in Table 3.1 which assesses hazards based upon the likelihood of the hazard's manifestation within a 25 year period. The probability scores indicate whether the identified hazard has a *Very Low*, *Low*, *Moderate*, *High* and *Very High* probability. Probability categories are also indicated in Chapter 5, Sections B-D.

Overall, the Town of Jackson is fairly safe from the effects of natural, technological and human-caused hazards. However, due to Jackson's geographic location, forested lands, hills, heavy snow pack and topography, there is always a probability that future hazards will occur.

#### HAZARD PROBABILITY & CLIMATE CHANGE

Although not identified as a natural hazard in this plan, no plan can be considered complete today without some discussion of the impact that climate change has had on weather patterns. *"The challenges posed by climate change, such as more intense storms, frequent heavy precipitation, heat waves, drought, extreme flooding, and higher sea levels, could significantly alter the types and magnitudes of hazards impacting states in the future"*, FEMA stated in its new State Mitigation Plan Review Guide<sup>9</sup>. By including climate change in the new hazard mitigation guide for state planners, FEMA is recognizing the reality of climate change.

The chart to the right shows the increased frequency of Major Disaster Declarations and Emergency Declarations in the State of New Hampshire, which may be indicative of climate change.<sup>10</sup>



Communities in New Hampshire, such as Jackson, should become increasingly aware of the effects of climate change on the hazards that are already being experienced and anticipate an increase in probability in the future.

#### HAZARD PROBABILITY COMBINED WITH LONG TERM UTILITY OUTAGE

Any potential disaster in Jackson is particularly impactful if combined with long term utility outage, as would most likely be the case with severe winter storms, blizzards and ice storms, hurricanes, tropical storms and windstorms. The food supply of individual citizens could become quickly depleted should a power failure last for a week or more. An outage during the winter months could result in frozen pipes and the lack of water and heat, a particular concern for the town's elderly and vulnerable citizens. The effects of any hazard, when combined with a long term utility outage, could result in a higher probability of damaging affects to the community.

<sup>9</sup> State Mitigation Plan Review Guide, FEMA, Released March 2015, Effective March 2016, Section 3.2, page 13

<sup>10</sup> Derived from FEMA's record of disasters; categorized by decade since 1970 by the planner

**TABLE 3.1: HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)**

Table 3.1 - Hazard Identification & Risk Assessment (HIRA)							
Scoring for Probability (Columns A, B & C)	Column A	Column B	Column C	Column D	Column E (A+B+C)/3	Column F D x E	High Risk 8.0-18.3  Medium Risk 4.0-7.9  Low Risk 0-3.9
1=Very Low (0-20%)	What is the probability of death or injury?	What is the probability of physical losses & damage?	What is the probability of interruption of service?	What is the probability of this occurring within 25 years?	Average of Human, Property & Business Impact	Relative Threat	
2=Low (21-40%)							
3=Moderate (41-60%)	Human Impact	Property Impact	Business Impact	Probability of Occurrence	Severity	Risk Severity x Occurrence	
4=High (61-80%)							
5=Very High (81-100%)							
Natural Hazards							
1) Severe Winter Weather	3.0	4.0	4.0	5.0	3.7	18.3	High
2) High Wind Events	3.0	5.0	3.0	4.0	3.7	14.7	High
3) Inland Flooding	2.0	3.0	3.0	3.0	2.7	8.0	High
4) Extreme Temperatures	2.0	1.0	2.0	4.0	1.7	6.7	Medium
5) Lightning	2.0	3.0	2.0	2.0	2.3	4.7	Medium
6) Wildfires	2.0	2.0	2.0	2.0	2.0	4.0	Medium
7) Infectious Diseases	4.0	1.0	3.0	1.0	2.7	2.7	Low
8) Tropical & Post-Tropical Cyclones	2.0	2.0	2.0	1.0	2.0	2.0	Low
9) Drought	1.0	1.0	1.0	2.0	1.0	2.0	Low
10) Avalanches	2.0	2.0	2.0	1.0	2.0	2.0	Low
11) Earthquakes	3.0	1.0	1.0	1.0	1.7	1.7	Low
12) Solar Storm & Space Weather	1.0	1.0	2.0	1.0	1.3	1.3	Low
Technological Hazards							
1) Long Term Utility Outage	3.0	3.0	3.0	4.0	3.0	12.0	High
2) Known & Emerging Contaminates	4.0	1.0	4.0	3.0	3.0	9.0	High
3) Conflagration	3.0	4.0	4.0	2.0	3.7	7.3	Medium
4) Hazardous Materials	2.0	2.0	2.0	2.0	2.0	4.0	Medium
5) Aging Infrastructure	2.0	1.0	2.0	1.0	1.7	1.7	Low
Human-cause Hazards							
6) Transport Accidents	3.5	3.0	2.0	3.0	2.8	8.5	High
7) Mass Casualty Incidents	4.5	3.0	2.5	2.0	3.3	6.7	Medium
8) Terrorism & Violence	4.0	2.0	3.0	2.0	3.0	6.0	Medium
9) Cyber Events	2.0	2.0	4.0	2.0	2.7	5.3	Medium

## D. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) STATUS

Jackson has been a member of the National Flood Insurance Program since July 2, 1979. Jackson actively monitors the NFIP and related compliance issues and participates in offered trainings by the State of or FEMA that address flood hazard planning. The most recent FEMA flood map is dated March 19, 2013; the most recent Flood Insurance Study (FIS) is also dated March 19, 2013.

According to the NH Office Strategic Initiatives, there are 21 NFIP residential policies in effect in Jackson for a total of \$7,821,500 of insurance in force. Of these policies, six are for single-family units, 9 are for 2-4 family units and six are for non-residential units. Two losses have been paid for a total of \$7,670. There have been no repetitive losses reported<sup>11</sup>.

The Town of Jackson has strict flood zone building codes and uses its zoning ordinances to guide development and to comply and enforce NFIP standards. The Planning Board, as the initiator, and the Selectboard, as the enforcer, adhere to the rules, regulations and requirements set forth in the ordinances. Most of the town's older buildings do not lie within flood-prone areas and current building codes have successfully deterred building in hazardous areas.

Among other floodplain related items, the town, with its strict building codes:

- *addresses the requirements to obtain a permit to build or develop in any flood hazard area;*
- *addresses the Planning Board's review of all building permit applications for determination that building sites will be reasonably safe from flooding;*
- *ensures that any proposed building site in a special flood hazard area shall be constructed with materials resistant to flood damage and constructed by methods and practices that minimize flood damages.*

In addition, the Jackson Zoning Ordinance describes requirements related to electrical, heating, ventilation, plumbing, as-built elevations and water and sewer systems as they pertain to flood prone areas based on Flood Insurance Rate Map (FIRM).



In 1968, although well-intentioned government flood initiatives were already in place, Congress established the National Flood Insurance Program (NFIP) to address both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the program are twofold: to protect communities from potential flood damage through floodplain management, and to provide people with flood insurance.

For decades, the NFIP has been offering flood insurance to homeowners, renters and business owners, with the one condition that their communities adopt and enforce measures to help reduce the consequences of flooding.

Source:

[http://www.floodsmart.gov/floodsmart/pages/about/nfip\\_overview.jsp](http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp)

**Severe Repetitive Loss (SRL) Properties**--NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described on page SRL 1. SRL properties with policy effective dates of January 1, 2007, and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent's Special Direct Facility so that they can be considered for possible mitigation activities.

Source: <http://www.fema.gov/national-flood-insurance-program/definitions#R>

<sup>11</sup> NH Office of Strategic Initiatives; Jennifer Gilbert, February 8, 2019

**FROM THE JACKSON ZONING ORDINANCE****SECTION 12: AREAS OF SPECIAL FLOOD HAZARD**

(Amended 3/12/2002, 3/13/2012)

The following provisions shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the Town of Jackson, N.H.", together with the associated Flood Insurance Rate Maps of the Town of Jackson, dated July 2, 1979, which are declared to be part of this Ordinance and are hereby incorporate by reference, including any additions, amendments or revisions thereto. This Section was adopted pursuant to the authority of RSA 674:16. The Regulations in this Section shall overlay and supplement other regulations in this Zoning Ordinance. If any provision of this Section differs or appears to conflict with any other provision of this Zoning Ordinance or regulation, the provision imposing the greater restriction or more stringent standard shall be controlling.

The Jackson Planning Board identifies and becomes aware of non-compliant proposals, offers advice on ways to mitigate flood damage, inspects foundations to determine if the lowest floor is at or above Base Flood Elevation, requires elevation certificates and assists builders and members of the community in their understanding of the FIRM and of the NFIP. The town continues to caution and educate builders, land owners and developers about the challenges and dangers of building within the floodplain. The town understands that the benefits of the NFIP also extend to structures that are not in the 100-year floodplain.

The town also continues to educate homeowners, developers and builders on the National Flood Insurance Program. As stated by a former Selectboard member in the 2009 hazard mitigation plan, "...we (the town) take these potential problems quite seriously and do all we can to help mitigate any damage"<sup>12</sup>.

The town will continue to work with the Office of Strategic Initiatives (OSI) and will carefully monitor its compliance with the NFIP. The team felt that it is worthwhile to have NFIP brochures and information available at the Town Office for current homeowners and potential developers and has included several flood-related mitigation strategies in this plan.

**Table 3.1, Table 3.2 and Chapter 5, Section B provide more information on past and potential hazards in Jackson.**



**Jackson Town Office**  
**Photo Credit: MAPS**

<sup>12</sup> 2009 Multi-Hazard Mitigation Plan



**TABLE 3.2: HISTORIC HAZARD IDENTIFICATION**

2014 HMPT = 2014 Hazard Mitigation Planning Team

2019 HMPT = 2019 Hazard Mitigation Planning Team

DR Major Disaster Declarations (DR) since 1953

EM Emergency Declarations (EM) since 1953

Type of Event	Date of Event	Location	Description	Source
<b>A. Inland flooding including inland, riverine, heavy rainfall, rapid snowmelt, ice jam flooding, flooding as a result of dam failure &amp; local road flooding:</b> Riverine flooding is the most common disaster event in the State of NH. Significant riverine flooding in some areas of the state occurs in less than ten year intervals and seems to be increasing with climate change. The entire State of NH has a high flood risk. Flood events have the potential to impact the community on a townwide basis. No significant flooding events have taken place in Jackson since the heavy rain event in October 2017.				
<b>Summary of flood events including Major Disaster &amp; Emergency Flood Declarations in the state &amp; regionwide</b>				
<b>Flooding</b> Prior to 1970	1927, 1936, 1938, 1943 (2), 1953, 1955, 1959		Spring and fall flooding events resulting from severe storms and/or heavy snowmelt	See below
<b>Flooding</b> 1970-1979	1972 (DR-327), 1973 (DR-399), 1974 (DR-411), 1976, 1978 (DR-549), 1979 (EM-3073)			
<b>Flooding</b> 1980-1989	1986 (DR-771), 1987 (DR-789)			
<b>Flooding</b> 1990-1999	1990 (DR-876), 1991 (DR-923), 1991 (DR-917), 1995, 1996 (DR-1077), 1996 (DR-1144), 1998 (DR-1231)			
<b>Flooding</b> 2000-2009	2003 (DR-1489), 2005 (DR-1610), 2006 (DR-1643), 2007 (DR-1695), 2008 (DR-1787), 2008 (DR-1799)			
<b>Flooding</b> 2010 - Present	2010 (DR-1892), 2010 (DR-1913), 2011 (DR-4006), 2012 (DR-4065), 2013 (DR-4139), 2015 (DR-4206), 2017 (DR-4329), 2017 (DR-4355), 2018 (DR-4370), 2019 (DR-4457)			
<b>Detailed summary of flood events in the community</b>				
<b>Flooding</b> Heavy Rain	March 30-April 11, 1987	Regionwide	<b>Major Disaster Declaration DR-789:</b> The Jackson Grammar School experienced flooding which included the building, playground and parking lot. The entire Mount Washington Valley was flooded.	FEMA & 2019 HMPT
<b>Coastal Flooding</b> Heavy Rain	October 30-31, 1991	Regionwide	<b>Major Disaster Declaration DR-923:</b> Although this was primarily a coastal storm, heavy rain in Jackson took out part of Dundee Road when a clogged culvert diverted water and undermined the asphalt.	FEMA & 2019 HMPT
<b>Flooding</b> Heavy Rain	October 20-November 15, 1995	Regionwide	<b>Major Disaster Declaration DR-1077:</b> Period of heavy rain, flooding occurred in the Mount Washington Valley. Conway received flooding as bad as the flooding that occurred during Tropical Storm Irene. The ballpark flooded and Crawford's Notch was shut down.	FEMA & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>Flooding</b> Heavy Rain	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	<b>Major Disaster Declaration DR-1643:</b> Flooding occurred in most of southern NH. (Mother's Day Storm). Jackson received heavy rain but had no major damage.	FEMA & 2014 & 2019 HMPT
<b>Flooding</b> Heavy Rain	April 15-23, 2007	All Ten NH Counties	<b>Major Disaster Declaration DR-1695:</b> FEMA & SBA obligated more than \$27.9 million in disaster aid for flood damages following the April nor'easter (Tax Day Storm). Jackson received a high accumulation of snow and there were roof collapses. Isolated power losses were caused by heavy wet snow and rain. Some culverts were overwhelmed from the heavy rains resulting in road closures.	FEMA & 2014 & 2019 HMPT
<b>Flooding</b> Heavy Rain & Tornado	July 24-August 14, 2008	Belknap, Carroll & Grafton & Coos	<b>Major Declaration DR-1787:</b> A period of severe storms and flooding for the period of July 24-August 14 which also spawned a tornado on July 24, 2008. The tornado did not reach Jackson and Jackson was not severely impacted by heavy rain.	FEMA & 2014 & 2019 HMPT
<b>Flooding</b> Tropical Storm Irene	August 26-September 6, 2011	<b>EM 3333:</b> All Ten NH Counties <b>DR-4026:</b> Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	<b>Major Disaster Declaration DR-4026 &amp; Emergency Declaration EM-3333:</b> See below, Section C	FEMA & 2014 & 2019 HMPT
<b>Flooding</b> Heavy Rain	July 1-2, 2017	Coos & Grafton	<b>Major Disaster Declaration DR-4329:</b> Although this extraordinary rain event occurred primarily in Grafton County, Jackson also experienced heavy rain resulting in one lost culvert on a Class IV road. This was mitigated at the time of the storm.	FEMA & 2019 HMPT
<b>Flooding</b> Heavy Rain	October 29-November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	<b>Major Disaster Declaration, DR-4355:</b> The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the State of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from October 29-November 1, 2017 in five New Hampshire Counties. Jackson experienced heavy rain during this storm but no damage to roads or structures.	FEMA & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>B. Wildfires:</b> New Hampshire is heavily forested and is therefore vulnerable to wildfire, particularly during periods of drought. The proximity of many populated areas to the state's forested land exposes these areas to the potential impact of wildfire. Wildfires have the potential to impact the Jurisdiction on a townwide basis. No significant wildfire events have taken place in Jackson since the Green Hill fire in 2012.				
<b>Summary of wildfire events including Major Disaster &amp; Emergency Declarations in the state</b>				
Wildfire Shaw Mountain	July 2, 1953		<b>Major Disaster Declaration DR-11:</b> Carroll County. This fire did not reach Jackson.	FEMA & 2019 HMPT
Wildfire Stoddard Fire	April 21-23, 2016		<b>Fire Management Assistance Declaration, FM-5123:</b> Stoddard, NH. This fire did not reach Carroll County or Jackson.	FEMA & 2019 HMPT
<b>Detailed summary of wildfire events in the community.</b> The fires below were taken from the 2009 hazard mitigation plan when wildfires of all sizes were considered. This plan considers wildfires larger than one acre; however it was decided to retain the information on wildfires that was in the 2009 HMP by grouping the data by decade.				
Wildfires Prior to 1980	Early 1960's (2)	Jackson	Wildfires noted prior to 1980: 2 Class A fires, 2 Class B fires, 1 Class Unknown, 3 fires started by logging operations, 1 by lightning, 1 by campfire.	2009 HMPT & 2019 HMPT
	Unknown (2)	Jackson		
	1970's	Jackson		
Wildfires 1980-1989	July 1983 (2)	Jackson	Wildfires noted between 1980-1989: 3 Class A fires, 2 Class B fires, 2 illegal burns, 1 caused by downed wire, Class B fires started as structure fires that were started by wind-blown debris.	2009 HMPT & 2019 HMPT
	March 1989	Jackson		
	April 1989	Jackson		
	August 1989	Jackson		
Wildfires 1990-1999	July 1995 (3)	Jackson	Wildfires noted between 1990-1999: 1 additional fire noted in early 1990's at Black Mountain caused by lightning; 3 Class A fires, 2 Class B fires, 2 caused by lightning, 2 illegal burns, and 1 out of control fire at Transfer Station.	2009 HMPT & 2019 HMPT
	October 1997	Jackson		
	November 1998	Jackson		
Wildfires 2000-2009	April 2000	Jackson	Wildfires noted between 2000 & 2009: 2 additional fires noted, months unknown, 2004 & 2007, 13 Class A fires, 3 Class B fires, 1 fire caused by lightning, 8 fires caused by illegal burns, 7 other small fires caused by miscellaneous human causes.	2009 HMPT & 2019 HMPT
	June 2000	Jackson		
	April 2001 (2)	Jackson		
	August 2001 (2)	Jackson		
	July 2003	Jackson		
	Unknown 2004	Jackson		
	July 2004	Jackson		
	October 2004	Jackson		
	April 2005	Jackson		
	November 2005	Jackson		
	October 2006 (2)	Jackson		
	Unknown 2007	Jackson		
	June 2007	Jackson		
Wildfire	June 2012	Jackson	The Green Hill fire was a permitted brush fire which burned out of control burning just over 1 acre. No structure damage occurred.	2014 & 2019 HMPT



Type of Event	Date of Event	Location	Description	Source
Wildfire	2014-2019	Jackson	The town reported that no wildfires larger than one acre have occurred in Jackson since the prior hazard mitigation plan in 2014.	2019 HMPT
<b>C. High Wind Events including Tropical &amp; Post-Tropical Cyclones, Tornadoes, Downbursts &amp; Windstorms:</b> Tornadoes are spawned by thunderstorms and occasionally by hurricanes; tornadoes may occur singularly or in multiples. A downburst is a severe localized wind blasting down from a thunderstorm. Downburst activity is prevalent throughout NH and is becoming more common with climate change; most downbursts go unrecognized unless significant damage occurs. Hurricanes develop from tropical depressions which form off the coast of Africa. New Hampshire's exposure to direct and indirect impacts from hurricanes is real, but modest, as compared to other states in New England. A hurricane that is downgraded to a Tropical Storm is more likely to have an impact in New Hampshire. Tornadoes and other wind events have the potential to impact the community on a townwide basis. No significant high wind events have taken place in Jackson since Tropical Storms Irene & Sandy in 2011 and 2012 respectively.				
<b>Summary of high wind events &amp; tropical &amp; post-tropical cyclone events including Major Disaster &amp; Emergency Declarations in the state &amp; regionwide</b>				
Tropical & Post-Tropical Cyclones	1804, 1869, 1938, 1944, 1954 (2), 1960, 1976, 1978, 1985, 1991 ( <b>DR-917</b> ), 1999 ( <b>DR-1305</b> ), 2005 ( <b>EM-3258</b> ), 2011 ( <b>EM-3333 &amp; DR-4026</b> ), 2012 ( <b>EM-3360</b> )		Number 4 (1938), Number 7 (1944), Carol (1954), Edna (1954), Donna (1960), Belle (1976), Amelia (1978), Gloria (1985), Bob (1991), Floyd (1999), Katrina (2005), Irene (2011), Sandy (2012)	See below
High Wind Events Tornadoes	1814, 1890, 1951, 1953, 1957, 1961, 1963, 2008 ( <b>DR-1782</b> )		All listed tornadoes were reported as F2 tornadoes except for the June 1953 tornado which was reported as an F3.	See below
<b>Detailed summary of high wind &amp; tropical &amp; post-tropical cyclone events in the community</b>				
Tropical & Post-Tropical Cyclone Great New England Hurricane	September 21, 1938	All Ten Counties	<b>The Great New England Hurricane:</b> Statewide there were multiple deaths and damages in NH were about \$12.3 million dollars in 1938 dollars (about \$200 million now). Throughout New England 20,000 structures were damaged and 26,000 automobiles, 6,000 boats and 325,000 sugar maples were lost. 80% of the people lost power. The impact in Jackson from this hurricane was like the rest of the state. (Source <a href="http://nhpr.org/post/75th-anniversary-new-englands-greatest-hurricane">http://nhpr.org/post/75th-anniversary-new-englands-greatest-hurricane</a> )	FEMA & 2019 HMPT
Tropical & Post-Tropical Cyclone Hurricanes Carol & Edna	August 31, 1954	All Ten Counties	<b>Hurricanes Carol &amp; Edna:</b> Hurricane Carol resulted in an extensive amount of trees blown down and damage to damage as well as large crop losses. Localized flooding and winds measuring over 100 mph also occurred. Hurricane Carol was followed by Hurricane Edna just 12 days later, which caused already weakened trees to fall. The impact in Jackson from this hurricane was like the rest of the state. (Source: <a href="http://www.wmur.com/Timeline-History-Of-NH-Hurricanes/11861310">http://www.wmur.com/Timeline-History-Of-NH-Hurricanes/11861310</a> )	FEMA & 2019 HMPT
High Wind Events Windstorm Long Term Utility Outage	1981	Jackson	A significant windstorm caused multiple trees, some very large, to fall. There was also damage to some roofs and shingles with one roof being completely lifted off a structure. Some power outages occurred for a short period of time.	2009 HMPT & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>Tropical &amp; Post-Tropical Cyclone</b> Hurricane Bob	August 18-20, 1991	All Ten Counties	<b>Major Disaster Declaration DR-917:</b> Jackson received heavy rain and minor wind but no damage.	FEMA & 2019 HMPT
<b>High Wind Events</b> Windstorm	1995	Jackson	A significant windstorm caused multiple trees, some very large, to fall. There was also damage to some roofs and shingles.	2009 HMPT & 2019 HMPT
<b>Tropical &amp; Post-Tropical Cyclone</b> Hurricane Katrina (evacuation)	August 29-October 1, 2005	All Ten NH Counties	<b>Emergency Declaration EM-3258:</b> Assistance was provided to evacuees from the area struck by Hurricane Katrina and to provide emergency assistance to those areas beginning on August 29, 2005, and continuing. The President's action made Federal funding available to the state and all 10 New Hampshire counties. No evacuees came to Jackson but some pets may have been taken in by individual residents.	FEMA & 2019 HMPT
<b>High Wind Event</b> Tornado	July 24, 2008	Belknap, Carroll, Merrimack, Strafford & Rockingham	<b>Major Disaster Declaration DR-1782:</b> Tornado damage to several New Hampshire counties (started in Hampstead and ending in Ossipee, the longest continuous contact with the earth in history). Damage did not extend to Jackson.	FEMA & 2014 & 2019 HMPT
<b>Tropical &amp; Post-Tropical Cyclone</b> Tropical Storm Irene <b>Long Term Utility Outage</b>	August 26-September 6, 2011	<b>EM 3333:</b> All Ten NH Counties <b>DR-4026:</b> Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	<b>Major Disaster Declaration DR-4026 &amp; Emergency Declaration EM-3333:</b> Tropical Storm Irene, August 26th- September 6, 2011, occurred in seven New Hampshire counties causing flood and wind damage. In addition, an Emergency Declaration was declared for all ten New Hampshire counties. There was significant damage to some roadways and most bridges in Jackson, particularly damage to Melloon Bridge Road. Trees were down, power losses occurred, some roads were closed and some Village streets were impassable.	FEMA & 2014 & 2019 HMPT
<b>Tropical &amp; Post-Tropical Cyclone</b> Hurricane Sandy	October 26-November 8, 2012	Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan	<b>Major Disaster Declaration DR-4095 &amp; Emergency Declaration EM-3360:</b> The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides and flooding over the period of October 26-November 8, 2012. Hurricane Sandy came ashore in NJ and brought high winds, power outages and heavy rain to six New Hampshire counties. Jackson received about 1" of rain but no major flooding.	FEMA & 2014 & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>D. Severe Winter Weather including Nor'easters, Blizzards &amp; Ice Storms:</b> Severe winter weather in NH may include heavy snowstorms, blizzards, Nor'easters and ice storms, particularly at elevations over 1,000 feet above sea level. Generally speaking, NH will experience at least one of these hazards during any winter season, however most NH communities are well prepared for such hazards. Severe winter weather and ice storms have the potential to impact the community on a townwide basis. No significant winter weather events have taken place since the town meeting day storms in March of 2017 and 2018.				
<b>Summary of severe winter weather events including Major Disaster &amp; Emergency Declarations in the state &amp; nationwide</b>				
Severe Winter Weather Ice Storms	1942, 1969, 1970, 1979, 1991, 1998 (DR-1199), 2008 (DR-1812)		Major ice storms that have occurred causing major disruptions to power, transportation, public and private utilities.	FEMA & 2019 HMPT
Severe Winter Weather Snowstorms	1920, 1929, 1940, 1950, 1952, 1958 (2), 1960, 1961, 1969, 1978, 1982, 1993 (EM-3101), 2001 (EM-3166), 2003 (EM-3177), 2003 (EM-3193), 2004, 2005 (EM-3207), 2005 (EM-3208), 2005 (EM-3211), 2008 (EM-3297), 2009, 2011 (EM-3344 & DR-4049), 2013 (EM-1405), 2015 (DR-4209), 2017 (DR-4316), 2018 (DR-4371), 2019 (DR-4457)		Major severe winter weather events marked by snowfalls exceeding 2' in parts of the state which resulted in disruptions to power and transportation systems.	FEMA & 2019 HMPT
<b>Detailed summary of severe winter storm events in the community</b>				
Severe Winter Weather Snowstorm	Winter of 1968-69	All Ten Counties	The winter of 1968-69 brought record amounts of snow to all of New Hampshire. Pinkham Notch at the base of Mount Washington recorded more than 75" of snowfall in a four day period at the end of February 1969 in addition to snow that had already fallen in previous storms. All of NH experienced difficulty with snow removal because of the great depths that had fallen from December 1968 to April 1969. Major snowstorms brought large amounts of snow to Jackson and all of northern NH; snow was measured in feet and roads were plowed with loaders and bulldozers. Some snow banks were over 7' high. Some roads were closed which made emergency response difficult. Jackson and all of northern NH received massive accumulations over the course of the winter.	2014 HMPT & 2019 HMPT
Severe Winter Weather High Winds, Tidal Surge, Coastal Flooding & Snow  Long Term Utility Outage	February 16, 1978	All Ten Counties	<b>Major Disaster Declaration DR-549: The</b> Blizzard of '78, a region-wide Blizzard severely affecting southern New England, resulted in high accumulations of snow throughout all of New England and New Hampshire. Recorded accumulations show up to 28" in northeast New Hampshire, 25" in west central New Hampshire and 33" along coastal New Hampshire. This storm also brought hurricane-force winds which made this storm one of the more intense to occur this century across the northeastern United States. This was a major snowstorm in southern New England, but heavy snow also reached Jackson. Heavy equipment was used to remove snow and area schools were closed for a week. Snowmobiles were used as a means of transportation in areas that were not yet plowed.	2014 HMPT & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>Severe Winter Weather</b> Ice Storm Long Term Utility Outage	January 7-25, 1998	All Ten Counties	<b>Major Disaster Declaration DR-1199:</b> A significant ice storm struck nearly every part of the state, particularly in northern communities and in areas over 1,000 feet above sea level. The 1998 Ice Storm was a disastrous storm in Jackson with some without power for up to two weeks. The storm was more devastating at elevations of 700' or more which is most of Jackson. Tyrol, Thorn Hill, Jackson Highlands and other elevations higher than 1,000 foot were extremely damaged.	FEMA & 2009 HMPT, 2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	<b>Emergency Declaration EM-3193:</b> The emergency declaration covers jurisdictions with record and near-record snowfall that occurred over the period of December 6-7, 2003 and affected eight New Hampshire counties. Heavy snow accumulation occurred in Jackson, but it was handled by the Highway Department. No damage occurred.	FEMA & 2009 HMPT, 2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorms	January 22-23, 2005 February 10-11, 2005 March 11-12, 2005	<b>EM-3208-002</b> (Jan, Feb & Mar): All Ten NH Counties <b>EM-3207</b> (Jan): Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan <b>EM-3208</b> (Feb): Carroll, Cheshire, Coos, Grafton & Sullivan <b>EM-3211</b> (Mar): Carroll, Cheshire, Hillsborough, Rockingham & Sullivan	<b>Emergency Declaration EM-3207:</b> January storm. More than \$3.5 million had been approved to help pay for costs of the heavy snow and high winds. Total aid for the January storm was <b>\$3,658,114.66</b> (Carroll: \$52,864.23; State of NH: \$1,107,426.59); <b>Emergency Declaration EM-3208:</b> Total aid for the February storm was \$1,121,727.20 (Carroll: \$91,832.72; State of NH: \$521,536.78). <b>Emergency Declaration EM-3211:</b> Total aid for the March storm was <b>\$2,112,182.01</b> (Carroll: \$73,964.57; State of NH: \$697,501.41). <b>Emergency Declaration EM 3208-002:</b> The total aid for all three storms was \$6,892,023.87. Heavy snow occurred throughout the winter of 2005, but no damage occurred and the heavy accumulations were handled by the Jackson Highway Department.	FEMA & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	2008	Jackson	The 2008 winter brought several storms to New Hampshire resulting in high accumulation. Heavy snow fell all winter with a 2' foot snowstorm about every week. Residents and businesses were reminded of the risk for roof collapse.	2014 HMPT & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
<b>Severe Winter Weather</b> Snowstorm & Ice Storm	December 11-23, 2008	All Ten NH Counties	<b>Major Disaster Declaration DR-1812 &amp; Emergency Declaration EM-3297:</b> Damaging ice storm impacted the entire state including all 10 New Hampshire counties resulting in fallen trees and large scale power outages. Nearly \$15 million in federal aid was been obligated by May 2009. Jackson experienced heavy snow but minimal impact. The heavy accumulation was handled by the Highway Department.	FEMA & 2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	Winter 2010	Jackson	Heavy snowstorm brought high accumulations to Jackson. This storm effected the higher elevations with up to four feet of heavy wet snow in some places. The heavy accumulation was handled by the Highway Department and no damage occurred.	2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	October 29-30, 2011	<b>DR-4049:</b> Hillsborough & Rockingham <b>EM-3344:</b> All Ten NH Counties	<b>Major Disaster Declaration DR-4049 &amp; Emergency Declaration EM-3344:</b> A severe winter storm occurred on October 29-30, 2011 in two New Hampshire counties. <b>EM-3344:</b> The emergency declaration for snow removal and damage repair included all ten NH countries (Snowtober). The heavy accumulation was handled by the Highway Department and no damage occurred.	FEMA & 2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	Winter of 2012	Jackson	The winter of 2012 brought heavy snow accumulations to Jackson with total accumulation for the winter recorded as the 3rd largest since the winter of 1969. The heavy accumulation was handled by the Highway Department and no damage occurred.	2014 HMPT & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm	February 8, 2013	All Ten NH Counties	<b>Major Disaster Declaration DR-4105:</b> Severe winter storm Nemo resulted in heavy snow in February 2013 in all ten New Hampshire counties. The heavy accumulation was handled by the Highway Department and no damage occurred.	FEMA & 2019 HMPT
<b>Severe Winter Weather</b> Snowstorm <b>High Wind Events</b> Downburst	March 14-15, 2017	Belknap & Carroll	<b>Major Disaster Declaration DR-4316:</b> A severe winter storm and snowstorm occurred in two New Hampshire counties resulting in disaster aid to supplement state and local recovery efforts. In Jackson, a confirmed downburst destroyed a house (with people in it) on Town Hall Road. The town held town meeting in spite of this significant wind and snowstorm. The heavy accumulation was handled the Highway Department.	FEMA & 2019 HMPT

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather Snowstorm	March 13-14, 2018	Carroll, Strafford & Rockingham	<b>Major Disaster Declaration, DR 4371:</b> The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018 for a period of a severe winter storm from March 13-14, 2018. The Jackson town meeting was held and the heavy accumulation was handled by the Highway Department. No damage occurred.	FEMA & 2019 HMPT

**E. Earthquakes:** According to the NH State Hazard Mitigation Plan, New Hampshire is considered to lie in an area of "Moderate" seismic activity when compared to other areas of the United States. New Hampshire is bordered to the north and southwest by areas of "Major" activity. Generally, earthquakes in NH cause little or no damage and have not exceeded a magnitude of 5.5 since 1940. Earthquakes have the potential to impact the community on a townwide basis. No significant earthquakes have taken place in Jackson in recent history and the last to be felt occurred in October 2012.

#### Summary of Earthquakes with a magnitude of 4.0 or greater in the state & regionwide

Earthquakes	6/11/1638 (Central NH, 6.5), 10/29/1727 (Off Coastline, 6.0-6.3), 11/18/1755 (Off Coastline, 5.8), 11/10/1810 (Portsmouth, NH, 4.0), 7/23/1823 (Off Hampton, NH, 4.1), 12/19/1882 (Concord, NH, Unknown), 3/5/1905 (Lebanon, NH, Unknown), 8/30/1905 (Rockingham County, Unknown), 11/09/1925 (Ossipee, NH, 4.0), 3/18/1926 (New Ipswich, NH, Unknown), 11/10/1936 (Laconia, NH, Unknown), 12/20/1940 (Ossipee, NH, 5.5-5.8), 12/24/40 (Ossipee, NH, 5.5-5.8), 1/19/1982 (Laconia, NH, 4.0), 11/20/1988 (Berlin, NH, 4.0), 4/6/1989 (Berlin, NH, 4.1), 10/16/2012 (Hollis Center, ME, 4.0)	Occurrences of earthquakes with a magnitude of 4.0 or greater in recorded New Hampshire History	State of NH Multi-Hazard Mitigation Plan, Update 2018
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#### Detailed summary of Earthquake events that were felt in the community since 1940 with a magnitude of 3.0 or greater.

Earthquake	December 20, 1940	Ossipee, NH	Magnitude 5.5. There is no team recollection of this being felt in Jackson or of damage occurring.	State of NH Multi-Hazard Mitigation Plan, Update 2018 & 2019 HMPT
Earthquake	December 24, 1940	Ossipee, NH	Magnitude 5.5. There is no team recollection of this being felt in Jackson or of damage occurring.	
Earthquake	June 15, 1973	Quebec Border / NH	Magnitude 4.8. There is no team recollection of this being felt in Jackson or of damage occurring.	
Earthquake	January 19, 1982	West of Laconia, NH	Magnitude 4.5. There is no team recollection of this being felt in Jackson or of damage occurring.	
Earthquake	June 23, 2010	Ontario-Quebec Border	Magnitude 5.0. There is no team recollection of this being felt in Jackson or of damage occurring.	
Earthquake	June 26, 2010	Boscawen, NH	Magnitude 3.1. There is no team recollection of this being felt in Jackson or of damage occurring.	



Type of Event	Date of Event	Location	Description	Source
Earthquake	October 16, 2012	Hollis Center, ME	An earthquake measuring 4.0 on the Richter Scale with an epicenter in Hollis, ME (just over the NH border) was felt throughout NH and as far south as Rhode Island. In Jackson, buildings shook for 10-30 seconds but no damage was reported. Due to call volume, there was a disruption of the telecommunication systems in Jackson and in other parts of the state.	State of NH Multi-Hazard Mitigation Plan, Update 2018 & 2019 HMPT
F. Drought: Drought is generally not as damaging or disruptive as floods and other hazards and it is more difficult to define. A drought is a natural hazard that evolves over months or even years and can last as long as several years to as short as a few months. According to the NH State Hazard Mitigation Plan, New Hampshire has a low probability, severity and overall risk for drought. These hazards were not mapped. Droughts have the potential to impact the community on a townwide basis. No significant droughts have occurred in Jackson since the 2016-17 drought.				
Summary of Drought in the state & regionwide				
Drought	1775, 1840, 1882, 1910's, 1929-1936, 1939-1944, 1947-1950, 1960-1969, 1999; 2001-2002, 2016-2017		Occurrences of serious droughts in recorded New Hampshire history.	State of NH Multi-Hazard Mitigation Plan, Update 2018
Summary of Drought in the community since 1929				
Drought	1929-1936	State & Regionwide	Regional	State of NH Multi-Hazard Mitigation Plan, Update 2018 & 2019 HMPT
Drought	1939-1944	State & Regionwide	Severe in southeast and moderate elsewhere	
Drought	1947-1950	State & Regionwide	Moderate	
Drought	1960-1969	State & Regionwide	Regional longest recorded continuous spell of less than normal precipitation	
Drought	2001-2002	State & Regionwide	Third worst drought on record	
Drought	2016-2017	State & Regionwide	Declared drought for the summer of 2016 and into 2017, moderating from extreme in southern New Hampshire to dry in the most northern communities. The drought affected Jackson with several wells in drying up.	
G. Miscellaneous Past or Potential Hazards: Human-caused hazards and other unusual hazardous events have been noted throughout New Hampshire. Among others, one concern is the transport of hazardous material through communities by rail and tractor-trailer. Other natural or human-caused hazards have the potential to impact the community on a townwide basis. No additional hazards have taken place in Jackson since the late 2000's.				
Lightning	2008-2009	Tyrol	During this time frame, two or three structure fires occurred as a result of lightning in Tyrol.	2019 HMPT



Type of Event	Date of Event	Location	Description	Source
<b>H. Other Hazards:</b> Identified hazards with no specific example of occurrence.				
<b>Natural Hazards</b>			<p>Although the team did not identify specific examples or past occurrences of these hazards, it was felt worthwhile to list them as potential hazards to the town. These hazards have the potential to impact the community either locally or on a townwide basis.</p> <p>See Table 3.1, Hazard Threat Analysis and Chapter 5 for more details on these hazards.</p>	
Extreme Temperatures				
Infectious Diseases				
Avalanche				
Solar Storm & Space Weather				
<b>Technological Hazards</b>				
Known & Emergency Contaminates				
Conflagration				
Hazardous Materials				
Aging Infrastructure				
<b>Human Caused</b>				
Transport Accidents				
Mass Casualty Incidents				
Terrorism & Violence				
Cyber Events				

\*Historic hazard events were derived from the following sources unless noted otherwise:

- Website for NH Disasters: <http://www3.gendisasters.com/mainlist/newhampshire/Tornadoes>
- FEMA Disaster Information: <http://www.fema.gov/disasters>
- The Tornado Project: <http://www.tornadoproject.com/alltorns/nhtorn.htm>
- The Tornado History Project: <http://www.tornadohistoryproject.com/>
- The Disaster Center (NH): <http://www.disastercenter.com/newhamp/tornado.html>
- EarthquakeTrack.com; <http://www.Earthquaketrack.com>

For more information on state and county-wide past events, see Major Disaster and Emergency Declaration, Appendix D, *NH Major & Emergency Declarations*.

## Chapter 4: Critical Infrastructure & Key Resources (CIKR)

With team discussion and brainstorming, Critical Infrastructure & Key Resources (CIKR) within Jackson were identified. The Hazard Risk rating was based on a scale of 1-3 with 1 indicating little or no risk.

**TABLE 4.1 - EMERGENCY RESPONSE FACILITIES (ERF) & EVACUATION**

EMERGENCY RESPONSE FACILITIES (ERF)			
ERF'S are primary facilities and resources that may be needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Fire Station (portable generator)	Primary EOC & Fire	All Hazards	1
Town Building Complex - Town Offices (generator)	Secondary EOC & Town Records	All Hazards	1
Town Building Complex - Police (generator)	Law Enforcement	All Hazards	1
Whitney Community Center (generator)	Primary Shelter	All Hazards	1
Highway Garage (generator)	Heavy Equipment, Sand & Gravel	All Hazards	1
Siren (Air Horn @ Fire Station)	Warning System	All Hazards	1
Memorial Hospital (North Conway)	Medical	All Hazards	1
Bartlett / Jackson Ambulance (Bartlett)	Emergency Medical Services	All Hazards	1
Emergency Communication & Repeater Tower (Thorn Mountain) (solar)	Communications	All Hazards & Wind & Ice	3
FM Commercial Radio Tower & Cell Towers (Black Mountain Knoll)	Communications	All Hazards & Wind & Ice	2
Carroll County Sheriff's Office Dispatch (Ossipee)	Communications	All Hazards	1
Helicopter Landing Zones			
Highway Garage	Helicopter Landing Zone	All Hazards	1
Town Park	Helicopter Landing Zone	All Hazards & Flooding	2
Bridges & Culverts on Evacuation Routes			
Jackson Covered Bridge (Route 16B)	Bridge on Evacuation Route	All Hazards	1
Route 16 at intersection of Green Hill Road	Bridge on Evacuation Route	All Hazards	1
Stone Bridge on Main Street	Bridge on Evacuation Route	All Hazards & Flooding	2
Bridge on Dundee over Great Brook	Bridge on Evacuation Route	All Hazards & Flooding	2

EMERGENCY RESPONSE FACILITIES (ERF)			
ERF'S are primary facilities and resources that may be needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Dundee Road over Mill Brook by Crossroads	Bridge on Evacuation Route	All Hazards & Flooding	2
Route 16 over the Ellis	Bridge on Evacuation Route	All Hazards	1
Melloon Road	Bridge on Evacuation Route	All Hazards & Flooding	2
Evacuation Routes			
NH Route 16	Primary Evacuation Route	All Hazards & Flooding	2
Thorn Hill Road	Primary Evacuation Route	All Hazards	1
Main Street	Primary Evacuation Route	All Hazards & Flooding	2
Dundee Road (Secondary)	Secondary Evacuation Route	All Hazards & Flooding	2

**TABLE 4.2 – NON-EMERGENCY RESPONSE FACILITIES (NERF)**

NON-EMERGENCY RESPONSE FACILITIES (NERF)			
NERF'S are facilities, that although they are critical, they are not necessary for the immediate emergency response efforts. This would include facilities to protect public health and safety and to provide backup emergency facilities.			
Facility	Type of Facility	Hazard Risk	
Jackson Library (no generator)	Secondary Shelter	All Hazards	1
Jackson Community Church	Possible Secondary Shelter	All Hazards & Flooding	2
Jackson Grammar School	Temporary Shelter for Students	All Hazards	1
Consolidated Communications Substation (Thorn Hill Road)	Utilities - Telephone	All Hazards	1
NHEC Substation (Route 16)	Utilities - Electric	All Hazards	1
Public Water Pumping Site/Treatment Plant/Water Storage (Green Hill Road)	Utilities - Water Supply	All Hazards & Flooding	3
Storage Tanks (Switchback Road)	Utilities - Water Supply	All Hazards	1

**TABLE 4.3 – FACILITIES & POPULATIONS TO PROTECT (FPP)**

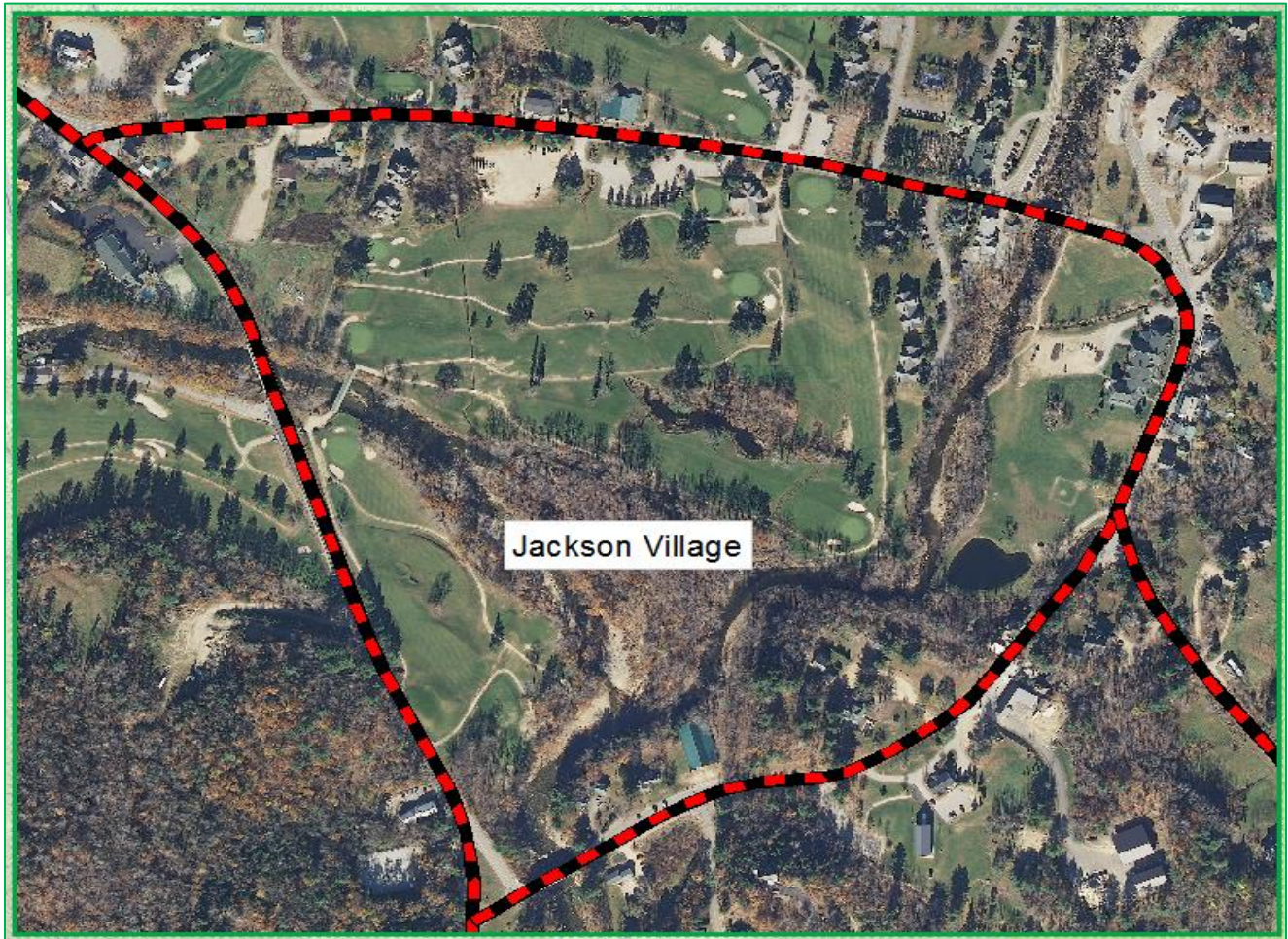
FACILITIES & PEOPLE TO PROTECT (FPP)			
FPPs are facilities that need to be protected because of their importance to the town and to residents who may need help during a hazardous event.			
Facility	Type of Facility	Hazard Risk	
Jackson Grammar School	School	All Hazards	1
Wentworth Hall Golf Course Maintenance Shed (pesticides, fertilizers, etc.)	Hazardous Material Storage	All Hazards & Flooding	2
Eagle Mountain Golf Course Maintenance Shed (pesticides, fertilizers, etc.)	Hazardous Material Storage	All Hazards	2
Covered Bridge (Main Street over Ellis River)	Historic	All Hazards	1
The Jackson Public Library	Historic	All Hazards	1
The Emerson Building (Old Library)	Historic	All Hazards & Flooding	2
Historical Society Building (Old Town Hall)	Historic	All Hazards	1

**TABLE 4.4 – POTENTIAL RESOURCES (PR)**

POTENTIAL RESOURCES (PR)			
PRs are potential resources that could be helpful for emergency response in the case of a hazardous event.			
Facility	Type of Facility	Hazard Risk	
Yesterday's	Food & Water	All Hazards	1
J-Town Deli	Food & Water	All Hazards & Flooding	2
Shannon Door	Food & Water	All Hazards	1
Red Fox	Food & Water	All Hazards	1
Wildcat Tavern	Lodging, Food & Water	All Hazards	1
Thompson House Eatery	Food & Water	All Hazards	1
Wentworth Resort	Lodging, Food & Water	All Hazards & Flooding	2
Inn at Thorn Hill	Lodging, Food & Water	All Hazards	1
Eagle Mountain House	Lodging, Food & Water	All Hazards	1
Christmas Farm Inn Lodging	Lodging, Food & Water	All Hazards	1
Whitney's Inn & Shovel Handle Pub	Lodging, Food & Water	All Hazards	1
Jackson Highway Diesel at Fire Station	Diesel	All Hazards	1
Many additional Inns, lodges & restaurants would also be available and willing to help in an emergency. For more potential resources, see the Jackson Emergency Operations Plan, 2016.			
Refer to EOP for Resource Inventory List for other Potential Resources			



Also considered critical is Jackson Village. This unique area is a collection of idyllic historic buildings that represent the true charm of Jackson. In addition, Jackson Village is vital for emergency evacuation (red/black line).



## Chapter 5: Hazard Effects in Jackson

### A. IDENTIFYING VULNERABLE CRITICAL INFRASTRUCTURE & KEY RESOURCES (CIKR)

Because damages from floods and wildfires are more predictable than damages from other disasters, it is important to identify the Critical Facilities and Key Resources (CIKR) and that are most likely to be damaged by these events. Using Geographic Information System (GIS) analysis and aerial imagery, at-risk CIKR were identified throughout the town.

All CIKR in Jackson were identified in GIS; this list was then narrowed by those CIKRs that were located in the FEMA floodplain. Eleven CIKRs were found in the FEMA flood zone (see table to the right). Four CIKRs are bridges or culverts on the evacuation routes, all which are expected to be in the floodplain. In addition, there is one helicopter landing zone that could be flooded when needed.

	ALL_H	NAME	Hazmit_Type
▶	ERFH	Helicopter Landing Zone, Town Park	Landing Zone
	ERFB	Bridge-Covered-Main St over Ellis R	Bridge/Covered
	ERFB	Bridge-Stone on Main St	Bridge (State)
	ERFB	Bridge-State/Rt 16 over Ellis R	Bridge (State)
	ERFB	Bridge-Meloon Rd/ Wildcat River	Bridge
	NERF	Jackson Community Church	Religious Facility
	FPP	Wentworth Hall Golf Course Mtnc Shed	Golf Course (Mtnc)
	FPP	Historic Library	Library
	PR	J-Town Deli, Main Street	Food & Water
	PR	Thomson House Eatery	Food & Water
	PR	Wentworth Resort/1 Carter Notch	Lodging

The remaining CIKR in harm's way for flooding include several facilities that are important not only for emergency response (resources for food, water and lodging) but also for their significance to the community, including the Jackson Community Church and the Historic Library. The Wentworth Hall Golf Course Maintenance Shed could also experience flooding; hazardous materials (fertilizers and chemicals) stored there could potentially leak into the ground water. CIKRs in the floodplain are indicated by yellow houses on the map on the following page.

No additional CIKR were found to be in the designated FEMA floodplain although it is expected that many non-CIKR structures are within the FEMA floodplain. Town officials should keep all of these CIKR in mind when a flood hazard is likely.

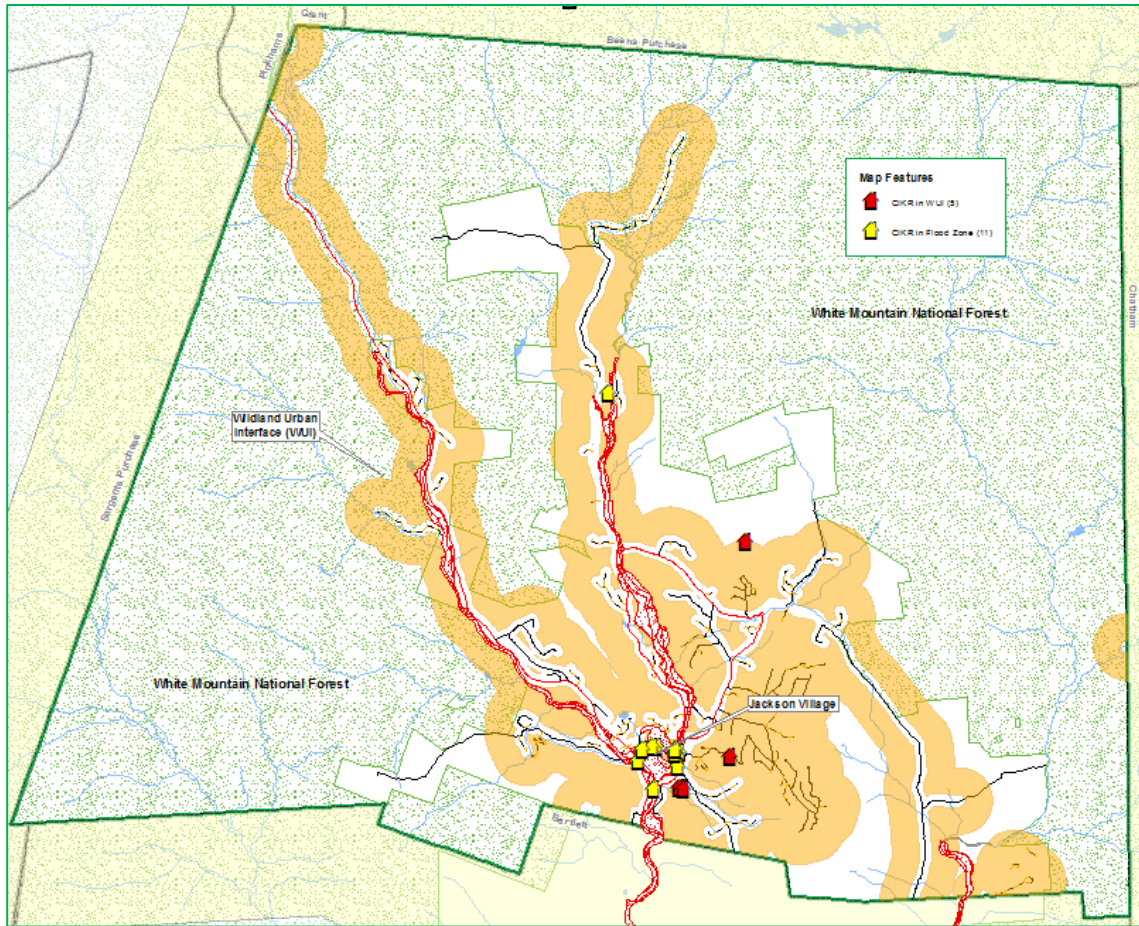
Using the same methodology that was used for flooding, CIKR falling within the Wildland Urban Interface (WUI) were reviewed. Identifying these facilities assists the team in creating wildfire mitigation action items and prioritizing those action items; it is important to determine which Critical Infrastructure & Key Resources are most vulnerable to wildfires. The WUI is indicated by the orange buffer in the map on the following page.

Many structures were found to be in the traditional WUI, however, only five CIKR were found in the WUI. These are the Jackson Highway Garage, the Highway Garage Parking Lot, the FM Communications Tower, the Storage Tanks on Switchback Road and the Salt Shed at the Highway Garage. Each of these facilities has ample defensible space and is unlikely to be impacted by wildfire. CIKRs in the WUI are indicated by red houses in the map on the following page.

The rest of the town's Critical Infrastructure & Key Resources were found to be within the 300 foot WUI buffer, therefore accessible by fire apparatus and hoses. However, as stated elsewhere in this plan, the entire town of Jackson, including many structures, is thought to be in the WUI because it is so heavily forested. Therefore, all structures in town can be assumed to be in the WUI.

**Table 3.1, The Hazard Identification & Risk Assessment, is used to evaluate the probability and the potential impact of all hazards.**





## B. CALCULATING THE POTENTIAL LOSS

It is difficult to ascertain the amount of damage that could be caused by hazards because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. Therefore, we have used the assumption that hazards that impact structures could result in damage to either 0-1% or 1-5% of the town's structures, depending on the nature of the hazard and whether or not the hazard is localized.

MS-1 Assessed Value of All Structures			
2018-MS1	Value	1% Damage	5% Damage
Residential	\$237,752,700	\$2,377,527	\$11,887,635
Manufactured Housing	\$87,100	\$871	\$4,355
Commercial	\$30,985,700	\$309,857	\$1,549,285
Tax Exempt	\$4,911,200	\$49,112	\$245,560
Utilities	\$2,143,800	\$21,438	\$107,190
Total	\$275,880,500	\$2,758,805	\$13,794,025
Received from Jackson, January 2019			

Based on this assumption, the potential loss from any of the identified natural hazards would range from **\$0 to \$2,758,805** or **\$2,758,805 to \$13,794,025** based on the 2018 Jackson town valuations which lists the assessed value of all structures in Jackson to be **\$275,880,500** (see table above).

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. Although descriptions are given for technological and human-caused hazards, no potential loss estimates for these hazards is provided in this plan.

C. NATURAL HAZARDS

Descriptions below represent the “local impact” to the community for the hazards that were identified by the team. For the “extent” of these hazards, please refer to *Appendix C, The Extent of Hazards*, which includes charts such as the Saffir-Simpson Hurricane Wind Scale, the Beaufort Wind Scale, the National Weather Service Heat Index, the Sperry-Piltz Ice Accumulation Index and the Enhanced Fujita Scale for tornadoes.

Table 3.1, The Hazard Identification & Risk Assessment (HIRA), is used to evaluate the probability and the potential impact of all hazards.

The “Hazard Identification & Risk Assessment (HIRA)” and the “Probability” are taken from analysis done in Table 3.1, *Hazard Identification & Risk Assessment (HIRA)*. The numbers preceding the hazard name in this section correspond to the numbers in Table 3.1 and are in order by “Relative Threat”. The estimated loss is determined using the methodology and table that are explained on the previous page (Section B of this chapter).

1) SEVERE WINTER WEATHER

Hazard Identification & Risk Assessment (HIRA) .....	High
Probability .....	Very High
Estimated Structure Loss Value .....	\$2,758,805 to \$13,794,025

Snowstorms, Blizzards & Nor’easters

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snowstorms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in Jackson in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly (43.4% of the population) and other vulnerable populations. The ability to get in and out of town and emergency service access can be hindered. Damage caused by severe winter snowstorms varies according to wind velocity, snow accumulation, duration and moisture content. Seasonal accumulation can also be as significant as an individual snowstorm. Heavy overall winter accumulations can impact the roof-load of some buildings. Significant snowstorms, nor’easters and blizzards could diminish food supplies within two days.

In 2010, one significant snowstorm brought very wet heavy snow accumulations to Jackson; fortunately, there was no significant damage and with time on their side, the Jackson Highway Department was able to handle the effects of the storm. The Team also reported that the winter of 2012 saw an overall accumulation of snow that led it be to recorded as the third largest winter accumulation since the winter of 1969, a winter which brought record amounts of snow to central and northern New Hampshire (see Table 3.2).

More recently, in both March 2017 and March 2018, snowstorms with unusually high spring accumulation received Major Disaster Declarations (DR-4316 and DR-4371). In both cases, the scheduled Town Meeting was held and voting continued. During the 2017 storm, some people were stuck in their homes and could not get out to vote, there were multiple car accidents and Tin Mine Road was impassable due to snow accumulation. Ultimately, there was no significant damage and the Highway Department was able to handle the heavy wet accumulation.

Although Jackson’s Highway Department generally handles usual snow amounts without difficulty, Jackson’s roads are often impacted by poor weather conditions and, this combined with heavy traffic on NH Route 16, can make travel difficult. Fire and other emergency response may also be hindered by poor road conditions.

**Ice Storms**

Of more concern in Jackson than 2-4' snowstorms are ice storms, though the probability of the occurrence of a major ice storm is lower than that of a major snowstorm. A significant ice storm can inflict several million dollars' worth of damage to forests and structures. Unlike normal snowstorms which are generally handled well by the Highway Department, ice storms present significant problems. Downed power lines and fallen trees make it difficult for the Highway Department and emergency responders. School buses are also at risk.

The 1998 ice storm (Major Disaster Declaration: DR-1199) was a disastrous storm in Jackson, particularly in the Tyrol area of town. Most of the devastation took place at elevations of 700' or more, however hardwood forests above 300' were also significantly damaged. Parts of the community lost power for up to two weeks and the Emergency Operations Center had intermittent power losses for four days. School was out for several days and with trees and power lines down on roads, some areas of the town were inaccessible.

The 2008 ice storm was considered one of the worst ice storms in New Hampshire history (Major Disaster Declaration: DR-1812) in much of the state, but fortunately, in Jackson, this storm was not as significant as the 1998 ice storm. Higher elevations were again impacted by the 2008 storm. The town experienced extended power outages and fallen trees resulting in power outages for up to seven days. There were again trees and power lines in the roadways creating closures; a few minor vehicular accidents occurred due steep icy roads. The town's EMD opened the EOC.

Due to the widespread nature of severe winter weather, particularly from ice storms, the potential loss value is estimated to be between 1% and 5% of the total assessed value of all structures in town.

**2) HIGH WIND EVENTS**

Hazard Identification & Risk Assessment (HIRA) .....	High
Probability .....	High
Estimated Structure Loss Value .....	\$0 to \$2,758,805

**Isolated High Wind Events**

Isolated high winds and down drafts often occur within Jackson. These wind events are unpredictable and could fall timber, which in turn could block roadways, down power lines and impair emergency response. Old-growth softwood is affected by these unexpected windstorms, particularly in the spring when the water table is high. As with other wind events, emergency response could be difficult.

The town often experiences sporadic high winds due to its location situated between large mountain peaks. Power companies have aggressively trimmed trees, particularly those near power lines, which could cause damage throughout the community, but the risk still exists.

**Tornadoes & Downbursts**

The biggest difference between tornadoes, microbursts and macrobursts is the direction, size and the location that the wind comes from, but all can cause significant damage. A tornado generally covers a large area, perhaps even several miles. It has winds that blow in a circular fashion leaving behind downed trees that lie in a swirling pattern. Straight-line winds and winds that burst downward are indicative of a microburst; the fallen trees that are left behind

lay in roughly the same direction. A microburst must be 2.5 miles in width or less, whereas a macroburst is a similar wind event that is greater than 2.5 miles wide and generally lasts longer than a microburst.

In Jackson, a microburst would be more likely than a tornado. Microbursts are becoming more and more common and often result in damage. Jackson experienced a microburst in the winter of 2017 on Town Hall Road. This microburst flattened a house, laid down many white pine trees and created loss of power throughout the community. Fortunately, no personal injuries occurred during this event.

Although the incidence of downbursts is becoming more common, damaging high wind events are relatively uncommon natural hazards in New Hampshire. On average only about six tornadoes touch down each year. Damage from high wind events largely depends on where the hazard strikes. If a high wind event were to strike a densely populated or commercial area, the impact could be significant and could result in personal injury and property damage. However, due to the rareness of tornadoes and the localized nature of downbursts, the potential loss structure value was determined to be between 0% and 1%.

### 3) INLAND FLOODING

Hazard Identification & Risk Assessment (HIRA) ..... High  
 Probability ..... Moderate  
 Estimated Structure Loss Value ..... \$2,758,805 to \$13,794,025

#### **100-Year Flood Events, Riverine Flooding & Ice Jams**

Riverine flooding and 100-year flood events can occur as result of hurricanes, tropical and post-tropical cyclones, heavy summer and fall rains as well ice jams.

Floodplains are usually located in lowlands near rivers and flood on a regular basis. The term 100-year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase “1% annual chance flood”.



Nearly every spring, rapid snowmelt and heavy rain cause the flooding of the Ellis River, which meets a number of smaller brooks and streams in the heart of Jackson Village. Among these brooks and streams that flow into the Ellis River are tributaries of Meserve Brook, Miles Brook, Marsh Brook, Spruce Brook and Great Brook. As seen in the map above, a large amount of water flows into Jackson Village (the red line represents the loop around the village, the blue lines represent rivers and streams).

Tropical Storm Irene in August 2011, the remnants of Hurricane Irene, brought heavy rain and flooding to Jackson. Several trees were downed as were some power lines. For most in Jackson, there was a brief loss of power; however some residents experienced power outages for three to four days. As a result of the extraordinary volume of rainfall that fell over the peaks of the White Mountains, rivers and streams throughout Jackson overflowed their banks causing significant damage to roadways and bridges, particularly to Melloon Bridge Road.



The ballfield and golf course experienced flooding. In addition, trees were down, some roads were closed and some streets within the Village were impassable. As experienced in other New Hampshire communities, the rivers of Jackson furiously flowed down mountain streams, causing damage along the way before dissipating quickly when the rain stopped.

The team also report that ice jam flooding has also occurred on several occasions. During one ice jam event on the Ellis River, the ballfield in Jackson Village flooded to a level higher than it was during Tropical Storm Irene.

Overall, with the exception of the damage done during Tropical Storm Irene and in spite of the volume of water that flows through the Village, the team indicated that most riverine flooding that occurs is “green-space” flooding that does not affect structures.

### ***Local Road Flooding***

#### **FLOODING LOCAL (ROADS)**

Local road flooding is often the result of rapid snowmelt and heavy spring or fall rain events. It is estimated that the town experiences some sort of stormwater problem whenever two or more inches of rain falls in a short period of time. Heavy rain from tropical downpours, hurricanes or severe thunderstorms along with rapid snowmelt often cause culverts to be overwhelmed and roads to wash out. In addition timber harvesting, undersized or aging culverts and inadequate ditching are some of the major causes of local road flooding in Jackson.

Although the major disaster declaration that occurred on July 1-2, 2017 (DR-4329) was not declared in Carroll County, Jackson and the rest of New Hampshire received heavy rain during this event. In Jackson, one culvert was lost during this storm on a Class IV road, but it was mitigated at the time of the storm.

Another major rain event took place on October 29-30, 2017 (DR-4355); this was declared in six New Hampshire counties including Carroll. Fortunately, during this event, Jackson experienced heavy rain but no significant damage to either roads or structure. Other parts of New Hampshire, particularly in Grafton County, experience very significant damage during both the July and October 2017 storms.

Jackson is the 14th largest town in New Hampshire in square miles, and although there are not a tremendous number of roads in town, those that are there are long and winding and subject to some of the most severe weather in the state. The continuous erosion of roads makes for a daunting task of “up-keep” for the Highway Department. The Highway Department maintains a total of 20.50 miles of Class V roads in the community, 17.08 miles of which are paved and 3.42 miles of which are gravel<sup>13</sup>. Fortunately, the town’s major thoroughfare, NH Route 16 is the responsibility of the state.

Jackson has been very proactive in the maintenance and repairs of culverts and ditches to reduce the incidence of local road erosion and washouts and has made considerable repairs since Tropical Storm Irene. With the exception of the undersized culvert on Green Hill Road (Action Item #18), Jackson’s roads are in excellent condition to handle excessive rain amounts and potential flooding.

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<sup>13</sup> GIS analysis of NH DOT Roads & Highways layer

The expected structure loss value from riverine and ice jam flooding and road erosion would be based not only on the cost to repair roadways but also on the potential cost of damage to structures. Flooding can be severe enough to take out utilities and create areas of town that become inaccessible to emergency responders. The team also noted that if flooding were more significant than what was experienced during Irene, the village water supply could be compromised causing an “economic nightmare”.

Due to the economic impact on the community, the loss of accessibility and the time and cost of road repair the estimated loss value was determined to be between 1% and 5% of the total structure value.

4) EXTREME TEMPERATURES

Hazard Identification & Risk Assessment (HIRA) .....	Medium
Probability .....	High
Estimated Structure Loss Value .....	Not estimated

Extreme Cold & Heat

Winter temperatures can fall below -30°F and summer temperatures, laden with high humidity can soar to nearly 100°F. In the past, there was more concern about extreme cold temperatures, but with improved heating systems and local communications, most New Hampshire residents are able to cope with extreme cold. Additionally, many New Hampshire residents have equipped their homes with generators and woodstoves and many cities and towns offer warming centers or have established a functional needs list to check on vulnerable citizens. In Jackson, the residents are urged to use the Whitney Center, the Library, the Town Hall and/or the Fire Station for cooling and warming centers.

Of concern today are extreme heat conditions, which seem to be more common with climate change. A heat wave with temperatures in excess of 95° for a week or more can have a substantial impact on the elderly and other vulnerable populations. Few residents, particularly vulnerable populations, have air conditioners and are less able to cope with extreme heat. The estimated elderly population in Jackson is 43.4% and the estimated poverty rate is 12.9% of the total population<sup>14</sup>.

Extreme Temperatures combined with Long Term Utility Outage

Extreme temperatures when combined with power failure are of the most concern; power failure could result in no water, heat and air conditioning for the town’s most vulnerable populations. Town officials and the community as a whole should be concerned and should look after its citizens to ensure that extreme temperatures do not create a life or property threatening disaster.

The cost of extreme temperatures is difficult to calculate as it is not based on the loss of structures. The expected loss value would be primarily on the economic impact to the community and the time and cost of emergency response. Based on the assumption that damage would not occur to structures, the structure loss value due to extreme temperatures was not estimated.

<sup>14</sup> US Census Bureau, American Community Survey, ACS, 2013-2017



**5) LIGHTNING**

Hazard Identification & Risk Assessment (HIRA) .....	Medium
Probability .....	Low
Estimated Structure Loss Value .....	\$0 to \$2,758,805

**Lightning**

Severe lightning as a result of summer storms or as a residual effect from hurricanes and tornadoes has occurred in Jackson. Some of the town's structures are older and historic buildings, as detailed in Table 4.3, many of which are in open areas and are susceptible to lightning strikes.

Other vulnerable structures are surrounded by forest. Dry timber on the forest floor, some of which remains from past ice or windstorms and the age of many buildings and out-buildings combined with lightning strikes can pose a significant disaster threat. Lightning could do damage to specific structures, injure or kill an individual, but the direct damage would not be widespread.

Although lightning is a potential problem, the town reports few occurrences, none of which were severe. Jackson is also home to two golf courses, but no injury producing or damaging strikes have been reported.

It was noted that severe thunder and lightning storms seem to happen more often in the recent years, perhaps the result of climate change. Also concerning are the heavy rains that thunderstorms can produce and the subsequent erosion of ditches and roadways.

**Hail**

Although not common in Jackson, hailstorm events resulting from significant thunder and lightning storms can occur at any time. Summer storms may produce hail large enough to damage roofs, siding and automobiles. Damage from hail could also result in failed crops, thus creating an economic impact for the local economy and individual citizens. It should be noted however, that Jackson is not a heavily farmed community. Overall, it was felt that a hailstorm event would be unlikely and would cause minimal damage.

Based on the localized nature of lightning strikes and the minimal damage that can be expected from hail, the potential loss value was determined to be 0-1% of the total assessed structure value.

**6) WILDFIRES**

Hazard Identification & Risk Assessment (HIRA) .....	Medium
Probability .....	Low
Estimated Structure Loss Value .....	\$2,758,805 to \$13,794,025

There are two main potential losses with a wildfire, the forest itself and the threat to the built-up human environment and structures within the Wildland Urban Interface (WUI). In many cases, the only time it is feasible for a community to control a forest fire is when it threatens the built-up human environment.

Any wildfire discussion must include a discussion of the Wildland Urban Interface (WUI). The WUI can be determined in a variety of ways; however it basically represents the area in which the forest and human habitation intersect. At times the WUI is defined as the area out of reach of available fire hoses and water resources, while

others times it is determined to be areas with substantial tree cover and limited egress. For most northern New Hampshire communities, entire towns are considered to be in the WUI because of the abundance of hardwood and softwood trees. In more populated areas, the WUI is often determined to be in densely populated neighborhoods where a large canopy of old-growth trees and limited access make people and structures more vulnerable. All structures within the WUI are generally assumed to be at some level of risk and therefore, vulnerable to wildfire. Please refer to the map on page 54 that symbolizes the WUI in an orange buffer of Jackson's Class V roads.

Due to the abundance of slash on the forest floor left by logging operations, blow downs and the mixture of hardwood and softwood trees throughout the northern forests, there is potential for fast burning fuels and a wildfire could potentially occur. In addition, the recreational use of woods-trails by snowmobilers, ATV operators, campers and other outdoor enthusiasts creates an opportunity for sparks and out-of-control fires to ignite the town's forested areas. To help combat fire, Jackson maintains and improves firefighting equipment and continuously maintains dry hydrants and fire ponds throughout the community.

The team described the forests of Jackson as consisting of primarily a combination of softwoods and northern hardwoods. With a low probability of drought and high humidity, it was felt that most fires are "duff" fires, the burning of *"the layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil."*<sup>15</sup> Burn permits are required in Jackson, as they are throughout the state, but often burning takes place without the proper permits. The steep terrain and heavily forested areas of the town are difficult to monitor, therefore the occasional unauthorized burn will take place.

Currently available documentation on fires in Jackson and New Hampshire indicates that the majority of fires are human-caused; however no significant wildfires have occurred in Jackson in many years. The team noted that more buildings are being built in the Wildland Urban Interface (WUI), thus increasing the probability for a large and damaging wildfire. The built-up human environment, if combined with a significant drought, steep terrain, lightning strikes and/or human-error, could produce wildfires in the future.

Large wildfires in New Hampshire are uncommon; however three large fires have occurred in the state in recent years, the Dilly Cliff Fire in Woodstock, the Covered Bridge Fire in Albany and the Bayle Mountain Fire in Ossipee. No large fires have occurred in Jackson, however, given the right set of conditions (drought, lightning, human interface), the potential for large wildfires is good. Because the Town of Jackson is heavily forested, the potential loss value was determined to be between 1% and 5% of the total assessed structure value.

## 7) INFECTIOUS DISEASES

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Very Low
Estimated Structure Loss Value .....	\$0 to \$2,758,805

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

<sup>15</sup> <http://www.fs.fed.us/nwacfire/home/terminology.html>

*Some infectious diseases can be passed from person to person. Some are transmitted by bites from insects or animals. And others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment.”<sup>16</sup>*

Jackson’s unique geography of mountains, rivers and lakes provides summer and winter recreation enthusiasts many opportunities to visit the town. The community’s population shows a large increase during the summer and winter months, due to the town’s proximity to major ski areas in northern New Hampshire and to Story Land, which is located just outside of the town in the neighboring town of Bartlett. In addition, the town’s middle and high school students attend school in Bartlett and Conway along with students from the neighboring towns of Albany, Chatham, Eaton, Hart’s Location, Bartlett and Conway, thus enabling infection and viruses to be transmitted from elsewhere.

Because of these factors, the team decided that infectious diseases and epidemics or pandemics could present a possible threat to Jackson. With the occurrence of world-wide pandemics such as SARS, the Zika Virus, H1N1 and Avian Flu, Jackson could be susceptible to an epidemic and subsequent quarantine.

As part of our discussion about infectious disease, it makes sense to discuss the opioid epidemic that is affecting the state and the nation in general. According to the National Institute on Drug Abuse, *“New Hampshire has the second highest rate of opioid-related overdose deaths in the country. In 2016, there were 437 opioid-related overdose deaths...from 2013 through 2016, opioid-related deaths in New Hampshire tripled”<sup>17</sup>*. Although the availability and use of NARCAN® has helped lower the death rate in New Hampshire, opioid-related overdose deaths are still a common occurrence.

## 8) TROPICAL & POST-TROPICAL CYCLONES

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Very Low
Estimated Structure Loss Value .....	\$2,758,805 to \$13,794,025

Wind damage due to tropical and post-tropical cyclones (hurricanes) is a consideration because of the forest and valley floors in Jackson. Like the 1938 hurricane and hurricanes Carol and Edna in 1954, major forest damage could occur. Although tropical and post-tropical cyclones could fit into several different categories (wind and flooding), the team considered tropical and post-tropical cyclones to be separate events. Tropical and post-tropical cyclones are rare in New Hampshire, but they should not be ruled out as potential hazards. In most cases, tropical cyclones have been down-graded to post-tropical cyclones by the time they reach northern New Hampshire.

Tropical Storm Irene, the remnants of Hurricane Irene, brought heavy rain to Jackson and took several trees and power lines down. Most residents only experienced short power outages; a few had outages for up to three days. Tropical Storm Sandy had little impact in Jackson, with the exception of heavy rain. For more information on the impact of Tropical Storm Irene, please refer to inland flooding in this chapter.

The probability that a tropical and post-tropical cyclone would remain a Category 1 or greater in this part of the state is low. Therefore, the potential loss value due to tropical and post-tropical cyclones was determined to be between 0% and 1% of the total assessed structure value.

<sup>16</sup> Infectious diseases, Overview, <https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173>

<sup>17</sup> NH Opioid Summary, National Institute on Drug Abuse; <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/new-hampshire-opioid-summary>

## 9) DROUGHT

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Low
Estimated Structure Loss Value .....	\$0 to \$2,758,805

An extended period without precipitation, or drought, could elevate the risk for wildfire and blow-downs in the forested areas of the community and with an extreme drought, the water supply and aquifer levels could be threatened. Only 20% of the residents in Jackson rely on town water, the rest of the residents rely on private wells. Fortunately, significant droughts rarely occur in New Hampshire or Jackson. According to the NH Department of Environmental Services, only six significant droughts have occurred since 1929<sup>18</sup>, including the drought of 2016-2017.



WMUR Archives; September 15, 2016

The 2016 drought in New Hampshire was significantly worse in the southern part of the state than in the northern region. The image to the right from WMUR-TV in September 2016 shows drought conditions in New Hampshire during the summer of 2016<sup>19</sup>.

During the 2016 drought, in Jackson some dug-wells dried up and were replaced with artesian wells. Well drillers from all over the east coast remained busy for several weeks. The 2016 drought continued into 2017 with dry conditions throughout the summer in some communities, but the impact was not as significant as the prior year. Fortunately, there are no longer drought conditions in New Hampshire.

The cost of future droughts in Jackson is difficult to calculate as any cost would likely result from an associated fire risk, crop loss and diminished water supply. An extended period without precipitation could elevate the risk for wildfire and in an extreme drought, the water supply and aquifer levels could be threatened. Based on these assumptions, the loss value was estimated to be between 0% and 1% of the total assessed structure value.

## 10) AVALANCHES

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Very Low
Estimated Structure Loss Value .....	\$0 to \$2,758,805

Because of the steepness of the terrain and heavy snowfall potential, the team felt that snow avalanches should be listed, although most areas where avalanche is possible are remote and within forested lands. Of these remote areas, the mountains in Pinkham Notch and around Mount Washington would be the most susceptible.

The impact on human life, property or business would be minimal if any; only with a very unique combination of factors could a snow avalanche cause damage to structures. The potential loss value was determined to be between 0% and 1% due to the expected minimal effect.

<sup>18</sup> NH DES; <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>

<sup>19</sup> <https://www.wmur.com/article/extreme-drought-conditions-worsen-in-new-hampshire/5269231>

**11) EARTHQUAKES**

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Very Low
Estimated Structure Loss Value .....	\$2,758,805 to \$13,794,025

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and are often associated with landslides and flash floods. Two earthquakes with a magnitude greater than 5.0 have occurred in New Hampshire since 1940, both of which occurred in Ossipee in December of 1940 (5.5-5.8). Three earthquakes with a magnitude greater than 4.0 have occurred in the state since 1982, one in Laconia (4.0), one in Berlin in 1988 (4.0) and another in Berlin in 1989 (4.1). The most recent earthquake to be felt by many New Hampshire residents occurred in October 2012 with its epicenter in nearby Hollis Center, ME. The team noted that this earthquake was felt in Jackson but no damage occurred.

It is well documented that there are fault lines running throughout New Hampshire, but high magnitude earthquakes have not been frequent in New Hampshire history. More recently, many small earthquakes have occurred, but none of these were felt in Jackson except the one in Hollis, ME (see Table 3.2).

Although historically earthquakes have been rare in northern New Hampshire, the potential does exist, and depending on the location, the impact could be significant. Therefore, the potential structure loss value due to earthquakes was determined to be between 1% and 5% of the total assessed structure value.

**12) SOLAR STORM & SPACE WEATHER**

Hazard Identification & Risk Assessment (HIRA) .....	Low
Probability .....	Very Low
Estimated Structure Loss Value .....	\$2,758,805 to \$13,794,025

*"Space weather describes the "dynamic conditions in the Earth's outer space environment, in the same way that "weather" and "climate" refer to conditions in Earth's lower atmosphere. Space weather includes any and all conditions and events on the sun, in the solar wind, in near-Earth space and in our upper atmosphere that can affect space-borne and ground-based technological systems and through these, human life and endeavor. Heliophysics is the science of space weather."*<sup>20</sup>

Solar storms and space weather are direct products of activity on the surface, or corona, of the Sun. As the Sun continuously changes, its wind blows charged particles in every direction, including the direction of Earth. When sudden amounts of stored magnetic energy and ions are discharged from the Sun's surface, solar flares, high-speed solar wind streams, solar energetic particles and coronal mass ejections (CMEs) are possible. At times, this magnetic energy finds its way to Earth by following the Sun's magnetic field. Then, upon collision with the Earth's magnetic field, these charged particles enter the Earth's upper atmosphere causing Auroras.

These particles can also produce their own magnetic field which can disrupt navigation and communication systems and GPS satellites and can potentially produce Geomagnetic Induced Currents (GICs) which can affect the power grid and pipelines. An electromagnetic surge from a solar storm has potential to produce an Electromagnetic Pulse (EMP) which could cause significant damage to infrastructure such as nuclear power plants,

<sup>20</sup>What is space weather?, [https://www.nasa.gov/mission\\_pages/sunearth/spaceweather/index.html#q2](https://www.nasa.gov/mission_pages/sunearth/spaceweather/index.html#q2)

banking systems, the electrical grid, sewage treatment facilities, cell phones, landlines and even vehicles. Although the probability of a damaging solar storm is low, the possibility of damage to electronics and utilities could be very high. Therefore, the estimated structure loss value was determined to be between 1% and 5% of the total assessed structure value.

**D. TECHNOLOGICAL HAZARDS**

The following technological hazards were also considered while developing this hazard mitigation plan. Though these hazards are not analyzed in more detail as part of this plan, they are nonetheless worth mentioning as real and possible hazards that could occur in Jackson. Estimated structure loss was not determined for technological hazards.

**1) LONG TERM UTILITY OUTAGE**

Hazard Identification & Risk Assessment (HIRA) ..... High  
Probability ..... High



Long term utility outage of five or more days have occurred in Jackson, both as a result of local line damage from high winds and storms and problems with the power grid. If a major and/or extended power outage occurs and lasts for more than a week, a significant hardship on individual residents could result, particularly those citizens who are elderly, handicapped or poor. The team reported that long term power outages have diminished as a result of continued efforts by the NH Electric Coop to trim trees and branches near power lines, but the problem still exists. During the 1998 and 2008 ice storms, outages ranged from three to twelve days, depending on the location in town.

Long term utility outage is a concern, particularly when combined with any of the natural hazards detailed above. However, the team felt that many residents were somewhat self-sufficient as many are now equipped with generators and woodstoves. The biggest impact from an expended power failure would be the inconvenience caused by the inability to pump water for residents who rely on wells. It is also noted that driving can be difficult due to weather conditions and steep terrain and that virtually all services including pharmacies and grocers are located out of town.

As a small close-knit community, town officials are aware of persons who may need help in emergency situations. Nonetheless, a long term utility outage causing frozen pipes and a lack of heat and water is potentially a serious hazard for the community.

**2) KNOWN & EMERGING CONTAMINATES**

Hazard Identification & Risk Assessment (HIRA) ..... High  
Probability ..... Moderate

Known contaminants in drinking water occur naturally or when introduced by man. Emerging contaminants are those that have not been historically monitored due to either lack of laboratory capabilities or an understanding of the risk that may be posed for human health. Contaminates can result in a variety of impacts that include, but are not limited to damage to the environment and local flora and fauna, a reduction in land values, a need for more



robust water treatment equipment, restrictions on the use of public water sources and an increase in short and long term health issues.<sup>21</sup>

Naturally occurring contaminants could include trace elements such as arsenic, lead, manganese and uranium. The most concerning of these to private well water is arsenic, which is naturally occurring and quite common in ground water. The NH State Multi-hazard Mitigation Plan states that “...health studies of New Hampshire residents have demonstrated the connection between arsenic and the increased prevalence of conditions such as bladder and other cancers and developmental effects on children.”<sup>22</sup>

Man-made contaminants generally include compounds such as pesticides and metals that have impacted the groundwater and/or surface water. Hazardous materials spills and other accidental introductions of chemicals into ground and surface water have the potential to significantly affect the safety of public and private water supplies.

Emerging contaminants, such as poly or perfluoroalkyl substances (PFAs) have also been found in ground and surface water in New Hampshire. Additional emerging contaminants, such as Methyl Tertiary Butyl Ether (MtBE) have also been found. Increased public awareness and testing of PFAs and MtBEs is helping to counteract the effects of emerging contaminants.

### 3) CONFLAGRATION

Hazard Identification & Risk Assessment (HIRA) ..... Medium  
Probability ..... Low

*“Conflagration is an uncontrolled burning that threatens human life, health, property or ecology. A conflagration can be accidentally or intentionally created.”<sup>23</sup>*

In Jackson, the risk of a large uncontrolled fire is particularly threatening in a small section of the Village where the houses and buildings are close together and are of significant age. These factors, when combined with high winds and a lack of water resources, could potentially result in a large uncontrolled fire that could spread from building to building across the village.

The impact to communication, power and transportation would likely be temporary, but damage to homes and businesses could be significant.

### 4) HAZARDOUS MATERIALS

Hazard Identification & Risk Assessment (HIRA) ..... Medium  
Probability ..... Low

Hazardous Material-Fixed Location is a concern in many of New Hampshire’s communities. Manufacturers, gas stations, fuel depots, small businesses and even homes can be found to have hazardous chemicals, explosive materials or poisons on site. Breaches in the storage, use, production or disposal can affect the groundwater, aquifers and water supply of a community as well as the air we breathe.

<sup>21</sup> NH Multi-hazard Mitigation Plan-2018

<sup>22</sup> Ibid

<sup>23</sup> Fire Definitions; HotAsBlazes.com

In Jackson, the potential exists at the Fire Station which has a 1,000 gallon diesel tank for refueling the fire trucks. There are also several other small tanks spread throughout the town that could pose a risk. Although these tanks have the potential to cause a hazard risk, the team felt there was a very small possibility of an event happening.

If ignition of hazardous materials were to take place, entire buildings could be susceptible to explosion and fire. If a large explosion were to occur, the disruption to business and traffic control would be significant. The resulting losses could be substantial, not only in terms of structure loss but also loss of business revenue for local merchants, but losses would likely be localized.

5) AGING INFRASTRUCTURE

Hazard Identification & Risk Assessment (HIRA) ..... Low  
Probability ..... Very Low

*“Infrastructure is the backbone of our community. While we don’t always acknowledge it, the condition of our infrastructure has a very real impact on our lives. We all depend on roads and bridges to get us where we are going, water infrastructure that delivers clean on-demand water, electricity to light our home and office, and schools that will facilitate a learning environment.”<sup>24</sup>*

Aging infrastructure is the continued deterioration of roads, bridges, culverts, ports, railroads, waste water facilities, airports, dams, utilities and public water and sewage systems. The American Society of Civil Engineers gave NH a C- rating overall in its 2017 report card.<sup>25</sup> The State Multi-hazard Mitigation Plan states that the average lifespan of a bridge is 50 years; the current average age of state-owned bridges in New Hampshire is 52-56 years.<sup>26</sup>

Aging infrastructure is a concern in Jackson as it is throughout New Hampshire and the United States. In Jackson, of particular concern is the town’s public water supply system; the backbone of the system was created in 1982 with some parts of the system dating back to 1970. The system is aging and could deteriorate or create leaks or possibly sink holes in town.

Also of concern is the possibility of hazardous material seeping into local rivers and streams thus impacting the public water supply; the intake for the Jackson water system is just four feet below the river. Hazardous materials in the water supply could be dispersed throughout the system. Fortunately the town is aware of the age of the system and of the possibility of a hazardous material spill and could act on the event with haste.



Jackson Highway Garage  
Photo Credit: MAPS

<sup>24</sup> <https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-NH-Report-Card-hq-with-cover.pdf>  
<sup>25</sup> Ibid  
<sup>26</sup> NH Multi-hazard Mitigation Plan, 2018, page 156

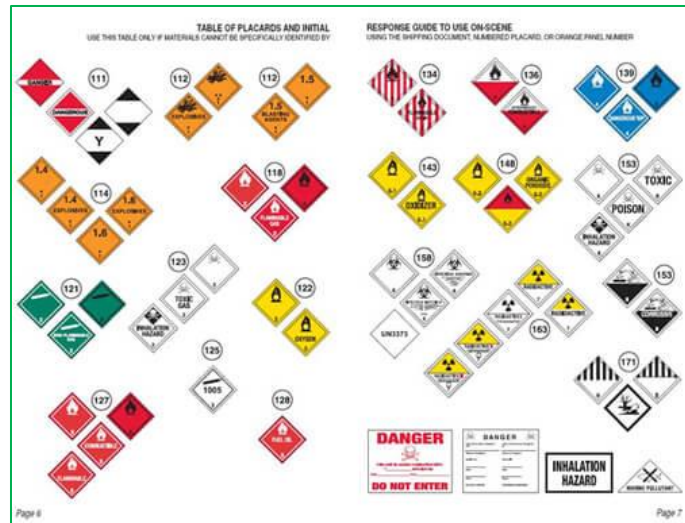
## E. HUMAN-CAUSED HAZARDS

The following human-caused hazards were also considered while developing this hazard mitigation plan. Though these hazards are not analyzed in more detail as part of this plan, they are nonetheless worth mentioning as real and possible hazards that could occur in Jackson. Estimated structure loss was not determined for human-caused hazards.

### 1) TRANSPORT ACCIDENTS

Hazard Identification & Risk Assessment (HIRA) ..... High  
Probability ..... Moderate

Jackson's roads are often travelled by trucks and busses carrying goods and people to and from other parts of the state. Some of Jackson's roads are narrow and winding and subject to severe winter weather; when affected by flooding, winter snow conditions and ice they become treacherous. In these conditions, vehicular accidents, wildlife collisions and truck accidents involving hazardous materials are always a possibility. A major ice storm or other significant event can make egress and access difficult for individuals and first responders. All roadways in Jackson are susceptible to hazards such as road flooding, icing and high winds leading to downed trees in the roadways and potential hazardous materials spills.



The possibility of vehicular accidents involving hazardous materials is identified as a significant hazard in Jackson. The town has one major road, NH Route 16. Route 16 runs north-south through the entire town and experiences heavy truck and vehicular traffic daily. There are a variety of factors that could create a potential transport accident on Route 16 including; wildlife in the roadway, the topography and design of the road and weather conditions.

The NH State Police estimates that 100,000 gallons of hazardous materials per day are transported on Route 16. If a spill were to impact the Ellis River, not only would there be a massive cleanup effort, but the town's drinking water would also be affected as it is drafted from the river. The water supply from the Ellis River supplies the school, some businesses including hotels and the municipal buildings in the town which includes the town's Emergency Operations Center and shelter. Also of concern could be local fuel, propane, gas, etc. deliveries within the village and to resident's houses.

Depending on the location of a hazardous material accident, the losses could be quite high, both in property and structural damage. However, the losses are also expected to be localized and unlikely to happen in a densely populated part of town.

## 2) MASS CASUALTY INCIDENTS

Hazard Identification & Risk Assessment (HIRA) ..... Medium  
Probability ..... Low

A Mass Casualty Incident (MCI) is a situation where the number of casualties exceeds the resources normally available locally. Mass Casualty Incidents have been known to occur as a result of bus, auto, train and aircraft accidents and as a result of natural hazards such as hurricanes, floods, earthquakes and tornadoes.

In Jackson an MCI could happen anywhere but are more likely to occur on NH Route 16. Route 16 is a twisty, steep and busy road that often sees animal crossings and poor weather. With the influx of tourists both in the summer and the winter and tour bus activity, an MCI is a very real possibility for the town.

## 3) TERRORISM & VIOLENCE

Hazard Identification & Risk Assessment (HIRA) ..... Medium  
Probability ..... Low

Terrorism is a fear throughout our country and the world. Soft-targets, such as the Jackson Grammar School, the Black Mountain Ski Area, the Wentworth Resort and large community events are present, but the probability of terrorism and violence is low.

As with many small towns, the terrorism threat is minimal; if a terrorist incident were to occur, it would most likely be a home-grown terrorist event.

## 4) CYBER EVENTS

Hazard Identification & Risk Assessment (HIRA) ..... Medium  
Probability ..... Low

Presidential Policy Directive (PDD-41) describes a cyber incident as *“An event occurring on or conducted through a computer network that actually or imminently jeopardizes the integrity, confidentiality, or availability of computers, information or communications systems or networks, physical or virtual infrastructure controlled by computers or information systems, or information resident thereon. For purposes of this directive, a cyber incident may include a vulnerability in an information system, system security procedures, internal controls, or implementation that could be exploited by a threat source.”*<sup>27</sup>

With increased use of computers and the internet, cyber events could include targets such as banks, hospitals, schools, churches, town, city and state government operations, emergency operations and critical infrastructure. Cyber events have been known to take place almost anywhere, from very small towns to large facilities in New Hampshire, causing large expenditures, disruption in normal business practices and the loss of data.

The Jackson planning team did not report any cyber-attacks, but the threat is certainly real. Added security on computer networks and user education on cyber threats is important to protect sensitive town information and data.

<sup>27</sup>PDD-41; <https://obamawhitehouse.archives.gov/the-press-office/2016/07/26/presidential-policy-directive-united-states-cyber-incident>

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## Chapter 6: Current Policies, Plans & Mutual Aid

### A. ANALYSIS OF EFFECTIVENESS OF CURRENT PROGRAMS

After researching historic hazards, identifying CIKR and determining potential hazards, the team determined what is already being done to protect its citizens and structures. Once identified, the team addressed each current policy or plan to determine its effectiveness and to determine whether or not improvements were needed. This analysis became one of the tools the team used to identify mitigation action items for this plan.

With the knowledge of what regulations Jackson currently had in place, creating new action items was less difficult. This process was helpful in identifying current plans and policies that were working well and those that should be addressed as a new “Action Item” as well as the responsible departments. The table that follows, *Table 6.1, Policies, Plans & Mutual Aid*, shows the analysis that resulted from discussion with the team.

Existing policies, plans and mutual aid that were designated as “Improvements Needed” were added to **Table 9.1, Mitigation Action Items** as new strategies and were reprioritized to meet the current needs of the town.

**TABLE 6.1: CURRENT POLICIES, PLANS & MUTUAL AID**

#### KEY TO EFFECTIVENESS:

**Excellent**..... The existing program works as intended and is exceeding its goals.

**Good** ..... The existing program works as intended and meets its goals.

**Average** ..... The existing program does not work as intended and/or does not meet its goals.

**Poor** ..... The existing program does not work as intended, often falls short of its goals, and/or may present unintended consequences.

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
E-911	Markers at driveway entrances that identify residence locations in conjunction with the E-911 alerting system.	Townwide	Select Board	Average	<b>Improvements Needed:</b> The town is about 55% compliant now. This is deferred to this plan to continue to increase compliance so that emergency responders can better assist the public at the time of need. Continue to promote 911 signage compliance utilizing public outreach opportunities, the Emergency Management webpage, Jackson E-News and social media. <b>Action Item #2 (also in Table 7.1)</b>
Emergency Operation Plan (2016)	An Emergency Operations Plan offers all members of the emergency management team a better understanding of procedures in the event of a natural or man-made disaster.	Townwide	Emergency Management	Excellent	<b>Improvements Needed:</b> The Jackson Emergency Operations Plan (EOP) was last updated in 2016 and will need to be updated again in 2021. Like the current EOP, the new EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. This is deferred to this plan to update the EOP. <b>Action Item #19 (also in Table 7.1)</b>



Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Master Plan (2016)	A Master Plan serves as the guiding document for future development and serves as the guiding document to assist the Planning Board as it updates the town Zoning Ordinances and Subdivision Regulations.	Townwide	Planning Board	Excellent	<b>Improvements Needed:</b> The Jackson Master Plan was last updated in 2016 and will not be ready for a recommended complete update until 2026, which is not within the scope of this plan. This is deferred however review this hazard mitigation plan when updating the Master Plan and to consider including a Natural Hazards Section and action items from this plan in any future updates. <b>Action Item #12 (also in Table 7.1)</b>
NIMS & ICS Training for Town Officials & EOC Staff	Ensure effective command, control, and communications during emergencies	Townwide	Emergency Management	Good	<b>Improvements Needed:</b> NIMS & ICS training has been done by most first responders. Although this is preparedness, this is deferred to this plan to continue to provide NIMS (IS-700) & ICS (ICS 100 & ICS 200) training to new first responders and to new town officials as they become elected and/or appointed. <b>Action Item #7 (also in Table 7.1)</b>
National Flood Insurance Program (NFIP) & Flood Ordinance (2013)	The minimum National Flood Insurance Program (NFIP) requirements (Section 60.3(c)) have been adopted; Jackson has been a member of the NFIP since July 2, 1979. The Flood Ordinance regulates all new and substantially improved structures located in the 100-year floodplain, as identified on the FEMA Flood Maps dated March 19, 2013.	Flood Zone	Planning Board & Selectboard	Excellent	<b>Improvements Needed:</b> The town's Flood Ordinance works well to successfully prohibit or force compliance to the ordinance for building and substantial improvements to structures within the FEMA flood zone. The Flood Ordinance was last amended in 2013. This is deferred to this plan to continue compliance with the National Flood Insurance Program, to obtain NFIP brochures to have available at the Town Office and to provide public outreach regarding the benefits of membership in the NFIP, whether or not properties are in the FEMA floodplain. Provide robust information on flood mitigation techniques that can be taken to protect individual homes and properties and links to ready.gov and other pertinent websites. <b>Action Item #6 (also in Table 7.1)</b>
Building Code & Permits	The town has not adopted International Building Codes (IBC) but does require builders to follow the NH State adopted codes for new construction to meet national standards for flood, wind, earthquake, fire and snow load.	Townwide	Building Inspector	Excellent	<b>Improvements Needed:</b> The Town of Jackson has a Building Inspector. The permitting process requires builders to abide by the International Building Codes (IBC) and the International Residential Codes (IRC) which have been adopted by the State of New Hampshire. The Highway Department signs off on all driveway permits. This is deferred to review the state's adopted building codes (IBC & IRC) and provide public education to the residents of Jackson on these codes, along with appropriate links on the town's website and available social media platforms. <b>Action Item #14</b>
NH Emergency Notification System (ENS)	Alerting system established by E-911 that allows town representatives to call in an emergency to part of the community or the entire community based on the extent of the emergency.	Townwide	Police Chief & Emergency Management Director	Excellent	<b>Improvements Needed:</b> The NH Emergency Notification System (ENS) is an excellent warning system but it only stores resident phone numbers that are listed in the phone book. The town has continuously provided information to residents on the ENS. This is deferred to continue to provide public outreach to encourage all residents to contact NH ENS to add cell numbers, emails, unlisted numbers and to verify information. Use the website, available social media platforms or a sign up at Town Meeting. <b>Action Item #1</b>

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Hazardous Materials Response Team	A Hazardous Materials Response Team is a specialized team of individuals who have the skill and expertise to successfully manage HazMat related incidents.	Townwide	Fire Department	Excellent	<b>Improvements Needed:</b> Although Jackson does not have a HazMat Team, firefighters are trained in the basic response to HazMat incidents and are adept at maintaining perimeters until specialized teams arrive. The Jackson EMD or the Fire Officer in charge would most likely call dispatch who would then contact the State Fire Marshal's Office (FMO) to request an available HazMat Response Team. Although this is preparedness, this is deferred to this plan to continue HazMat training for the members of the Jackson Fire Department. <b>Action Item #8</b>
Emergency Generators	The town has emergency back-up power at many of the town's Critical Infrastructure & Key Resources (CIKR) including at the Town Hall Complex/PD, the Whitney Center and the Highway Garage.	Townwide	Emergency Management Director	Good	<b>Improvements Needed:</b> Although Jackson has emergency backup power at many of the town's Critical Infrastructure & Key Resources (CIKR) there are still some CIKR that do not have backup emergency power and/or have portable generators only. This is deferred to this plan to obtain and install a new permanent emergency generator at the Fire Station and at the Library (Secondary Shelter) to improve the effectiveness of these facilities during a disaster. <b>Action Items #13 and #22</b>
Hydrant Maintenance	The Jackson Water Precinct serves approximately 20% of the town including 150 residential and 50 commercial units within Jackson Village. The remaining residents in the community rely on private wells. The water systems in Jackson include pressurized and dry hydrants.	Townwide	Selectboard	Excellent	<b>Improvements Needed:</b> The Fire Department tests and maintains dry hydrants and the Water Precinct tests and maintains 38 pressurized hydrants. This is deferred to continue to maintain all hydrants located within the Village water district and townwide. <b>Action Item #11</b>
Multi-Hazard Mitigation Plan (2014)	Addresses all potential hazards, natural, human-caused and technological and includes wildland fires.	Townwide	Emergency Management Director & Selectboard	Excellent	<b>Improvements Needed:</b> The Jackson Hazard Mitigation Plan (2014) is being updated with this plan. This is deferred to review the hazard mitigation plan on an annual basis and to update the plan again in 2024. <b>Action Item #16</b>

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Culvert & Stormwater Maintenance Plan	The Jackson Highway Department and the State Department of Transportation (DOT) clean the drainage basins once a year and after major flooding events. Culverts are repaired as needed.	Townwide	Highway Department	Good	<b>Improvements Needed:</b> The Jackson Highway Department does an excellent job cleaning and repairing drainage basins and culverts. However, a written stormwater maintenance plan should be developed to ensure continuity of actions and efficient stormwater management. This is deferred for continued culvert and ditch maintenance and the development of a written stormwater maintenance plan detailing such items as the size, material, date of installation, recommended date for improvement, GPS location and any problems associated with the location (i.e. flooding). Many culverts were repaired after Tropical Storm Irene; however one culvert needs improvement on Green Hill Road. <b>Action Items #10 &amp; #18</b>
Wellhead Protection Program	Jackson has identified a wellhead protection area. The purpose of wellhead protection is to prevent the contamination of groundwater used for drinking water. The area is the surface and subsurface area surrounding the public water supply in the Jackson Water Precinct where contaminants are likely to reach.	Jackson Water Precinct	Jackson Water Precinct	Good	<b>Improvements Needed:</b> The Jackson Water Precinct has established a source and wellhead protection area. This is deferred to review the wellhead protection plan to ensure compliance with state regulations and to research opportunities for conservation easements for the water supply. <b>Action Item #15</b>
Social Media & Communications	The Jackson Police Department uses Twitter and the Jackson Fire Department, Library and School use Facebook to communicate with and make announcements to the citizens of Jackson. Jackson E-News is also implemented to notify subscribed citizens of events taking place in the community.	Townwide	Police Chief	Excellent	<b>No Improvements Needed:</b> Social media efforts in Jackson work very well to keep the citizens of Jackson informed about things happening in their town. This is combined with <b>Action Item #4</b> to continue to keep the public informed about both emergency preparedness and mitigation activities.
Capital Improvement Plan (CIP)	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. A CIP is a phased projection of major equipment and supply purchases by each department and the town.	Townwide	Selectboard	Excellent	<b>No Improvements Needed:</b> A review of the Capital Improvement Program (CIP) is a part of the annual budget review process. The CIP is reviewed to ensure that the goals of the program will be achieved to assist the town's departments with planned purchases or equipment and supplies. The process is working well and keeps the town on task.

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Burning Index	New Hampshire Forests & Lands, Department of Natural and Cultural Resources (DNCR) has a burning index, which measures the risk for wildfires and how likely they are to start on a given day. It also evaluates the potential damages wildfires can create, the number of people that will be needed to fight it and the type of equipment that might be needed as well.	Townwide	Fire Department & DNCR	Excellent	<b>No Improvements Needed:</b> The Fire Department receives regular notification of the burning index via fax and email from NH Forests & Lands (DNCR). This notification is made daily during the fire danger season.
Mutual Aid Agreements (Fire, Police, Bartlett-Jackson Ambulance & Highway)	Mutual Aid agreements provide communications capabilities and cooperative assistance between area cities and towns; mutual aid provides access to resources that are appropriate to the scope of the emergency. Police, Fire and Bartlett-Jackson Ambulance are dispatched by Carroll County Dispatch.	Townwide	Fire, Police Bartlett-Jackson Ambulance & Highway	Excellent	<b>No Improvements Needed:</b> The Jackson Fire Department has a mutual aid agreement with Mount Washington Valley Mutual Aid. The Jackson Police Department has mutual aid agreements with surrounding towns, the Carroll County Sheriff's Office and the NH State Police (Troop E). Bartlett-Jackson Ambulance provides EMS and transportation and has mutual aid agreements with other area EMS services. The Highway Department and the Water Precinct are members of the NH Public Works Mutual Aid Association. All mutual aid systems in Jackson work well.
Fire Department Training	Fire Department personnel receive yearly training addressing wildfire attack strategies	Townwide	Fire Chief, Fire Warden	Excellent	<b>No Improvements Needed:</b> The Jackson Fire Department participates in ongoing wildfire training as well as other fire-related training through Mount Washington Valley Mutual Aid and other state or local agencies.
Life Safety & Fire Codes	Provides guidance for all buildings for life safety and fire codes	Townwide	State Fire Marshall & Fire Department	Excellent	<b>No Improvements Needed:</b> The National Fire Protection Association (NFPA) along with NH safety and fire codes provide guidance to Jackson's fire department for inspection of all commercial and rental properties in the community. The Jackson Fire Department provides timely inspections as needed.
State Health Department Public Health Plan	State plan, "Influenza, Pandemic, Public Health Preparedness and Response Plan" written by state health department to be prepared for any public health emergency; the town is part of the Carroll County Coalition for Public Health (3CPH).	Townwide	Carroll County Coalition for Public Health	Good	<b>No Improvements Needed:</b> The Public Health Plan does what it is meant to do. The Health Officer participates in regional public health meetings whenever possible.

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Capital Reserve Fund (CRF)	A type of account on a town's balance sheet that is reserved for capital investment projects or any other large and anticipated expense(s) that will be incurred in the future. Reserve funds are set aside to ensure adequate funding to at least partially finance future projects, equipment and other expenditures.	Townwide	Selectboard & Town Departments	Excellent	<b>No Improvements Needed:</b> The town's Capital Reserve Funds are set aside each year at budget time to assist the town's departments with planned purchases of equipment and supplies or in emergency situations. The Jackson Capital Reserve Funds work well and are part of the town warrant at Town Meeting.
Zoning Ordinances (2017)	Regulations dealing with land use including rural, residential, agriculture and timber management; constantly updated, they are considered current. Include drainage and infrastructure provisions.	Townwide	Selectboard & Planning Board	Excellent	<b>No Improvements Needed:</b> The Zoning Ordinance is a working document that is reviewed and updated whenever an issue arises that needs the attention of the Planning or Selectboards. The Zoning Ordinances do what they are meant to do.
Local Road Design Standards	Standards and specifications for construction of roads.	Townwide	Selectboard & Planning Board	Excellent	<b>No Improvements Needed:</b> Road design standards are detailed within the Subdivision Regulations, are based on Average Daily Traffic (ADT) and adhere to state standards. The town will not assume ownership of substandard roads and roads must be up to state standards and voted on at Town Meeting to be accepted as town-owned roads.
State Division of Forest and Lands/Fire Permits	State regulations for open burning and permits	Townwide	NH Forests & Lands permit but local fire wardens issue	Excellent	<b>No Improvements Needed:</b> System that is in place with NH Forests & Lands (DNCR) and the local fire warden works well. The public is aware of fire permitting requirements and the ability to get permits online (\$3.00 fee required).
School Emergency Response Plan (2018)	Ensures preparedness and response for school personnel and town emergency personnel in the instance of a major disaster in the school.	Jackson Grammar School	School Principal & Emergency Response	Excellent	<b>No Improvements Needed:</b> The Jackson Grammar School in coordination with the EMD and Police Chief completes the school's Emergency Operations Plan annually as required by the state. Training and drills are available for school personnel for emergency preparedness and intruder defense.
Subdivision Regulations (2017)	The purpose of 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.	Townwide	Planning Board	Excellent	<b>No Improvements Needed:</b> The Jackson Subdivision Regulations, most recently updated in 2017, are in good shape. The Subdivision Regulations address set-backs, road frontage and size of the lot. The regulations also address the availability of water resources for fire suppression, the steepness of driveways and roads and maintaining adequate stormwater flow to prevent flooding.

## Chapter 7: Last Mitigation Plan

### A. DATE OF LAST PLAN

Based on the Disaster Mitigation Act (DMA) of 2000, Jackson has participated in the development of hazard mitigation plans in the past. The most recent update was formally approved in 2014. This plan, the “Jackson Hazard Mitigation Plan Update 2019” is an update to the 2014 plan.

The action items that were identified in the 2014 plan are shown in *Table 7.1, Accomplishments since the last Plan*, on the following page. The team identified the current status of each strategy based on three sets of questions:

#### COMPLETED

- Has the strategy been completed?
- If so, what was done?

Strategies “deferred” from the prior plan, were added to **Table 9.1, Mitigation Action Plan** as new strategies and were reprioritized to meet the current needs of the town.

#### DELETED

- Should the strategy be deleted?
- Is the strategy mitigation or preparedness?
- Is the strategy useful to the town under the current circumstances?

#### DEFERRED

- Should the strategy be deferred for consideration in this plan?
- If the strategy was not completed, should this strategy be reconsidered and included as a new action item for this plan?



*Damage from Tropical Storm Irene,  
August 2011  
Photo Credit: Town of Jackson*



**TABLE 7.1: ACCOMPLISHMENTS SINCE THE LAST PLAN**

NOTE: Items in **red** were extracted word-for-word from the **2014** Hazard Mitigation Plan and do not represent a time frame for this plan.

Rank	Mitigation Action Item	Type of Hazard	Responsible Department	Funding	Time Frame	Completed, Deleted or Deferred
<b>0-1</b>	<b>Action Item #13:</b> Provide NIMS & ICS Training for Town Officials in order to have better trained individuals handling disaster events so that the effects of the event can be mitigated. (ICS 100 & 200; NIMS 700) ( <b>Table 6.1</b> )	All Hazards	EMD	Local	As needed for newly hired or elected Town Officials and Emergency Responders between 2014-2019	<b>Completed &amp; Deferred:</b> NIMS & ICS training has been done by most first responders. Although this is preparedness, this is deferred to this plan to continue to provide NIMS (IS-700) & ICS (ICS 100 & ICS 200) training to new first responders and to new town officials as they become elected and/or appointed. <b>Action Item #7 (also in Table 6.1)</b>
<b>0-2</b>	<b>Action Item #8:</b> Develop and maintain program to cut tree and limbs near power lines, above roads and homes in an effort to lessen the impact of high wind events. ( <b>SW4</b> )	Windstorms	Highway Department	Local	As needed between 2014-2019	<b>Completed &amp; Deferred:</b> As trees become damaged and threaten power lines and structures on town roads, the Highway Department removes them. NH DOT does this for state roads along with NH Electric Coop as needed. This is deferred to continue to trim trees and brush to help lessen the impact of natural hazard events, such as ice and wind storms. <b>Action Item #9</b>
<b>1-1</b>	<b>Action Item #15:</b> Through Public Outreach and the Town's website to include additional public outreach; establish an interactive webpage for educating the public on hazard mitigation and preparedness measures ( <b>MU14</b> ) by adding a page to the Town's recently enhanced website that will include such information as emergency contacts, shelter locations, evacuation routes ( <b>SW7, WF11 &amp; T3</b> ), methods of emergency alerting, 911 compliance, water saving techniques ( <b>D9</b> ), earthquake risk and mitigation activities that can be taken in residents' homes ( <b>EQ7</b> ), steps homeowners can take to protect themselves and their properties when extreme temperatures occur ( <b>ET1 &amp; ET4</b> ), safety measures that can be taken during hail ( <b>HA3</b> ) and lightning storms ( <b>L2</b> ), mitigation techniques for property protection from flood ( <b>F10</b> ) and links to available sources; educate homeowners regarding the risks of building in hazard zones and encourage homeowners to install carbon monoxide monitors and alarms. ( <b>Table 7.1</b> )	All Hazards including: Severe Wind, Wildfire, Tornado, Drought, Earthquake, Extreme Temperatures, Hail, Lightning & Flooding	EMD	Local	3/26/2015	<b>Partially Completed &amp; Deferred:</b> Jackson has developed an Emergency Management webpage on the town's website and has provided some information to residents about hazard mitigation. This is deferred to this plan to further educate the public about this hazard mitigation plan and potential mitigation action items that residents can take to protect their own properties. Use the website, Jackson E-News and available social media platforms. <b>Action Item #4</b>

Rank	Mitigation Action Item	Type of Hazard	Responsible Department	Funding	Time Frame	Completed, Deleted or Deferred
1-2	<b>Action Item #4:</b> Require and maintain safe access for fire apparatus to wildland-urban interface neighborhoods and properties ( <b>WF8</b> ) by advising residents who live on private roads of the importance of maintaining their roads for first responders; add information to the Town's website.	Wildfire & All Hazards	EMD	Local & Grants	3/26/2015	<b>Partially Completed &amp; Deferred:</b> The town continuously advises residents to keep private and Class VI roads maintained in order to allow access by emergency responders. This is deferred to continue to provide public outreach to encourage the maintenance of private roads for emergency response. <b>Action Item #3</b>
1-3	<b>Action Item #12:</b> Public outreach initiative should be continued to encourage all citizens to install 911 markers or a system established that would allow the Town to install driveway markers (Town Column, Tax Bills or Website all possible ways to provide outreach) ( <b>MU13</b> ) ( <b>Table 6.1</b> )	All Hazards	Police Department	Local	1/24/2015	<b>Completed &amp; Deferred:</b> The town is about 55% compliant now. This is deferred to this plan to continue to increase compliance so that emergency responders can better assist the public at the time of need. Continue to promote 911 signage compliance utilizing public outreach opportunities, the Emergency Management webpage, Jackson E-News and other social media platforms. <b>Action Item #2 (also in Table 6.1)</b>
1-5	<b>Action Item #1:</b> Advise the public about the local flood hazard, flood insurance and flood protection measures ( <b>F10</b> ) by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices; give NFIP materials to homeowners and builders when proposing new development or substantial improvements; encourage property owners to purchase flood insurance ( <b>F22</b> ), whether or not they are in the flood zone and provide appropriate links to the NFIP and Ready.gov on the Town's website.	Flooding	Administrative Assistant	Local	9/23/2014	<b>Completed &amp; Deferred:</b> The Jackson floodplain ordinance was reviewed and updated in 2012 as part of the town's Zoning Ordinance. Building permits are required and special ordinances regulate building in flood hazard zones. Jackson has been a compliant member of the National Flood Insurance Program (NFIP) since July 2, 1979. Floodplain maps were last updated on 3/19/13. This is deferred to continue to provide flood education to the public. <b>Action Item #6 (also in Table 6.1)</b>
1-4	<b>Action Item #9:</b> Mail or distribute "courtesy notifications" to resources that are mentioned in this plan as determined by the EMD.	All Hazards	EMD	Local	3/26/2015	<b>Deleted:</b> The plan to submit courtesy notifications to resources in this plan was not done due to oversight. This is being deleted as notifications and MOUs are done in accordance with the town's Emergency Operation Plan. This strategy is preparedness, not mitigation.
1-6	<b>Action Item #3:</b> Obtain and have available "Firewise" brochures to educate homeowners on methods to reduce fire risk around their homes ( <b>WF10</b> ); provide "Firewise" brochures to those residents seeking burn permits; advise residents of the importance of maintaining defensible space, the safe disposal of yard and household water and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. ( <b>WF12</b> ) ( <b>Table 7.1</b> )	Wildfire	Fire Warden	Local	12/24/2014	<b>Completed &amp; Deferred:</b> Although the town has provided Firewise® brochures in the past, the supply has diminished. The Team felt that it is important to have Firewise® and brochures from NH Forest and Lands (DNCR) available to promote the development of defensible space around town and privately owned structures. Burn permits are issued both on-line and in person. This is deferred to provide Firewise® brochures to those persons seeking burn permits in person and to continue to provide public education on mitigation efforts that can reduce the risk of wildfire. <b>Action Item #5</b>

Rank	Mitigation Action Item	Type of Hazard	Responsible Department	Funding	Time Frame	Completed, Deleted or Deferred
1-7	<b>Action Item #6:</b> Get this Hazard Mitigation Plan approved as a Community Wildfire Protection Plan through DRED so that the Town may be able to work with the state and federal governments on future wildfire mitigation projects such as the clearing of slash on the forest floor and the clearing of dangerous fuel loads. <b>(WF9) (Table 7.1)</b>	Wildfire	MAPS	Local	12/24/2014	<b>Completed &amp; Deferred:</b> The 2014 Jackson Hazard Mitigation Plan (HMP) was approved as a Community Wildfire Protection Plan (CWPP). This is deferred to this plan to once again get this HMP approved as a CWPP so that there could be potential assistance from the state and federal governments for future wildfire mitigation projects. <b>Action Item #17</b>
1-8	<b>Action Item #10:</b> Update the Town's building code ordinances to coincide with State law; consider adopting the International Building Code (IBC) <b>(EQ1, F4, SW1, and WW1). (Table 6.1)</b>	All Hazards including: Severe Wind, Earthquake, Severe Winter Weather & Flooding	Planning Board	Local	9/23/2014	<b>Completed &amp; Deferred:</b> The Town of Jackson has a Building Inspector. The permitting process requires builders to abide by the International Building Codes (IBC) and the International Residential Codes (IRC) which have been adopted by the State of New Hampshire. This is deferred to review the building codes and to provide links to the state-adopted codes to provide public outreach for the citizens of Jackson. <b>Action Item #14 (also in Table 6.1).</b>
2-1	<b>Action Item #14:</b> Update the Master Plan and incorporate a natural hazards section into the Master Plan. <b>(Table 6.1)</b>	All Hazards	Planning Board	Local	3/25/2016	<b>Completed &amp; Deferred:</b> The Jackson Master Plan was last updated in 2016 and will not be ready for a recommended complete update until 2026, which is not within the scope of this plan. This is deferred however to review this hazard mitigation plan when updating the Master Plan and consider including a Natural Hazards Section and mitigation action items from this plan in any future updates. <b>Action Item #12 (also in Table 6.1)</b>
3-1	<b>Action Item #2:</b> Upgrade the undersized culvert on Green Hill Road to make the redirection of storm water more efficient. <b>(F13)</b>	Flooding	Highway Department	Local & Grants	8/24/2017	<b>Deferred:</b> This was not done due to oversight and funding, however the undersized culvert on Green Hill Road still needs improvement as the snow and ice during the winter months plugs the culvert causing flooding on Green Hill Road. This is deferred to improve the culvert on Green Hill Road. <b>Action Item #18</b>
3-2	<b>Action Item #5:</b> Obtain a dedicated cistern or cisterns with an aggregate total of 30,000 gallons for the Tyrol development to be used for fire suppression <b>(WF6). (Table 7.1)</b>	Wildfire	Fire Department & Planning Board	Local & Grants	4/26/2019	<b>Deferred:</b> The strategy from the prior HMP to obtain a dedicated cistern(s) for an aggregate total of 30,000 gallons of water for the Tyrol Development was not done due to budget constraints. This is deferred to seek funding and obtain a dedicated cistern(s) to use for fire suppression. <b>Action Item #20</b>

Rank	Mitigation Action Item	Type of Hazard	Responsible Department	Funding	Time Frame	Completed, Deleted or Deferred
3-3	<b>Action Item #7:</b> Use subdivision and development regulations to regulate development in hazard-prone areas ( <b>MU4</b> ), paying particular attention to specific changes to the subdivision regulations that would outline the need for fire suppression capabilities for new developments. ( <b>Table 7.1</b> )	All Hazards including Wildfire	Planning Board & Fire Department	Local	4/25/2017	<b>Deleted:</b> The Jackson Subdivision Regulations, most recently updated in 2017, are in good shape. The Subdivision Regulations address set-backs, road frontage and size of the lot. The regulations also address the steepness of driveways and roads and maintaining adequate stormwater flow to prevent flooding. Developers need to review plans with the Fire Chief and comply with NFPA1 & NFPA101. Deleted as the Subdivision Regulations now address water resources and hazards included in this plan. ( <b>Also in Table 6.1</b> )
3-4	<b>Action Item #11:</b> Define steep slope/high-risk areas in land use and comprehensive plans and create guidelines or restrictions on new development in those areas ( <b>LS2</b> ); a steep slopes ordinance could also better insure emergency response and safety from land and mudslides. ( <b>Tables 6.1 &amp; 7.1</b> )	All Hazards including Land and Mudslides	Planning Board	Local	12/23/2016	<b>Deleted:</b> The Jackson Subdivision Regulations, most recently updated in 2017, are in good shape. The Subdivision Regulations address set-backs, road frontage and size of the lot. The regulations also address the steepness of driveways and roads and maintaining adequate stormwater flow to prevent flooding. Guidance for steep slope development is provided by the Building Inspector and driveway slope is addressed in regulations and through NFPA. This is deleted as the regulations and guidance work to help prevent building on steep slopes.
3-5	<b>Action Item #16:</b> Update the Emergency Operations Plan to increase the Town's ability to respond to disasters and to mitigate future or continued occurrences; incorporate this plan as an annex to the Emergency Operations Plan. ( <b>Table 6.1</b> )	All Hazards	Emergency Management Director	Local & Grants	9/23/2017	<b>Completed &amp; Deferred:</b> The Jackson Emergency Operations Plan (EOP) was last updated in 2016 and will need to be updated again in 2021. Like the current EOP, the new EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. This is deferred to this plan to update the EOP. <b>Action Item #19 (also in Table 6.1)</b>

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## Chapter 8: New Mitigation Strategies & STAPLEE

### A. MITIGATION STRATEGIES BY TYPE

The following list of mitigation categories and comprehensive possible strategy ideas was compiled from a number of sources including the USFS, FEMA, other planners and past hazard mitigation plans. This list was used during a brainstorming session to discuss what issues there may be in town. Team involvement and the brainstorming sessions proved helpful in bringing new ideas, better relationships and a more in-depth knowledge of the community.



#### Prevention

- Forest fire fuel reduction programs
- Special management regulations
- Fire Protection Codes NFPA 1
- Firewise® landscaping
- Culvert and hydrant maintenance
- Planning and zoning regulations
- Building Codes
- Density controls
- Driveway standards
- Slope development regulations
- Master Plan
- Capital Improvement Plan
- Rural Fire Water Resource Plan
- NFIP compliance

#### Public Education & Awareness

- Hazard information centers
- Public education and outreach programs
- Emergency website creation
- Firewise® training
- National Flood Insurance Program awareness
- Public hazard notification
- Defensible space brochures

#### Emergency Service Protection

- Critical facilities protection
- Critical infrastructure protection
- Emergency training for town officials
- Ongoing training for first responders

#### Property Protection

- Current use or other conservation measures
- Transfer of development rights
- Firewise® landscaping
- Water drafting facilities
- High risk notification for homeowners
- Structure elevation
- Real estate disclosures
- Flood proofing
- Building codes
- Development regulations

#### Natural Resource Protection

- Best management practices within the forest
- Forest and vegetation management
- Forestry and landscape management
- Wetlands development regulations
- Watershed management
- Erosion control
- Soil stabilization
- Open space preservation initiatives

#### Structural Projects

- Structure acquisition and demolition
- Structure acquisition and relocation
- Bridge replacement
- Dam removal
- Culvert up-size and/or realignment



## B. POTENTIAL MITIGATION STRATEGIES BY HAZARD

In order to further promote the concept of mitigation, the town was provided with a handout that was developed by Mapping and Planning Solutions and used to determine what additional mitigation action items might be appropriate for the town. The mitigation action items from that handout are listed below and on the following page. Each item from this comprehensive list of possible mitigation action items was considered by the planning team to determine if any of these action items could be put in place for Jackson with special emphasis on new and existing buildings and infrastructure.

### Strategies that may apply to more than one hazard

### Type of Project

- *Community Outreach and Education* ..... *Public Awareness*
- *Changes to Zoning Regulations* ..... *Prevention*
- *Changes to Subdivision Regulations* ..... *Prevention*
- *Steep Slopes Ordinance* ..... *Prevention*
- *Density Controls* ..... *Prevention*
- *Driveway Standards* ..... *Prevention*
- *Emergency Website Creation* ..... *Public Awareness*
- *Critical Infrastructure & Key Resources* ..... *Emergency Service Protection*
- *Emergency Training for Town Officials* ..... *Emergency Service Protection*
- *High Risk Notification to Homeowners* ..... *Property Protection*
- *Master Plan Update or Development* ..... *Prevention*
- *Capital Improvement Plan* ..... *Prevention*

### Flood Mitigation Ideas

### Type of Project

- *Stormwater Management Ordinances* ..... *Prevention*
- *Floodplain Ordinances* ..... *Prevention*
- *Updated Floodplain Mapping* ..... *Prevention*
- *Watershed Management* ..... *Natural Resource Protection*
- *Drainage Easements* ..... *Prevention*
- *Purchase of Easements* ..... *Prevention*
- *Wetland Protection* ..... *Natural Resource Protection*
- *Structural Flood Control Measures* ..... *Prevention*
- *Bridge Replacement* ..... *Structural Project*
- *Dam Removal* ..... *Structural Project*
- *NFIP Compliance* ..... *Prevention*
- *Acquisition, Demolition & Relocation* ..... *Structural Project*
- *Structure Elevation* ..... *Structural Project*
- *Flood Proofing* ..... *Property Protection*
- *Erosion Control* ..... *Natural Resource Protection*
- *Floodplain/Coastal Zone Management* ..... *Prevention*
- *Building Codes Adoption or Amendments* ..... *Prevention*
- *Culvert & Hydrant Maintenance* ..... *Prevention*
- *Culvert & Drainage Improvements* ..... *Structural Protection*
- *Transfer of Development Rights* ..... *Property Protection*

**Natural Hazard Mitigation Ideas****Type of Project****Landslide**

- Slide-Prone Area Ordinance..... Prevention
- Drainage Control Regulations..... Prevention
- Grading Ordinances..... Prevention
- Hillside Development Ordinances..... Prevention
- Open Space Initiatives..... Prevention
- Acquisition, Demolition & Relocation..... Structural Project
- Vegetation Placement and Management..... Natural Resource Protection
- Soil Stabilization..... Natural Resource Protection

**Thunderstorms & Lightning**

- Building Construction..... Property Protection

**Tornado & Severe Wind**

- Construction Standards and Techniques..... Property Protection
- Safe Rooms..... Prevention
- Manufactured Home Tie Downs..... Property Protection
- Building Codes..... Property Protection

**Wildfire**

- Building Codes..... Property Protection
- Defensible Space..... Prevention
- Forest Fire Fuel Reduction..... Prevention
- Burning Restriction..... Property Protection
- Water Resource Plan..... Prevention
- Firewise® Training & Brochures..... Public Awareness
- Woods Roads Mapping..... Prevention

**Extreme Temperatures**

- Warming & Cooling Stations..... Prevention

**Winter Weather Snowstorms**

- Snow Load Design Standards..... Property Protection

**Subsidence**

- Open Space..... Natural Resource Protection
- Acquisition, Demolition & Relocation..... Structural Project

**Earthquake**

- Construction Standards and Techniques..... Property Protection
- Building Codes..... Property Protection
- Bridge Strengthening..... Structural Project
- Infrastructure Hardening..... Structural Project

**Drought**

- Water Use Ordinances..... Prevention

### C. STAPLEE METHODOLOGY

Table 8.1, *Potential Mitigation Items & the STAPLEE*, reflects the newly identified potential hazard and wildfires mitigation action items as well as the results of the STAPLEE evaluation as explained below. It should also be noted that although some areas are identified as “All Hazards”, many of these would apply indirectly to wildfire response and capabilities. Many of these potential mitigation action items overlap.

The goal of each proposed mitigation action item is “to reduce or eliminate the long-term risk to human life and property from hazards”. To determine the effectiveness of each mitigation action item in accomplishing this goal, a set of criteria that was developed by FEMA, the STAPLEE method, was applied to each proposed action item.

The STAPLEE method analyzes the Social, Technical, Addministrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation action items discussed in Table 8.1.

**Social:** ..... Is the proposed action item socially acceptable to the community? Is there an equity issue involved that would result in one segment of the community being treated unfairly?

**Technical:** ..... Will the proposed action item work? Will it create more problems than it solves?

**Administrative:** ..... Can the community implement the action item? Is there someone to coordinate and lead the effort?

**Political:** ..... Is the action item politically acceptable? Is there public support both to implement and to maintain the project?

**Legal:** ..... Is the community authorized to implement the proposed action item? Is there a clear legal basis or precedent for this activity?

**Economic:** ..... What are the costs and benefits of this action item? Does the cost seem reasonable for the size of the problem and the likely benefits?

**Environmental:** ..... How will the action item impact the environment? Will it need environmental regulatory approvals?

Each proposed mitigation action item was then evaluated and assigned a score based on the above criteria. Each of the STAPLEE categories was discussed and was awarded one of the following scores:

**1 - Poor ..... 2 - Average..... 3 - Good**

An evaluation chart with total scores for each new action item is shown in Table 8.1.

The “Type” of Action Item was also considered (see section A of this chapter for reference):

- **Prevention**
- **Public Education & Awareness**
- **Emergency Service Protection**
- **Property Protection**
- **Natural Resource Protection**
- **Structural Projects**

### D. TEAM'S UNDERSTANDING OF HAZARD MITIGATION ACTION ITEMS

The team determined that any strategy designed to reduce personal injury or damage to property that could be done prior to an actual disaster would be listed as a potential mitigation action item. This decision was made even though not all projects listed in Table 8.1 and Table 9.1, *The Mitigation Action Plan*, are fundable under FEMA pre-mitigation guidelines. The team determined that this plan was in large part a management document designed to assist the Selectboard and other town officials in all aspects of managing and tracking potential emergency planning action items. For instance, the team was aware that some of these action items are more properly identified as preparedness or readiness issues. As there are no other established planning mechanisms that recognize some of these issues, the team did not want to “lose” any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

Also, it should be noted that the town understands that the action items for a town of 200 are not the same as the action items for a town of 30,000. In addition, the action items for a town in the middle of predominantly hardwood forests, are not the same as the action items for a town on the Jersey Shore. Therefore the Town of Jackson has accepted the “Mitigation Action Items” in Tables 8.1 and 9.1 as the complete list of “Mitigation Action Items” for this town and only this town and hereby indicates that having carefully considered a comprehensive list of other possible mitigation action items (see sections A & B of this chapter) for this plan, there are no additional “Mitigation Action Items” to add at this time.

Potential mitigation action items in Table 8.1 on the following page are listed in numerical order and indicate if they were derived from prior tables in this plan, i.e., (Table 7.1).

Items in green such as (MU14) represent mitigation action items taken from Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013; see Appendix F: *Potential Mitigation Ideas*, for more information.

**TABLE 8.1: POTENTIAL MITIGATION ACTION ITEMS & THE STAPLEE**

**Action Items are listed in numerical order. TTL: STAPLEE Total**

Proposed Mitigation Action Items	Affected Location	Type of Activity	S	T	A	P	L	E	E	TTL
<b>Action Item #1:</b> Provide public outreach to encourage all residents to contact NH ENS to add cell numbers, unlisted numbers, emails and to verify information. Use the website, Jackson E-News, available social media platforms or a sign up at Town Meeting. (MU14) (Table 6.1)	Townwide	Prevention Public Education & Awareness Emergency Service Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #2:</b> Improve 911 signage compliance so that emergency responders can better assist the public at the time of need. Utilize all available public outreach opportunities including the town's website, social media platforms and Jackson E-News. (MU14) (Tables 6.1 & 7.1)	Townwide	Prevention Public Education & Awareness Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	2	3	3	3	20
			<b>Political:</b> Some may not want a 911 sign on their property							
<b>Action Item #3:</b> To promote private mitigation efforts, provide public outreach to the citizens of Jackson on the importance of maintaining private roads to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This will help to ensure accessibility for emergency response and decrease the risk for wildfire. (MU16) (Table 7.1)	Private Roads Townwide	Prevention Public Education & Awareness Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							

Proposed Mitigation Action Items	Affected Location	Type of Activity	S	T	A	P	L	E	E	TTL
<b>Action Item #4:</b> Provide robust information on the town's Emergency Management webpage and on other available social media platforms to educate the public on hazard mitigation and preparedness measures (MU14) that will include such information as: emergency contacts, shelter locations, evacuation routes (SW7, WF11 & T3), methods of emergency alerting, 911 compliance, water saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 & ET4), safety measures that can be taken during hail (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources. Educate homeowners regarding the risks of building in hazard zones and encourage homeowners to install carbon monoxide monitors and alarms (WW5) and provide public information regarding infectious diseases. Continue to develop ways to provide notification to citizens. (Table 7.1)	Townwide	Prevention Public Education & Awareness Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #5:</b> Post important information on the town's Emergency Management webpage and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) and provide a link to Firewise® on the Emergency page of the town's website. Provide Firewise® brochures to those residents seeking burn permits (if not obtained on-line). Advise residents of the importance of maintaining defensible space, the safe disposal of yard and household waste and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. (WF12) (Table 7.1)	Townwide	Prevention Public Education & Awareness Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #6:</b> Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of National Flood Insurance Program (NFIP) brochures to have available in the Town Offices. Give NFIP materials to homeowners and builders when proposing new development or substantial improvements and encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone. Through public outreach, educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters. Add links to the NFIP, Ready.gov and other flood mitigation information to the town's Emergency Management webpage and other available social media platforms, such as Jackson E-News. Continue to actively work with residents to ensure they are in compliance with the town's Floodplain Ordinance. (F23) (Tables 6.1 & 7.1)	Areas prone to flooding Townwide	Prevention Public Education & Awareness Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #7:</b> The Emergency management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) & ICS (ISC100 & ISC200). (Tables 6.1 & 7.1)	Townwide	Prevention Emergency Service Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							

Proposed Mitigation Action Items	Affected Location	Type of Activity	S	T	A	P	L	E	E	TTL
<b>Action Item #8:</b> Continue HazMat training for the members of the Jackson Fire Department. <b>(Table 6.1)</b>	Townwide	Prevention Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #9:</b> In addition to work that is done by and with local utility companies, monitor and maintain brush cutting, drainage system maintenance and tree removal as part of a tree maintenance program. Create defensible space around power lines, oil and gas lines and other infrastructure and work to reduce wildfire risk by clearing dead vegetation, cutting high grass and other fuel loads in the community. <b>(SW4, WF7, WF9 &amp; F14) (Table 7.1)</b>	Townwide	Prevention Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #10:</b> Maintain culverts and ditches in the community and develop and maintain a written stormwater maintenance plan in order to ensure more efficient stormwater management. In this plan or "inventory", include the location, date of installation, GPS coordinates, material, type, size, age and expected replacement date of all culverts, catch basins and drainage ditches in the community. <b>(F5) (Table 6.1)</b>	Townwide	Prevention Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #11:</b> Inspect the functionality of fire hydrants and maintain and repair all hydrants and other water resources in Jackson. Consider other areas of the community that have limited water resources and address these issues by installing new hydrants, fire ponds and/or cisterns as needed. <b>(WF8) (Table 6.1)</b>	Townwide	Prevention Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #12:</b> Review this plan, the Jackson Hazard Mitigation Plan Update 2019, whenever an annual review of the Master Plan is done and consider the incorporation of a "Natural Hazards" section and mitigation action items from this plan. <b>(MU6) (Tables 6.1 &amp; 7.1)</b>	Townwide	Prevention	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #13:</b> Obtain funding and install a permanent generator at the Jackson Fire Station to ensure the capabilities of this important Emergency Response Facility. <b>(MU13) (Table 6.1)</b>	Jackson Fire Station	Emergency Service Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #14:</b> Review the state's adopted building codes (IBC & IRC) and provide public education to the residents of Jackson on these codes, along with appropriate links on the town's website and available social media platforms. Revise the town's building code as needed to reflect the state's adopted codes. <b>(MU14) (Tables 6.1 &amp; 7.1)</b>	Townwide	Prevention Public Education & Awareness	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #15:</b> Review the wellhead protection plan to ensure compliance with state regulations. Research opportunities for conservation easements for the water supply. <b>(Table 6.1)</b>	Jackson Water Precinct	Prevention Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #16:</b> Provide an annual review of the Jackson Hazard Mitigation Plan Update 2019 including a review of the status of "Action Items" listed in this plan to encourage completion. Obtain approval from the local elected body on an annual basis. <b>(MU11) (Table 6.1)</b>	Townwide	Prevention	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							



Proposed Mitigation Action Items	Affected Location	Type of Activity	S	T	A	P	L	E	E	TTL
<b>Action Item #17:</b> Obtain approval of this hazard mitigation plan as a Community Wildfire Protection Plan (CWPP) to enable potential assistance from the state and federal governments for future wildfire mitigation projects. <b>(Table 7.1 ) (WF2)</b>	Townwide	Prevention Public Education & Awareness Emergency Service Protection Property Protection Natural Resource Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #18:</b> Alleviate the flooding that occurs when winter snow and ice clog the culvert on Green Hill Road by replacing the 40" metal culvert with at least a 36" plastic culvert. Exact culvert improvements to be based on an engineered hydrology study. <b>(F13) (Table 7.1 )</b>	Green Hill Road	Prevention Emergency Service Protection Property Protection Structural Project	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #19:</b> Update the Jackson Emergency Operations Plan to coincide with the new state 15-ESF format. Include an analysis of the impact of natural hazards on Critical Infrastructure & Key Resources that may be needed during an emergency. Like the current EOP, the new EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. <b>(MU6) (Tables 6.1 &amp; 7.1)</b>	Townwide	Emergency Service Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #20:</b> Obtain a dedicated cistern or cisterns with an aggregate total of 30,000 gallons for the Tyrol development to be used for fire suppression <b>(WF6). (Table 7.1 )</b>	Tyrol	Prevention Emergency Service Protection Property Protection Structural Project	2	3	3	2	2	1	2	15
			<b>Social:</b> Other areas of Town may also want a new water source <b>Political:</b> Other areas of Town may also want a new water source <b>Legal:</b> May need legal waivers <b>Economical:</b> Budget constraints <b>Environmental:</b> May need environmental waivers							
<b>Action Item #21:</b> Install a new repeater at the top of Tyrol to improve townwide radio communications. <b>(MU13)</b>	Tyrol	Prevention Emergency Service Protection	3	3	3	3	3	3	3	21
			No apparent difficulty with this action item							
<b>Action Item #22:</b> Obtain funding and install a permanent generator at the Jackson Public Library to ensure the use of this important CIKR as a Secondary Shelter and/or cooling and warming place. <b>(MU13) (Table 6.1)</b>	Jackson Public Library	Emergency Service Protection	3	3	3	2	3	3	3	20
			<b>Political:</b> Some people may not see the need for this							

## Chapter 9: Implementation Schedule for Prioritized Action Items

### A. PRIORITY METHODOLOGY

After reviewing the finalized STAPLEE numerical ratings, the team prepared to develop *Table 9.1, The Mitigation Action Plan*. To do this, each potential mitigation action item was placed into one of the four categories below.

#### CATEGORY 0

Category 0 includes those items which are being done and will continue to be done in the future.

#### CATEGORY 1

Category 1 includes those items under the direct control of town officials, within the financial capability of the town using only town funding, those already being done or planned and those that could generally be completed within one year.

#### CATEGORY 2

Category 2 includes those items that the town does not have sole authority to act upon, those for which funding might be beyond the town's capability and those that would generally take between 13-36 months to complete.

#### CATEGORY 3

Category 3 includes those items that would take a major funding effort, those that the town has little control over the final decision and those that would take in excess of 37 months to complete.

Each potential mitigation action item was placed in one of these four categories and then those action items were prioritized within each category according to cost-benefit, time frame and capability. Actual cost estimates were unavailable during the planning process, although using the STAPLEE process along with the methodology detailed above and a Low-High estimate (see following page) the team was able to come up with a general consensus on cost-benefit for each proposed action item.

The team also considered the following criteria while ranking and prioritizing each action item:

- *Does the action reduce damage?*
- *Does the action contribute to community objectives?*
- *Does the action meet existing regulations?*
- *Does the action protect historic structures?*
- *Does the action keep in mind future development?*
- *Can the action be implemented quickly?*

The prioritization exercise helped the committee seriously evaluate the new hazard mitigation action items that they had brainstormed throughout the hazard mitigation planning process. While all actions would help improve the town's hazard and wildfire responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation action items are implemented.

## B. WHO, WHEN, HOW?

Once this was completed, the team developed an action plan that outlined who is responsible for implementing each action item, as well as when and how the actions will be implemented. The following questions were asked in order to develop a schedule for the identified mitigation action items.

**WHO?** Who will lead the implementation efforts? Who will put together funding requests and applications?

**WHEN?** When will these actions be implemented and in what order?

**HOW?** How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

In addition to the prioritized mitigation action items, *Table 9.1, The Mitigation Action Plan*, includes the responsible party (WHO), how the project will be supported (HOW) and what the time frame is for implementation of the project (WHEN).

Once the plan is approved, the community will begin working on the action items listed in *Table 9.1, The Mitigation Action Plan* (see below and on the following pages). An estimation of completion for each action item is noted in the "Time Frame" column of Table 9.1. Some projects, including most training and education of residents on emergency and evacuation procedures, could be tied into the emergency operations plan and implemented through that planning effort.

### TABLE 9.1: THE MITIGATION ACTION PLAN

*Table 9.1, The Mitigation Action Plan*, located on the next page, includes problem statements that were expressed by the planning team. These action items are listed in order of priority and indicate if they were derived from other tables in this plan.

The estimated cost was determined using the following criteria:

- **Low Cost** ..... \$0 - \$1,000 or staff time only
- **Medium Cost** ..... \$1,000-\$10,000
- **High Cost** ..... \$10,000 or more

The time frame was determined using the following criteria:

- **Short Term** ..... Ongoing for the life of the plan
- **Short Term** ..... Less than 1 year (0-12 months)
- **Medium Term** ..... 2-3 years (13-36 months)
- **Long Term:** ..... 4-5 years (37-60 months)

Items in green such as (MU14) represent mitigation action items taken from Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013; see *Appendix F: Potential Mitigation Ideas*, for more information.

**Mitigation Action Items are listed in order of priority. Final R/P: Final Ranking & Priority**

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
0-1	<p><b>Problem Statement:</b> The NH Emergency Notification System (ENS) is an excellent warning system but it only stores resident phone numbers that are listed in the phone book. Residents may not be aware that they can add cell numbers, emails and unlisted numbers.</p> <p><b>Action Item #1:</b> Provide public outreach to encourage all residents to contact NH ENS to add cell numbers, unlisted numbers, emails and to verify information. Use the website, available social media platforms or a sign up at Town Meeting. (MU14) (Table 6.1)</p>	All Hazards	Selectboard & Emergency Management Director	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-2	<p><b>Problem Statement:</b> The town has continuously used public outreach to advise residents of the need for proper 911 signage. However, the town is currently only about 55% compliant with the proper 911 signage.</p> <p><b>Action Item #2:</b> Improve 911 signage compliance so that emergency responders can better assist the public at the time of need. Utilize all available public outreach opportunities including the town's website, social media platforms and Jackson E-News. (MU14) (Tables 6.1 &amp; 7.1)</p>	All Hazards	Fire Department & Selectboard	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-3	<p><b>Problem Statement:</b> Residents may not be aware of the importance of maintaining their private roads to allow access for emergency responders and to prevent wildfire.</p> <p><b>Action Item #3:</b> To promote private mitigation efforts, provide public outreach to the citizens of Jackson on the importance of maintaining private roads to allow for safe access for fire apparatus into wildland-urban interface neighborhoods and properties. This will help to ensure accessibility for emergency response and decrease the risk for wildfire. (MU16) (Table 7.1)</p>	Wildfire & Conflagration	Selectboard & Emergency Management Director	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-4	<p><b>Problem Statement:</b> Although the town has established an excellent Emergency Management page to provide public education on emergency preparedness and mitigation, these efforts should continue into the future.</p> <p><b>Action Item #4:</b> Provide robust information on the town's Emergency Management webpage and on other available social media platforms to educate the public on hazard mitigation and preparedness measures (MU14) that will include such information as: emergency contacts, shelter locations, evacuation routes (SW7, WF11 &amp; T3), methods of emergency alerting, 911 compliance, water saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 &amp; ET4), safety measures that can be taken during hail (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources. Educate homeowners regarding the risks of building in hazard zones and encourage homeowners to install carbon monoxide monitors and alarms (WW5) and provide public information regarding infectious diseases. Continue to develop ways to provide notification to citizens. (Table 7.1)</p>	All Hazards including: Severe Wind, Drought, Earthquake, Extreme Temperatures, Hail, Lightning, Severe Winter Weather, Tornado, Wildfire & Infectious Disease	Selectboard, Emergency Management Director & Department Heads	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
0-5	<p><b>Problem Statement:</b> <i>Although the town does a great job using its Emergency Management webpage to promote preparedness, residents may not be aware of the steps they can take to reduce the risk of fire at their homes.</i></p> <p><b>Action Item #5:</b> Post important information on the town's Emergency Management webpage and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) and provide a link to Firewise® on the Emergency page of the town's website. Provide Firewise® brochures to those residents seeking burn permits (if not obtained on-line). Advise residents of the importance of maintaining defensible space, the safe disposal of yard and household waste and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. (WF12) (Table 7.1)</p>	Wildfire & Conflagration	Selectboard & Fire Chief	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-6	<p><b>Problem Statement:</b> <i>Residents and builders may not be aware of flood regulations and the availability of flood insurance through the National Flood Insurance Program (NFIP). They also may not be aware of the risk of building in the floodplain and the steps they can take to reduce flooding.</i></p> <p><b>Action Item #6:</b> Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of National Flood Insurance Program (NFIP) brochures to have available in the Town Offices. Give NFIP materials to homeowners and builders when proposing new development or substantial improvements and encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone. Through public outreach, educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters. Add links to the NFIP, Ready.gov and other flood mitigation information to the town's Emergency Management webpage and other available social media platforms. Continue to actively work with residents to ensure they are in compliance with the town's Floodplain Ordinance. (F23) (Tables 6.1 &amp; 7.1)</p>	Inland Flooding	Selectboard	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-7	<p><b>Problem Statement:</b> <i>Although first responders including firefighters have received NIMS &amp; ICS training, not all of Jackson's town officials have.</i></p> <p><b>Action Item #7:</b> The Emergency management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) &amp; ICS (ISC100 &amp; ISC200). (Tables 6.1 &amp; 7.1)</p>	All Hazards	Emergency Management Direct	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
0-8	<p><b>Problem Statement:</b> Although Jackson does not have a HazMat Team, firefighters are trained in the basic response to HazMat incidents and are adept at maintaining perimeters until specialized teams arrive. The Jackson EMD or the Fire Officer in charge would most likely call dispatch who would then contact the State Fire Marshal's Office (FMO) to request an available HazMat Response Team. HazMat training needs to continue.</p> <p><b>Action Item #8:</b> Continue HazMat training for the members of the Jackson Fire Department. (Table 6.1)</p>	Hazardous Materials	Fire Department	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-9	<p><b>Problem Statement:</b> As trees become damaged and threaten power lines and structures on town roads, the Highway Department removes them. NH DOT does this for state roads along with NH Electric Coop as needed. There is a need to continue to work to keep this hazard to a minimum.</p> <p><b>Action Item #9:</b> In addition to work that is done by and with local utility companies, monitor and maintain brush cutting, drainage system maintenance and tree removal as part of a tree maintenance program. Create defensible space around power lines, oil and gas lines and other infrastructure and work to reduce wildfire risk by clearing dead vegetation, cutting high grass and other fuel loads in the community. (SW4, WF7, WF9 &amp; F14) (Table 7.1)</p>	Severe Wind, Wildfire, Ice Storms & Flooding	Highway Department	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-10	<p><b>Problem Statement:</b> Although the Jackson Highway Department works to clean and repair drainage basins and culverts, a written stormwater maintenance plan should be developed to ensure continuity of actions and efficient stormwater management.</p> <p><b>Action Item #10:</b> Maintain culverts and ditches in the community and develop and maintain a written stormwater maintenance plan in order to ensure more efficient storm water management. In this plan or "inventory", include the location, date of installation, GPS coordinates, material, type, size, age and expected replacement date of all culverts, catch basins and drainage ditches in the community. (F5) (Table 6.1)</p>	Inland Flooding	Highway Department	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-11	<p><b>Problem Statement:</b> The Fire Department tests and maintains dry hydrants and the Water Precinct tests and maintains 38 pressurized hydrants. Hydrant maintenance needs to continue to ensure water availability while fighting wildfires or conflagrations.</p> <p><b>Action Item #11:</b> Inspect the functionality of fire hydrants and maintain and repair all hydrants and other water resources in Jackson. Consider other areas of the community that have limited water resources and address these issues by installing new hydrants, fire ponds and/or cisterns as needed. (WF8) (Table 6.1)</p>	Wildfire & Conflagration	Fire Chief & Water Precinct	Local	Short Term Ongoing (For the life of the plan)	Low Cost (\$0 - \$1,000 or staff time only)



Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
0-12	<p><b>Problem Statement:</b> The Jackson Master Plan (2016), which is reviewed annually and will be in need of an update in 2026 (based on the state's 10-year recommendation), does not have a "Natural Hazards" section.</p> <p><b>Action Item #12:</b> Review this plan, the Jackson Hazard Mitigation Plan Update 2019, whenever an annual review of the Master Plan is done and consider the incorporation of a "Natural Hazards" section and mitigation action items from this plan. <b>(MU6) (Tables 6.1 &amp; 7.1)</b></p>	All Hazards	Planning Board	Local	<b>Short Term Ongoing</b> (For the life of the plan)	<b>Low Cost</b> (\$0 - \$1,000 or staff time only)
1-1	<p><b>Problem Statement:</b> Although Jackson has emergency backup power at many of the town's Critical Infrastructure &amp; Key Resources (CIKR) there are still some CIKR that do not have permanent backup emergency power, including the Fire Station (currently has a portable generator that may be needed elsewhere).</p> <p><b>Action Item #13:</b> Obtain funding and install a permanent generator at the Jackson Fire Station to ensure the capabilities of this important Emergency Response Facility. <b>(MU13) (Table 6.1)</b></p>	Wildfire & Conflagration	Emergency Management Director, Selectboard & Fire Chief	Local & Grants	<b>Short Term</b> (1 year or less: 0-12 months)	<b>High Cost</b> (\$10,000 or more)
1-2	<p><b>Problem Statement:</b> The permitting process requires builders to abide by the International Building Codes (IBC) and the International Residential Codes (IRC) which have been adopted by the State of New Hampshire. However, information may not be readily available to citizens.</p> <p><b>Action Item #14:</b> Review the state's adopted building codes (IBC &amp; IRC) and provide public education to the residents of Jackson on these codes, along with appropriate links on the town's website and available social media platforms. Revise the town's building code as needed to reflect the state's adopted codes. <b>(MU14) (Tables 6.1 &amp; 7.1)</b></p>	All Hazards	Building Inspector & Selectboard	Local	<b>Short Term</b> (1 year or less: 0-12 months)	<b>Low Cost</b> (\$0 - \$1,000 or staff time only)
1-3	<p><b>Problem Statement:</b> The Jackson Water Precinct has established a source and wellhead protection area. A review of the wellhead protection plan should be done to ensure compliance with current state regulations.</p> <p><b>Action Item #15:</b> Review the wellhead protection plan to ensure compliance with state regulations. Research opportunities for conservation easements for the water supply. <b>(Table 6.1)</b></p>	Known & Emerging Contaminates & Aging Infrastructure	Water Precinct	Local	<b>Short Term</b> (1 year or less: 0-12 months)	<b>Low Cost</b> (\$0 - \$1,000 or staff time only)
1-4	<p><b>Problem Statement:</b> This plan, the Jackson Hazard Mitigation Plan Update 2019, will require an annual review and a complete update in five years.</p> <p><b>Action Item #16:</b> Provide an annual review of the Jackson Hazard Mitigation Plan Update 2019 including a review of the status of "Action Items" listed in this plan to encourage completion. Obtain approval from the local elected body on an annual basis. <b>(MU11) (Table 6.1)</b></p>	All Hazards	Emergency	Local	<b>Short Term</b> (1 year or less: 0-12 months)	<b>Low Cost</b> (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Managing Department	Funding or Support	Time Frame	Est. Cost
1-5	<p><b>Problem Statement:</b> This plan, the Jackson Hazard Mitigation Plan Update, 2019, will need to be approved again as Community Wildfire Protection Plan (CWPP).</p> <p><b>Action Item #17:</b> Obtain approval of this hazard mitigation plan as a Community Wildfire Protection Plan (CWPP) to enable there be potential assistance from the state and federal governments for future wildfire mitigation projects. <b>(Table 7.1 ) (WF2)</b></p>	Wildfire & Conflagration	Mapping & Planning Solutions	Local	<b>Short Term</b> (1 year or less: 0-12 months)	<b>Low Cost</b> (\$0 - \$1,000 or staff time only)
2-1	<p><b>Problem Statement:</b> The undersized culvert on Green Hill Road needs improvement as snow and ice during the winter months plugs the culvert causing flooding on Green Hill Road.</p> <p><b>Action Item #18:</b> Alleviate the flooding that occurs when winter snow and ice clog the culvert on Green Hill Road by replacing the 40" metal culvert with at least a 36" plastic culvert. Exact culvert improvements to be based on an engineered hydrology study. <b>(F13) (Table 7.1 )</b></p>	Inland Flooding	Highway Department	Local & Grants	<b>Medium Term</b> (2-3 years: 13-36 months)	<b>High Cost</b> (\$10,000 or more)
2-2	<p><b>Problem Statement:</b> The Jackson Emergency Operations Plan (EOP) was last updated in 2016 and will need to be updated again in 2021.</p> <p><b>Action Item #19:</b> Update the Jackson Emergency Operations Plan to coincide with the new state 15-ESF format. Include an analysis of the impact of natural hazards on Critical Infrastructure &amp; Key Resources that may be needed during an emergency. Like the current EOP, the new EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. <b>(MU6) (Tables 6.1 &amp; 7.1)</b></p>	All Hazards	Emergency Management Direct	Local & Grants	<b>Medium Term</b> (2-3 years: 13-36 months)	<b>Medium Cost</b> (\$1,000 - \$10,000)
2-3	<p><b>Problem Statement:</b> Water resources for fire suppression in the Tyrol Development are inadequate.</p> <p><b>Action Item #20:</b> Obtain a dedicated cistern or cisterns with an aggregate total of 30,000 gallons for the Tyrol development to be used for fire suppression <b>(WF6). (Table 7.1 )</b></p>	Wildfire & Conflagration	Fire Chief	Local & Grants	<b>Medium Term</b> (2-3 years: 13-36 months)	<b>High Cost</b> (\$10,000 or more)
2-4	<p><b>Problem Statement:</b> The town's emergency radio capabilities do not reach across the entire community; communications "dead spots" remain.</p> <p><b>Action Item #21:</b> Install a new repeater at the top of Tyrol to improve townwide radio communications. <b>(MU13)</b></p>	All Hazards	Fire Chief	Local & Grants	<b>Medium Term</b> (2-3 years: 13-36 months)	<b>Medium Cost</b> (\$1,000 - \$10,000)
3-1	<p><b>Problem Statement:</b> Although Jackson has emergency backup power at many of the town's Critical Infrastructure &amp; Key Resources (CIKR) there are still some CIKR that do not have permanent backup emergency power, including the Jackson Public Library, which is the designated Secondary Shelter.</p> <p><b>Action Item #22:</b> Obtain funding and install a permanent generator at the Jackson Public Library to ensure the use of this important CIKR as a Secondary Shelter and/or cooling and warming place. <b>(MU13) (Table 6.1)</b></p>	All Hazards	Emergency Management Director, Selectboard & Library Board of Trustees	Local & Grants	<b>Long Term</b> (3-5 years: 37-60 months)	<b>High Cost</b> (\$10,000 or more)

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## Chapter 10: Adopting, Monitoring, Evaluating and Updating the Plan

### ***A. HAZARD MITIGATION PLAN MONITORING, EVALUATION AND UPDATES***

A good mitigation plan must allow for updates where and when necessary and will incorporate periodic monitoring and evaluation mechanisms to allow for review of successes and failures or even just simple updates.

The Jackson Hazard Mitigation Plan Update, 2019 is considered a work in progress. There are three situations which will prompt revisiting this plan:

- *First, as a minimum, it will be reviewed annually or after any emergency event to assess whether the existing and suggested mitigation action items were successful. This review will focus on the assessment of the plan's effectiveness, accuracy and completeness in monitoring of the implementation action items. The review will also address recommended improvements to the plan as contained in the FEMA plan review checklist and address any weaknesses the town identified that the plan did not adequately address.*
- *Second, the plan will be thoroughly updated every five years.*
- *Third, if the town adopts any major modifications to its land use planning documents, the jurisdiction will conduct a plan review and make changes as applicable.*

In keeping with the process of adopting this hazard mitigation plan, the public and stakeholders will have the opportunity for future involvement as they will be invited to participate in any and all future reviews or updates of this plan. Public notice before any review or update will be given by such means as: press releases in local papers, using available social media, posting meeting information on the town website and at the Town Offices, sending letters to federal, state and local organizations impacted by the plan and posting notices in public places in the town. This will ensure that all comments and revisions from the public and stakeholders will be considered. The Emergency Management Director is responsible for initiating plan reviews and will consult with members of the hazard mitigation planning team identified in this plan.

Concurrence forms to be used for post-hazard or annual reviews are available in Chapter 11 of this plan. The town is encouraged to use these forms to document any changes and accomplishments since the development of this plan. Forms are available for years 1-4, with expectation that the five-year annual update will be in process during the fifth year.

### ***B. INTEGRATION WITH OTHER PLANS***

This plan will only enhance mitigation if balanced with all other town plans. Jackson completed its last hazard mitigation plan in 2014 and has completed many of projects from that plan. Examples of these can be found in Table 7.1 and include items such as providing ongoing fire and flood education, reviewing and updating the town's subdivision regulations, developing a tree maintenance program and establishing an emergency webpage. The town was able to integrate these actions into other town activities, budgets, plans and mechanisms.

The town will incorporate elements from this plan into the following documents:

#### **JACKSON MASTER PLAN**

Traditionally, Master Plans are updated every 5 to 10 years and detail the use of capital reserves funds and capital improvements within the town. A complete update of the Jackson's Master Plan was completed in 2016 and is due for a recommended update in 2026. Future updates of the Master Plan will include a natural hazards section and will integrate concepts, ideas and action items from this hazard mitigation plan (**Action Item #12**).

#### **JACKSON EMERGENCY OPERATIONS PLAN 2016 (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. EOPs are generally reviewed after each hazardous event and updated on a five-year basis. The last Jackson EOP was completed in 2016. An update for the Emergency Operations Plan is expected to be completed in 2021 or 2022. The new EOP will include elements from this hazard mitigation plan (**Action Item #19**).

#### **TOWN BUDGET, CAPITAL IMPROVEMENT PLAN & CAPITAL RESERVE FUNDS**

The Town of Jackson maintains a Capital Improvement Plan and also maintains Capital Reserve Funds for major expenditures. The Capital Reserve Fund is adjusted annually in coordination with the Selectboard and the town's department heads at budget time. The budget is then voted on at the annual Town Meeting. During the annual budget planning process, specific mitigation actions identified in this plan that require town fiscal support will be reviewed for incorporation into the budget. **Refer to those Action Items that require local money or match money (multiple action items) or address the CIP and CRF.**

#### **THE JACKSON ORDINANCES & SUBDIVISION REGULATIONS**

As time goes by and the needs of the town change, the town's planning mechanisms will be reviewed and updated. In coordination with these actions, the Planning Board will review this plan and incorporate any changes that help mitigate the susceptibility of the community and its citizens to the dangers of natural, technical or human-caused disasters.

The local governments will modify other plans and actions as necessary to incorporate hazard and/or wildfire issues. The Selectboard ensures this process will be followed in the future. In addition, the town will review and make note of instances when this has been done and include it as part of their annual review of the plan.

### **C. PLAN APPROVAL & ADOPTION**

This plan was completed in a series of open meetings beginning on December 3, 2018. The plan was presented to the town for review, submitted to HSEM for Conditional Approval (*APA, Approved Pending Adoption*), formally adopted by the Selectboard and resubmitted to HSEM for Final Approval. Once Final Approval from HSEM was met, copies of the plan were distributed to the town, HSEM, FEMA, DNCR and the USDA-FS; the plan was then distributed as these entities saw fit. Copies of the plan remain on file at Mapping and Planning Solutions (MAPS) in both digital and paper format.

## Chapter 11: Signed Community Documents and Approval Letters

### A. PLANNING SCOPE OF WORK & AGREEMENT

#### PLANNING SCOPE OF WORK & AGREEMENT HAZARD MITIGATION PLAN



#### **PARTIES TO THE AGREEMENT**

Mapping and Planning Solutions  
Town of Jackson, NH

Current Plan Expiration: 6/16/19  
PDM17 Grant Expiration: 1/30/2021

This agreement between the Town of Jackson (the town) or its official designee and Mapping and Planning Solutions (MAPS) outlines the town's desire to engage the services of MAPS to assist in planning and technical services in order to produce the 2019 Hazard Mitigation Plan Update (the plan).

#### **Agreement**

This agreement outlines the responsibilities that will ensure that the plan is developed in a manner that involves town members and local, federal and state emergency responders and organizations. The agreement identifies the work to be done by detailing the specific tasks, schedules and finished products that are the result of the planning process.

The goal of this agreement is that the plan and planning process be consistent with town policies and that it accurately reflects the values and individuality of the town. This is accomplished by forming a working relationship between the town's citizens, the planning team and MAPS.

The plan created as a result of this agreement will be presented to the town for adoption once conditional approval is received from FEMA. When adopted, the plan provides guidance to the town, commissions, and departments; adopted plans serve as a guide and do not include any financial commitments by the town. Additionally, all adopted plans should address mitigation strategies for reducing the risk of natural, man-made, and wildfire disasters on life and property and written so that they may be integrated within other town planning initiatives.

#### **Scope of Work**

***MAPS - Responsibilities include, but are not limited to, the following:***

- MAPS will collect data that is necessary to complete the plan and meet the requirements of the FEMA Plan Review Tool by working with the planning team (the team) and taking public input from community members.
- With the assistance of the team, MAPS will coordinate and facilitate meetings and provide any materials, handouts and maps necessary to provide a full understanding of each step in the planning process.



- MAPS will assist the team in the development of goals, objectives and implementation strategies and clearly define the processes needed for future plan monitoring, educating the public and integrating the plan with other town plans and activities.
- MAPS will coordinate and collaborate with other federal, state and local agencies throughout the process.
- MAPS will explain and delineate the town's Wildland Urban Interface (WUI) and working with the team, will establish a list of potential hazards and analyze the risk severity of each.
- MAPS will author, edit and prepare the plan for review by the team prior to submitting the plan to FEMA for conditional approval. Upon conditional approval by FEMA, MAPS will assist the planning team as needed with presentation of the plan to the Jackson Selectboard and/or Planning Board and continue to work with the town until final approval and distribution of the plan is complete, unless extraordinary circumstances prevail.
- MAPS shall provide, at its office, all supplies and space necessary to complete the Jackson Hazard Mitigation Plan.
- After final approval is received from FEMA, MAPS will provide the town with a two copies of the plan containing all signed documents, approvals and GIS maps along with CDs containing these same documents in digital form, for distribution by the town as it sees fit. Additional CDs may be requested at no additional cost. CD copies of the plan will be distributed by MAPS to collaborating agencies including, but not limited to, NH Homeland Security (HSEM) and FEMA.
- MAPS will provide plan maintenance reminders and assistance on an annual basis leading up to the next five-year plan update at no cost to the town, if requested by the town.

***The Town - Responsibilities include but are not limited to the following:***

- The town shall insure that the planning team includes members who are able to support the planning process by identifying available town resources including people who will have access to and can provide pertinent data. The planning team should include, but not be limited to, such town members as the local Emergency Management Director, the Fire, Ambulance and Police Chiefs, members of the Selectboard and the Planning Board, the Public Works Director or Road Agent, representatives from relevant federal and state organizations, other local officials, property owners, and relevant businesses or organizations.
- The town shall determine a lead contact to work with MAPS. This contact shall assist with recruiting participants for planning meetings, including the development of mailing lists when and if necessary, distribution of flyers, and placement of meeting announcements. In addition, this contact shall assist MAPS with organizing public meetings to develop the plan and offer assistance to MAPS in developing the work program which will produce the plan.
- The town shall gain the support of stakeholders for the recommendations found within the plan.
- The town shall provide public access for all meetings and provide public notice at the start of the planning process and at the time of adoption, as required by FEMA.
- The proposed plan shall be submitted to the Selectboard and/or Planning Board for consideration and adoption.

- After adoption and final approval from FEMA is received, the town will:
  - *Distribute copies of the plan as it sees fit throughout the local community.*
  - *Develop a team to monitor and work toward plan implementation.*
  - *Publicize the plan to the community and insure citizen awareness.*
  - *Urge the Planning Board to incorporate priority projects into the town's Capital Improvement Plan (if available).*
  - *Integrate mitigation strategies and priorities from the plan into other town planning documents.*

## Terms

- **Fees & Payment Schedule:** The contract price is limited to \$6,999.75; an invoice will be sent to the town for each payment as outlined below.

- 1. Initial payment upon signing of this contract and receipt of first invoice .....\$3,500.00
- 2. Second payment upon plan submittal to FEMA for Conditional Approval .....\$3,300.00
- 3. Final payment upon project completion and receipt of final plan copy .....\$199.75
- Total Fees.....\$6,999.75

- **Payment Procedures:** The payment procedure is as follows:

- MAPS will invoice the town
- The town will pay MAPS
- The town will forward the MAPS invoice along with an invoice from the town on letterhead to HSEM
- HSEM will reimburse the town for the monies paid to MAPS

All payments to MAPS are fully reimbursable to the town by Homeland Security & Emergency Management.

- **Required Matching Funds:** The Town of Jackson will be responsible to provide and document any and all resources to be used to meet the FEMA required matching funds in the amount of \$2,333.25. Matching funds are the responsibility of the Town of Jackson, not MAPS. Mapping and Planning Solutions will however assist the town with attendance tracking by asking meeting attendees to “sign in” at all meetings and to “log” any time spent outside of the meetings working on this project. MAPS will provide the town with final attendance records in spreadsheet form at project's end for the town to use in its match fulfillment.
- **Project Period:** This project shall begin upon signing this agreement by both parties and continue through a date yet to be determined or whenever the planning process is complete. The project period may be extended by mutual written agreement between the town, MAPS and Homeland Security if required. The actual project end date is dependent upon timely adoptions and approvals which may be outside of the control of MAPS and the town. It is anticipated that five or six two-hour meetings will be required to gather the necessary information to create the updated the plan.

The grant provided for this project is funded through PDM17; per the grant agreement between the town and HSEM, all work must be completed by January 30, 2021. It is expected that this project will be completed long before the grant expiration date of January 30, 2021.

- **Ownership of Material:** All maps, reports, documents and other materials produced during the project period shall be owned by the town; each party may keep file copies of any generated work. MAPS shall have the right to use work products collected during the planning process; however, MAPS shall not use any data in such a way as to reveal personal or public information about individuals or groups which could reasonably be considered confidential.

- **Termination:** This agreement may be terminated if both parties agree in writing. In the event of termination, MAPS shall forward all information prepared to date to the town. MAPS shall be entitled to recover its costs for any work that was completed.
- **Limit of Liability:** MAPS agrees to perform all work in a diligent and efficient manner according to the terms of this agreement. MAPS' responsibilities under this agreement depend upon the cooperation of the Town of Jackson. MAPS and its employees, if any, shall not be liable for opinions rendered, advice, or errors resulting from the quality of data that is supplied. Adoption of the plan by the town and final approval of the plan by FEMA, relieve MAPS of content liability. Mapping and Planning Solutions carries annual general liability insurance.
- **Amendments:** Changes, alterations or additions to this agreement may be made if agreed to in writing between both the Town of Jackson and Mapping and Planning Solutions.
- **About Mapping and Planning Solutions:** Mapping and Planning Solutions provides hazard mitigation and emergency operations planning throughout New Hampshire. Mapping and Planning Solutions has developed more than forty Hazard Mitigation Plans, more than forty five Emergency Operations Plans and has completed the following FEMA courses in Emergency Planning and Operations:
  - Introduction to Incident Command System, IS-100.a
  - ICS Single Resources and Initial Action Incidents, IS-200.a
  - National Incident Management System (NIMS) An Introduction, IS-700.a
  - National Response Framework, An Introduction, IS 800.b
  - Emergency Planning, IS-235
  - Homeland Security Exercise & Evaluation Program (HSEEP)
  - IS-547.a – Introduction to Continuity Operations
  - IS-546.a – Continuity of Operations (COOP) Awareness Course
  - G-318; Preparing & Review Hazard Mitigation Plans
  - Climate Change Adaptation Planning, AWR-347
  - ALICE; School Shooting Workshop, Littleton High School

➤ **Contacts:**

**For Mapping & Planning Solutions**

June Garneau  
Mapping and Planning Solutions  
105 Union Street  
Whitefield, NH 03598  
jgarneau@mappingandplanning.com  
(603) 837-7122; (603) 991-9664 (cell)

**For the Town**

Thomas Greig  
Emergency Management Director  
Town of Jackson  
PO Box 268, 54 Main Street  
Jackson, NH 03846  
Dundee683@msn.com  
(603) 219-7602

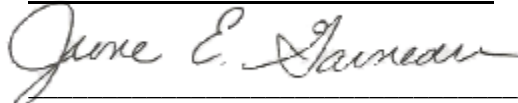
**Signature below indicates acceptance of and agreement to details outlined in this agreement**

**FOR THE TOWN OF JACKSON, NH**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name/Title

**FOR MAPPING AND PLANNING SOLUTIONS**



\_\_\_\_\_  
Signature  
June Garneau, Owner  
December 3, 2018

**Signatures are scanned facsimiles, original signatures are on file.**

**B. APPROVED PENDING ADOPTION (APA) & FORMAL APPROVAL EMAILS FROM HSEM****APA FROM HSEM****Jackson, NH - Approvable Pending Adoption**

Hazard Mitigation Planning &lt;HazardMitigationPlanning@dos.nh.gov&gt;

Sent: Wed 11/13/2019 11:24 AM

To: June Garneau; 'adminassist@jackson-nh.org'; 'dundee635@msn.com'

Cc: Lawton, Heidi; Monastiero, Alexandre

Good morning,

The Department of Safety, Division of Homeland Security & Emergency Management (HSEM) has completed its review of the Jackson, NH Hazard Mitigation Plan and found it approvable pending adoption. Congratulations on a job well done!

With this approval, the jurisdiction meets the local mitigation planning requirements under 44 CFR 201 **pending HSEM's receipt of electronic copies of the adoption documentation and the final plan.**

Acceptable electronic formats include Word or PDF files and must be submitted to us via email at [HazardMitigationPlanning@dos.nh.gov](mailto:HazardMitigationPlanning@dos.nh.gov). Upon HSEM's receipt of these documents, notification of formal approval will be issued, along with the final Checklist and Assessment.

The approved plan will be submitted to FEMA on the same day the community receives the formal approval notification from HSEM. FEMA will then issue a Letter of Formal Approval to HSEM for dissemination that will confirm the jurisdiction's eligibility to apply for mitigation grants administered by FEMA and identify related issues affecting eligibility, if any. If the plan is not adopted within one calendar year of HSEM's Approval Pending Adoption, the jurisdiction must update the entire plan and resubmit it for HSEM review. If you have questions or wish to discuss this determination further, please contact me at [Kayla.Henderson@dos.nh.gov](mailto:Kayla.Henderson@dos.nh.gov) or 603-223-3650.

Thank you for submitting the Jackson, NH Hazard Mitigation Plan and again, congratulations on your successful community planning efforts.

Sincerely,

Kayla J. Henderson

**NH Department of Safety – Division of Homeland Security & Emergency Management  
Hazard Mitigation Planning**

**FORMAL APPROVAL FROM HSEM**

*Signatures are scanned facsimile, original signatures are on file.*

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**C. SIGNED CERTIFICATE OF ADOPTION**

**CERTIFICATE OF ADOPTION**

**JACKSON, NH**

**SELECTBOARD**

**A RESOLUTION ADOPTING THE TOWN OF JACKSON HAZARD MITIGATION PLAN UPDATE 2019**

WHEREAS, the Town of Jackson has historically experienced severe damage from natural hazards and it continues to be vulnerable to the effects of those natural hazards profiled in this plan, resulting in loss of property and life, economic hardship and threats to public health and safety; and

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

WHEREAS, public and committee meetings were held between December 3, 2018 and April 29, 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 Jackson; and

WHEREAS, the plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Jackson 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 Jackson eligible for funding to alleviate the impacts of future hazards; now therefore be it

RESOLVED by the Selectboard:

1. The plan is hereby adopted as an official plan of the Town of Jackson;
2. The respective officials identified in the mitigation action items of the plan are hereby directed to pursue implementation of the recommended actions assigned to them;



**Jackson, Hazard Mitigation Plan Update Certificate of Adoption, page two**

- 3. Future revisions and plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution;
- 4. An annual report on the progress of the implementation elements of the plan shall be presented to the Selectboard by the Emergency Management Director.

Adopted this day, the \_\_\_\_\_ of \_\_\_\_\_, 2019

**Chairman of the Selectboard**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

**Member of the Selectboard**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

**Member of the Selectboard**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

**Emergency Management Director**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name

**IN WITNESS WHEREOF**, the undersigned has affixed his/her signature and the corporate seal of the Town of Jackson on this day, \_\_\_\_\_, 2019

\_\_\_\_\_  
Notary

\_\_\_\_\_  
Expiration

\_\_\_\_\_  
Date

**Signatures are scanned facsimile, original signatures are on file.**

***D. FORMAL APPROVAL LETTER FEMA***

PAGE LEFT INTENTIONALLY BLANK FOR  
INSERTION OF FINAL APPROVAL LETTER FROM  
FEMA WHEN RECEIVED.

*Signatures are scanned facsimile, original signatures are on file.*

**E. CWPP APPROVAL LETTER FROM DNCR**

**Jackson, NH**  
**A Resolution Approving the**  
**Jackson Hazard Mitigation Plan Update 2019**  
**As a Community Wildfire Protection Plan**

Several public meetings and committee meetings were held between December 3, 2018 and April 29, 2019 regarding the development and review of the Jackson Hazard Mitigation Plan Update 2019. The Jackson Hazard Mitigation Plan Update 2019 contains potential future projects to mitigate hazard and wildfire damage in the Town of Jackson.

The Fire Chief along with the Selectboard and the Emergency Management Director desire that this plan and be accepted by the Department of Natural and Cultural Resources (DNCR) as a Community Wildfire Protection Plan, having adhered to the requirements of said plan.

The Selectboard, the Emergency Management Director and the Fire Chief approve the Jackson Hazard Mitigation Plan Update 2019 and understand that with approval by DNCR, this plan will also serve as a Community Wildfire Protection Plan.

**For the Town of Jackson**

APPROVED and SIGNED this day, \_\_\_\_\_, 2019.

\_\_\_\_\_  
Chairman of the Selectboard

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Fire Chief

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Emergency Management Director

\_\_\_\_\_  
Printed Name

**For the Department of Natural & Cultural Resources (DNCR)**

APPROVED and SIGNED this day, \_\_\_\_\_, 2019.

\_\_\_\_\_  
Forest Ranger – NH Division of Forest and Lands, DNCR

APPROVED and SIGNED this day, \_\_\_\_\_, 2019.

\_\_\_\_\_  
Director – NH Division of Forest and Lands, DNCR

***Signatures are scanned facsimile, original signatures are on file.***

**F. ANNUAL REVIEW OR POST HAZARD CONCURRENCE FORMS**

**YEAR ONE**

CHECK ALL THAT APPLY

- ☐ Annual Review & Concurrence - **Year One:** \_\_\_\_\_ (Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)

The Town of Jackson, NH shall execute this page annually by the members of the town's governing body and the town's designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual and/or post hazard review and/or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Jackson, NH  
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Chairman of the Selectboard

Changes and notes regarding the 2019 Hazard Mitigation Plan Update

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**Please use reverse side for additional notes** 

### Additional Notes – Year One:

[illegible]

YEAR TWO

CHECK ALL THAT APPLY

- ☐ Annual Review & Concurrence - Year Two: \_\_\_\_\_ (Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)

The Town of Jackson, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual and/or post hazard review and/or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Jackson, NH  
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Chairman of the Selectboard

Changes and notes regarding the 2019 Hazard Mitigation Plan Update

Please use reverse side for additional notes ➡



### Additional Notes – Year Two:

[illegible]

YEAR THREE

CHECK ALL THAT APPLY

- ☐ Annual Review & Concurrence - Year Three: \_\_\_\_\_ (Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)

The Town of Jackson, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual and/or post hazard review and/or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Jackson, NH  
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Chairman of the Selectboard

Changes and notes regarding the 2019 Hazard Mitigation Plan Update

Please use reverse side for additional notes ➡

### Additional Notes – Year Three:

[illegible]

YEAR FOUR

CHECK ALL THAT APPLY

- ☐ Annual Review & Concurrence - **Year Four:** \_\_\_\_\_ (Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)
- ☐ Annual Review & Concurrence – Post Hazardous Event: \_\_\_\_\_ (Event/Date)

The Town of Jackson, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual and/or post hazard review and/or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Jackson, NH  
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: \_\_\_\_\_

PRINTED NAME: \_\_\_\_\_

Chairman of the Selectboard

Changes and notes regarding the 2019 Hazard Mitigation Plan Update

Please use reverse side for additional notes ➡

### Additional Notes – Year Four:

[illegible]

## Chapter 12: Appendices

- APPENDIX A: BIBLIOGRAPHY
- APPENDIX B: TECHNICAL AND FINANCIAL ASSISTANCE FOR HAZARD MITIGATION
  - *Hazard Mitigation Grant Program (HMGP)*
  - *Pre-Disaster Mitigation (PDM)*
  - *Flood Mitigation Assistance (FMA)*
  - *Repetitive Flood Claims (RFC)*
  - *Severe Repetitive Loss (SRL)*
- APPENDIX C: THE EXTENT OF HAZARDS
- APPENDIX D: MAJOR DISASTER & EMERGENCY DECLARATIONS
- APPENDIX E: ACRONYMS
- APPENDIX F: POTENTIAL MITIGATION IDEAS



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**APPENDIX A: BIBLIOGRAPHY****Documents**

- **Local Hazard Mitigation Planning Review Guide**, FEMA, October 2011
- **Local Hazard Mitigation Planning Handbook**, FEMA, March 2013
- **Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards**, FEMA, January 2013
- **Hazard Mitigation Unified Guidance**, FEMA, July 12, 2013
- **Hazard Mitigation Assistance Guidance**, FEMA, February 27, 2015
- **Hazards Mitigation Plans**
  - Jackson Hazard Mitigation Plan, 2014
  - Franconia Hazard Mitigation Plan, 2019
  - Tamworth Hazard Mitigation Plan, 2019
  - Albany Hazard Mitigation Plan, 2017
- **NH State Multi-Hazard Mitigation Plan**, 2018
  - [https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018\\_FINAL.pdf](https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf)
- **NH Division of Forests and Lands Quarterly Update**
  - <http://www.nhdfi.org/fire-control-and-law-enforcement/fire-statistics.aspx>
- **Disaster Mitigation Act (DMA) of 2000**, Section 101, b1 & b2 and Section 322a
  - <http://www.fema.gov/library/viewRecord.do?id=1935>
- **Economic & Labor Market Information Bureau**, NH Employment Security, July 2019; Community Response for Jackson, Received, 6/4/18, Census 2000 and Revenue Information derived from this site;
  - <http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Jackson.htm>

**Photos**

- Photos taken by MAPS unless otherwise noted.

**Wildfire Links**

- US Forest Service; <http://www.fs.fed.us>
- US Fire Administration; <http://www.usfa.dhs.gov/>
- US Department of Agriculture Wildfire Programs: <http://www.wildfireprograms.usda.gov/>
- Firewise®; <http://www.firewise.org/>
- Fire Adapted Communities; [www.fireadapted.org](http://www.fireadapted.org)
- Wildfire Preparedness Guide to Forest Wardens; [www.quickseries.com](http://www.quickseries.com)
- Ready Set Go; [www.wildlandfires.org](http://www.wildlandfires.org)
- Fire education for children; [www.smokeybear.com](http://www.smokeybear.com)

**Additional Websites**

- NH Homeland Security & Emergency Management; <http://www.nh.gov/safety/divisions/hsem/>
- US Geological Society; <http://water.usgs.gov/ogw/subsidence.html>
- Department Environmental Services;  
<http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>
- The Disaster Center (NH); <http://www.disastercenter.com/newhamp/tornado.html>
- Floodsmart, about the NFIP; [http://www.floodsmart.gov/floodsmart/pages/about/nfip\\_overview.jsp](http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp)
- NOAA, National Weather Service; <http://www.nws.noaa.gov/glossary/index.php?letter=w>
- NOAA, Storm Prediction Center; <http://www.spc.noaa.gov/faq/tornado/beaufort.html>
- National Weather Service; [http://www.nws.noaa.gov/om/cold/wind\\_chill.shtml](http://www.nws.noaa.gov/om/cold/wind_chill.shtml)
- Center for Disease Control; <https://www.cdc.gov/disasters/winter/index.html>
- Slate; <http://www.slate.com/id/2092969/>
- NH Office Strategic Initiatives; <http://www.nh.gov/osi/>
- Code of Federal Regulations; Title 14, Aeronautics and Space; Part 1, Definitions and Abbreviations;  
[https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title14/14tab\\_02.tpl](https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title14/14tab_02.tpl)
- Federal Aviation Administration; <http://faa.custhelp.com>
- US Legal, Inc.; <http://definitions.uslegal.com/v/violent-crimes/>

## APPENDIX B: TECHNICAL & FINANCIAL ASSISTANCE FOR HAZARD MITIGATION

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs<sup>28</sup>:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

FEMA's HMA grants are provided to eligible applicants (states/tribes/territories) that, in turn, provide sub-grants to local governments and communities. The applicant selects and prioritizes subapplications developed and submitted to them by subapplicants. These subapplications are submitted to FEMA for consideration of funding.

Prospective subapplicants should consult the office designated as their applicant for further information regarding specific program and application requirements. Contact information for the FEMA Regional Offices and State Hazard Mitigation Officers is available on the FEMA website, [www.fema.gov](http://www.fema.gov).

### HMA Grant Programs

The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to Natural Hazards. Brief descriptions of the HMA grant programs can be found below.

#### A. Hazard Mitigation Grant Program (HMGP)

HMGP assists in implementing long-term hazard mitigation measures following major disaster declarations. Funding is available to implement projects in accordance with state, tribal and local priorities.

**Table 3: Eligible Activities by Program**

Eligible Activities	HMGP	PDM	FMA
<b>1. Mitigation Projects</b>	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation	✓	✓	✓
Mitigation Reconstruction	✓	✓	✓
Dry Floodproofing of Historic Residential Structures	✓	✓	✓
Dry Floodproofing of Non-residential Structures	✓	✓	✓
Generators	✓	✓	
Localized Flood Risk Reduction Projects	✓	✓	✓
Non-localized Flood Risk Reduction Projects	✓	✓	
Structural Retrofitting of Existing Buildings	✓	✓	✓
Non-structural Retrofitting of Existing Buildings and Facilities	✓	✓	✓
Safe Room Construction	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Advance Assistance	✓		
5 Percent Initiative Projects	✓		
Miscellaneous/Other <sup>(1)</sup>	✓	✓	✓
<b>2. Hazard Mitigation Planning</b>	✓	✓	✓
Planning Related Activities	✓		
<b>3. Technical Assistance</b>			✓
<b>4. Management Cost</b>	✓	✓	✓

<sup>(1)</sup> Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

*Eligibility Chart taken from Hazard Mitigation Assistance Guidance, February 27, 2015*

<sup>28</sup> Information in Appendix B is taken from the following website and links to specific programs unless otherwise noted [http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA\\_Guidance\\_022715\\_508.pdf](http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf)

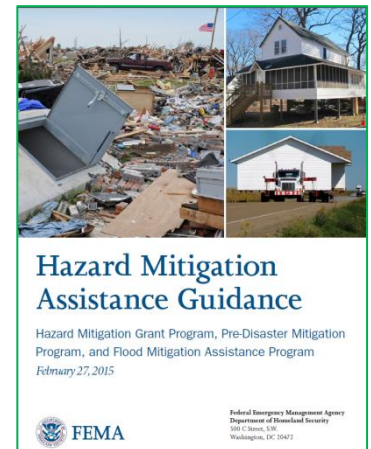
What is the Hazard Mitigation Grant Program?

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Authorized under Section 404 of the Stafford Act and administered by FEMA, HMGP was created to reduce the loss of life and property due to natural disasters. The program enables mitigation measures to be implemented during the immediate recovery from a disaster.

Who is eligible to apply?

Hazard Mitigation Grant Program funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are

- State and local governments
- Indian tribes or other tribal organizations
- Certain non-profit organizations



Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf.

How are potential projects selected and identified?

The state's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects are part of an overall mitigation strategy for the disaster area.

The state prioritizes and selects project applications developed and submitted by local jurisdictions. The state forwards applications consistent with state mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and states and local communities must make difficult decisions as to the most effective use of grant funds.

**B. Pre-Disaster Mitigation (PDM)**

PDM provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on federal funding from actual disaster declarations.

Program Overview

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.

### **C. Flood Mitigation Assistance (FMA)**

FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program.

#### Program Overview

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

FEMA provides FMA funds to assist states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program.

#### Types of FMA Grants

Three types of FMA grants are available to states and communities:

**Planning Grants** to prepare flood mitigation plans. Only NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project grants.

**Project Grants** to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. States are encouraged to prioritize FMA funds for applications that include repetitive loss properties; these include structures with 2 or more losses each with a claim of at least \$1,000 within any ten-year period since 1978.

**Technical Assistance Grants** for the state to help administer the FMA program and activities. Up to ten percent (10%) of project grants may be awarded to states for Technical Assistance Grants

### **D. Repetitive Flood Claims (RFC)**

RFC provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100% federal funding for projects in communities that meet the reduced capacity requirements.

#### Program Overview

The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108–264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al).

Up to \$10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

#### Federal / Non-Federal Cost Share

FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.

### **E. Severe Repetitive Loss (SRL)**

SRL provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that are qualified as severe repetitive loss structures. SRL provides up to 90% federal funding for eligible projects.

#### Program Overview

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

#### Definition

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.

#### Purpose

To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).

#### Federal / Non-Federal cost share

75/25%; up to 90% federal cost-share funding for projects approved in states, territories and federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.

**For further information all of these programs, please refer to  
the new FEMA Hazard Mitigation Assistance Guidance:**

**[http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA\\_Guidance\\_022715\\_508.pdf](http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf)**



## APPENDIX C: THE EXTENT OF NATURAL HAZARDS

Hazards indicated with an asterisk \* are included in this plan.

### \*SEVERE WINTER WEATHER

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

#### Snowstorms

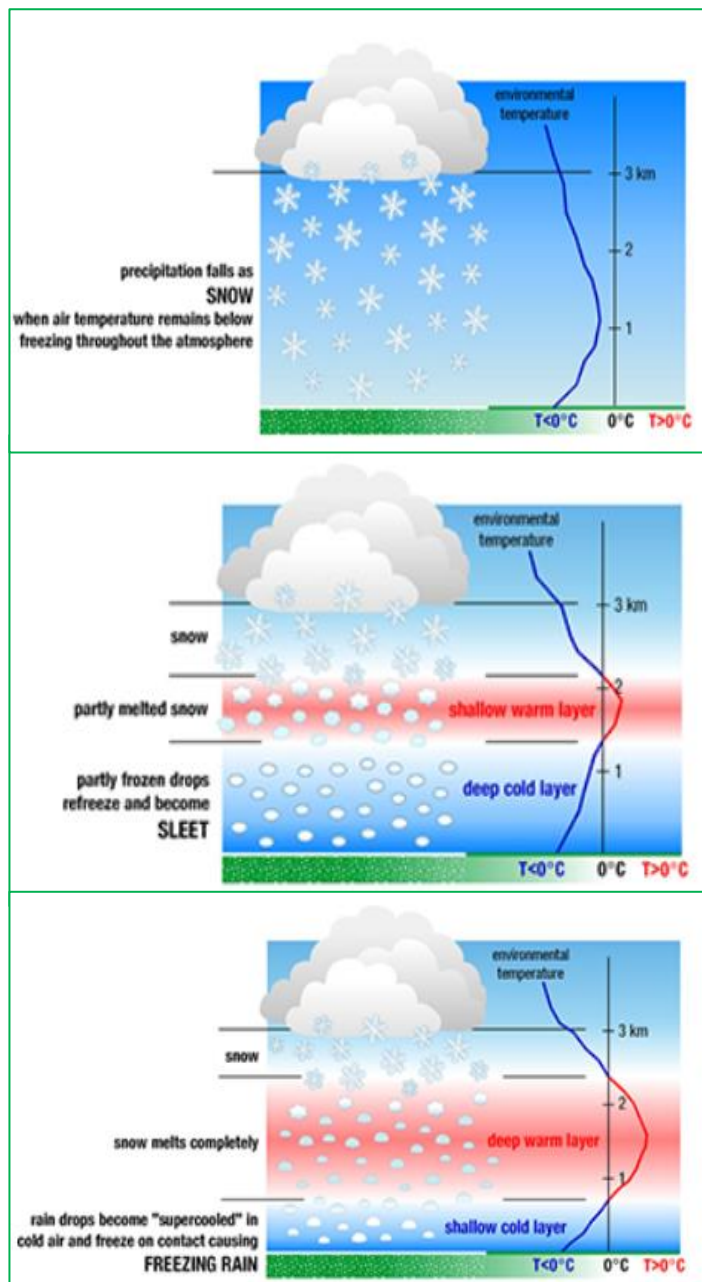
A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

#### Sleet

Snowflakes melt as they fall through a small band of warm air and later refreeze when passing through a wider band of cold air. These frozen rain drops then fall to the ground as “sleet”.

#### Freezing Rain & Ice Storms

Snowflakes melt completely as they fall through a warm band of air then fall through a shallow band of cold air close to the ground to become “supercooled”. These supercooled raindrops instantly freeze upon contact with the ground and anything else that is below 32 degrees Fahrenheit. This freezing creates accumulations of ice on roads, trees, utility lines and other objects resulting in what we think of as an “Ice Storm”. “Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires and similar objects.”<sup>29</sup>



Types of Severe Winter Weather  
NOAA – National Severe Storms Laboratory

<sup>29</sup> NOAA, National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/winter/types/>

The Sperry-Piltz Ice Accumulation Index (SPIA) (below) is designed to help utility companies better prepare for predicated ice storms.<sup>30</sup>

**The Sperry-Piltz Ice Accumulation Index, or "SPIA Index" – Copyright, February, 2009**

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) <small>* Revised-October, 2011</small>	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
<b>0</b>	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
<b>1</b>	0.10 – 0.25	15 – 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 – 0.50	> 15	
<b>2</b>	0.10 – 0.25	25 – 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 – 0.50	15 – 25	
	0.50 – 0.75	< 15	
<b>3</b>	0.10 – 0.25	> = 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
	0.25 – 0.50	25 – 35	
	0.50 – 0.75	15 – 25	
	0.75 – 1.00	< 15	
<b>4</b>	0.25 – 0.50	> = 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 – 10 days.
	0.50 – 0.75	25 – 35	
	0.75 – 1.00	15 – 25	
	1.00 – 1.50	< 15	
<b>5</b>	0.50 – 0.75	> = 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 – 1.00	> = 25	
	1.00 – 1.50	> = 15	
	> 1.50	Any	

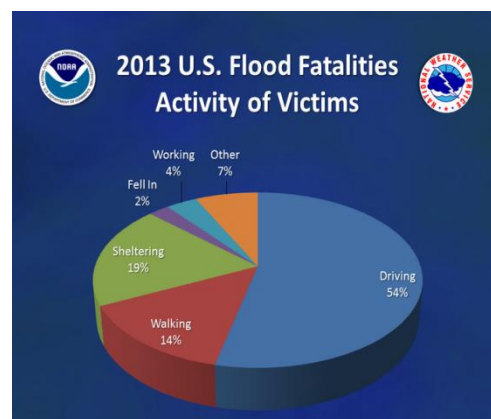
(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

## \*INLAND FLOODING

### General Flooding Conditions

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

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go; warm temperatures and heavy rains cause rapid snowmelt producing prime conditions for flooding. In addition, rising waters in early spring often breaks ice into chunks that float downstream and pile up, causing flooding behind them. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents a significant flooding threat to bridges, roads and the surrounding lands.



<sup>30</sup> The Weather Channel, <http://www.weather.com/news/weather-winter/rating-ice-storms-damage-sperry-piltz-20131202>

**Flooding (Dam Failure)**

Flooding as a result of dam failure can be small enough to only affect the immediate area of the dam, or large enough to cause catastrophic results to cities, towns and human life that is below the dam. The extent of flooding depends largely on the size of the dam, the amount of water that is being held by the dam, the size of the breach, the amount of water flow from the dam and the amount of human habitation that is downstream.

A “Dam” means any artificial barrier, including appurtenant works, which impounds or diverts water, and which has a height of 4 feet or more, or a storage capacity of 2 acre-feet or more, or is located at the outlet of a great pond<sup>[1]</sup>. A dam failure occurs when water overtops the dam, or there is structural failure of the dam which causes there to be a breach and an unintentional release of water. Dams are classified in the following manner<sup>31</sup>:

Classification	Description	Inspection Intervals
<b>Non-Menace</b>	A dam is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property. The dam must be less than six feet in height if the storage capacity is greater than 50 acre-feet or less than 25 feet in height if it has a storage capacity of 15-50 acre-feet.	Every 6 years
<b>Low Hazard</b>	A dam 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 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 contained sediment if the storage capacity is less two-acre-feet and is located more than 250 feet from a water body or water course, and/or reversible environmental losses to environmentally-sensitive sites.	Every 6 years
<b>Significant Hazard</b>	A dam has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no probable loss of lives; however, there would be major economic loss to structures or property, structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services, major environmental or public health losses including one or more of the following: Damages to a public water system (RSA 485:1-a, XV) which will take longer than 48 hours to repair, the release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more; or damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.	Every 4 years
<b>High Hazard</b>	A dam has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as well 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 a dam failure is greater than one foot; structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services; the release of a quantity and concentration of material, which qualify as “hazardous waste” as defined by RSA 147-A:2 VII; or any other circumstance that would more likely than not cause one or more deaths.	Every 2 years

<sup>[1]</sup> NH DES [http://des.nh.gov/organization/divisions/water/dwgb/wrpp/documents/primer\\_chapter11.pdf](http://des.nh.gov/organization/divisions/water/dwgb/wrpp/documents/primer_chapter11.pdf)

<sup>31</sup> <http://des.nh.gov/organization/commissioner/pip/factsheets/db/documents/db-15.pdf>

### ***Flooding (local, road erosion)***

Heavy rain, rapid snowmelt and stream flooding often cause culverts to be overwhelmed and roads to wash out. Today, with changes in land use, aging roads, designs that are no longer effective and undersized culverts, the risk of flooding is a serious concern. Inadequate and aging stormwater drainage systems create local flooding on both asphalt and gravel roads.

### ***Flooding (Riverine)***

Floodplains are usually located in lowlands near rivers and flood on a regular basis. The term 100-year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase "1% annual chance flood". Flooding is often associated with hurricanes, heavy rains, ice jams and rapid snowmelt in the spring.

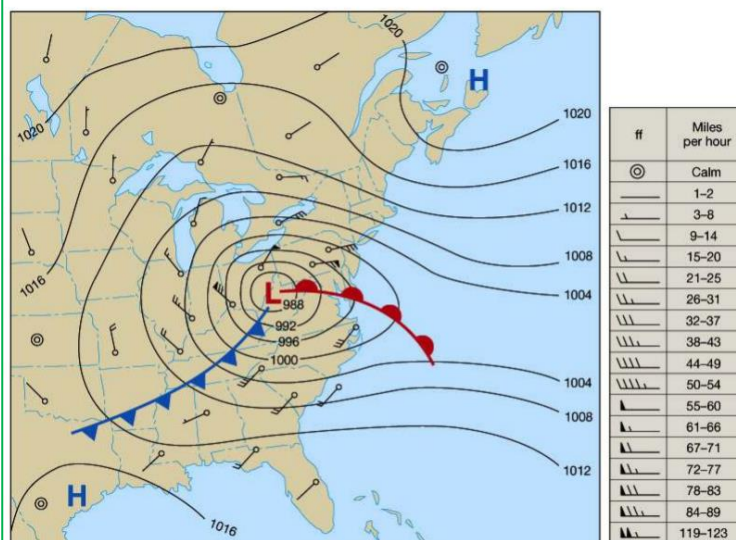
## **\*HIGH WIND EVENTS**

### ***Windstorm***

As stated by NOAA (National Oceanic & Atmospheric Administration), wind is defined as "The horizontal motion of the air past a given point. Winds begin with differences in air pressures. Those pressures which are higher at one place than another place set up a force pushing from the high pressure toward the low pressure; the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated. Meteorologists refer to the force that starts the wind flowing as the "pressure gradient force." High and low pressures are relative. There's no set number that divides high and low pressure. Wind is used to describe the prevailing direction from which the wind is blowing with the speed given usually in miles per hour or knots." In addition, NOAA's issuance of a Wind Advisory takes place when sustained winds reach 25 to 39 mph and/or gusts to 57 mph.<sup>32 33</sup>

#### **Pressure Gradient Force, PGF**

The Pressure Gradient Force (PGF) is the direct result of different air pressures. As we have done for temperature by drawing isothermal maps, we can do for pressure and draw isobaric maps. Lines on these maps connect points of equal pressure.



Pressure Gradient Force (PGF) resulting in winds generated between pressure differences. Solid lines are isobars - lines of constant pressure.

Figure 6.9 in *The Atmosphere*, 8th edition, Lutgens and Tarbuck, 8th edition, 2001.

<sup>32</sup> NOAA; <http://www.nws.noaa.gov/glossary/index.php?letter=w>

<sup>33</sup> Pressure Gradient Force Chart "snipped" from [Air Pressure and Wind](https://www.weather.gov/media/zhu/ZHU_Training_Page/winds/pressure_winds/pressure_winds.pdf); [https://www.weather.gov/media/zhu/ZHU\\_Training\\_Page/winds/pressure\\_winds/pressure\\_winds.pdf](https://www.weather.gov/media/zhu/ZHU_Training_Page/winds/pressure_winds/pressure_winds.pdf)



## Tornado

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. Tornadoes develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain and a loud “freight train” noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

“Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale (F-Scale) to provide estimates of tornado strength based on damage surveys. Since it's practically impossible to make direct measurements of tornado winds, an estimate of the winds based on damage is the best way to classify a tornado. The new Enhanced Fujita Scale (EF-Scale) addresses some of the limitations identified by meteorologists and engineers since the introduction of the Fujita Scale in 1971. The new scale identifies 28 different free standing structures most affected by tornadoes taking into account construction quality and maintenance. The range of tornado intensities remains as before, zero to five, with 'EF-0' being the weakest, associated with very little damage and 'EF-5' representing complete destruction, which was the case in Greensburg, Kansas on May 4th, 2007, the first tornado classified as 'EF-5'. The EF scale was adopted on February 1, 2007.”<sup>34</sup> The chart (right), adapted from wunderground.com, shows a comparison of the Fujita Scale to the Enhanced Fujita Scale.

EF SCALE	OLD F-SCALE	TYPICAL DAMAGE
<b>EF-0</b> (65-85mph)	<b>F0</b> (65-73 mph)	<b>Light damage.</b> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
<b>EF-1</b> (86-110 mph)	<b>F1</b> (74-112 mph)	<b>Moderate damage.</b> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
<b>EF-2</b> (111-135 mph)	<b>F2</b> (113-157 mph)	<b>Considerable damage.</b> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
<b>EF-3</b> (136-165 mph)	<b>F3</b> (158-206 mph)	<b>Severe damage.</b> Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
<b>EF-4</b> (166-200 mph)	<b>F4</b> (207-260 mph)	<b>Devastating damage.</b> Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
<b>EF-5</b> (>200 mph)	<b>F5</b> (261-318 mph)	<b>Incredible damage.</b> Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yards); high-rise buildings have significant structural deformation; incredible phenomena will occur.
EF No rating	<b>F6-F12</b> (319 mph to speed of sound)	<b>Inconceivable damage.</b> Should a tornado with the maximum wind speed in excess of EF5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

<sup>34</sup> Enhance Fujita Scale, [http://www.wunderground.com/resources/severe/fujita\\_scale.asp](http://www.wunderground.com/resources/severe/fujita_scale.asp)

## Downburst

A downburst is a strong downdraft which causes damaging winds on or near the ground according to NOAA. Not to be confused with downburst, the term "microburst" describes the size of the downburst. A comparison of a microburst and the larger macroburst shows that both can cause extreme winds.

A microburst is a downburst with winds extending 2 ½ miles or less, lasting 5 to 15 minutes and causing damaging winds as high as 168 MPH. A macroburst is a downburst with winds extending more than 2 ½ miles lasting 5 to 30 minutes. Damaging winds, causing widespread, tornado-like damage, could be as high as 134 MPH.<sup>35</sup>

Below is the Beaufort Wind Scale, showing expected damage based on wind (knots), developed in 1805 by Sir Francis Beaufort of England and posted on NOAA's Storm Prediction Center website.<sup>36</sup>

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes bring to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (30-45 ft.) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	

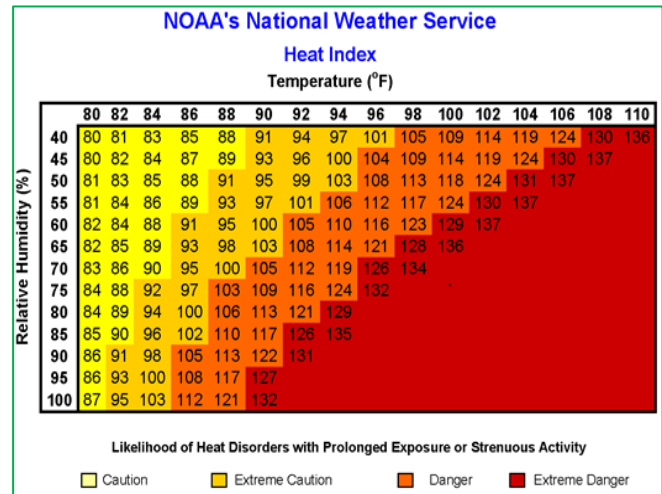
<sup>35</sup> NOAA - <http://www.srh.noaa.gov/jetstream/tstorms/wind.html>

<sup>36</sup> NOAA, Storm Prediction Center, <http://www.spc.noaa.gov/faq/tornado/beaufort.html>

**\*EXTREME TEMPERATURES****Extreme Heat**

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.

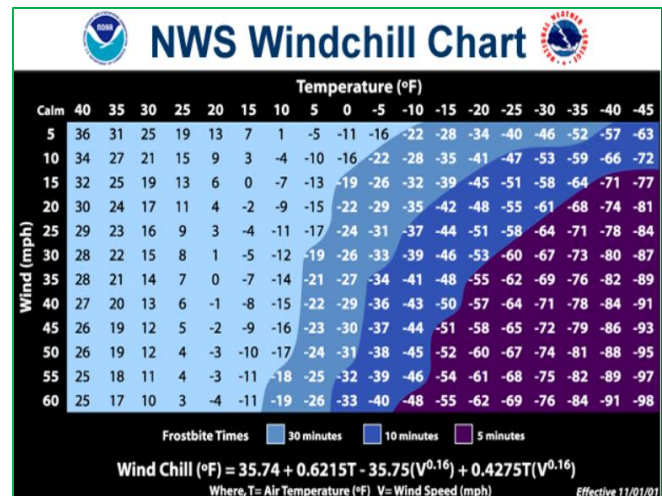
Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children and those who are sick or overweight are more likely to succumb to extreme heat.



Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the “urban heat island effect.”<sup>37</sup> The chart above explains the likelihood of heat disorders that may result from high heat.<sup>38</sup>

**Extreme Cold**

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered “extreme cold.” Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly; these weather related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.<sup>39</sup> The National Weather Service Chart (see right) shows windchill as a result of wind and temperature.<sup>40</sup>



<sup>37</sup> NOAA, Index/Heat Disorders; <http://www.srh.noaa.gov/ssd/html/heatwv.htm>

<sup>38</sup> NOAA; <http://www.nws.noaa.gov/os/heat/index.shtml>

<sup>39</sup> CDC; <http://www.bt.cdc.gov/disasters/winter/guide.asp>

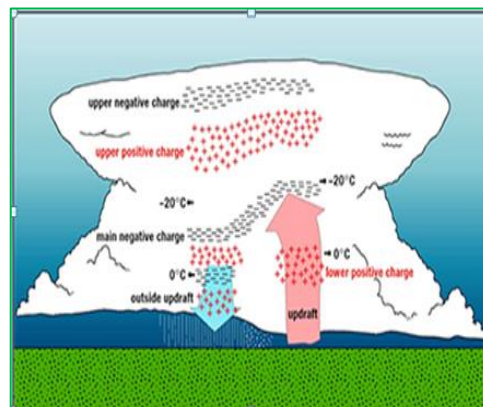
<sup>40</sup> National Weather Service; <http://www.nws.noaa.gov/om/windchill/>



**\*LIGHTNING****Lightning**

As stated by the NOAA National Severe Storms Laboratory (NSSL) “Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again.”<sup>41</sup>

Thunder, a result of lightning, is created when the “lightning channel heats the air to around 18,000 degrees Fahrenheit...”<sup>42</sup> thus causing the rapid expansion of the air and the sounds we hear as thunder. Although thunder that is heard during a storm cannot hurt you, the lightning that is associated with the thunder can not only strike people but also strike homes, out-buildings, grass and trees sparking disaster. Wildfires and structure loss are at a high risk during severe lightning events.



*“A conceptual model shows the electrical charge distribution inside deep convection (thunderstorms), developed by NSSL and university scientists. In the main updraft (in and above the red arrow), there are four main charge regions. In the convective region but outside the out draft (in and above the blue arrow), there are more than four charge regions.” - NOAA*

Although thunderstorms and their associated lightning can occur any time of year, in New England they are most likely to occur in the summer months and during the late afternoon or early evening hours; they may even occur during a winter snowstorm. Trees, tall buildings and mountains are often the targets of lightning because their tops are closer to the cloud; however, lightning is unpredictable and does not always strike the tallest thing in the area.

“Lightning strikes the ground somewhere in the U.S. nearly every day of the year. Thunderstorms and lightning occur most commonly in moist warm climates. Data from the National Lightning Detection Network shows that over the continental U.S. an average of 20,000,000 cloud-to-ground flashes occur every year. Around the world, lightning strikes the ground about 100 times each second, or 8 million times a day.

In general, lightning decreases across the U.S. mainland toward the northwest. Over the entire year, the highest frequency of cloud-to-ground lightning is in Florida between Tampa and Orlando. This is due to the presence, on many days during the year, of a large moisture content in the atmosphere at low levels (below 5,000 feet), as well as high surface temperatures that produce strong sea breezes along the Florida coasts. The western mountains of the United States also produce strong upward motions and contribute to frequent cloud-to-ground lightning. There are also high frequencies along the Gulf of Mexico coast, the Atlantic coast and in the southeast United States. Regions along the Pacific west coast have the least cloud-to-ground lightning.”<sup>43</sup>

<sup>41</sup> NOAA National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/lightning>

<sup>42</sup> Ibid

<sup>43</sup> Ibid

**Lightning Activity Level (LAL) Grid**

The lightning activity level is a common parameter that is part of fire weather forecasts nationwide. LAL is a measure of the amount of lightning activity using values 1 to 6 where:

LAL	Cloud & Storm Development	Lightning Strikes 15 Minutes
1	No thunderstorms	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

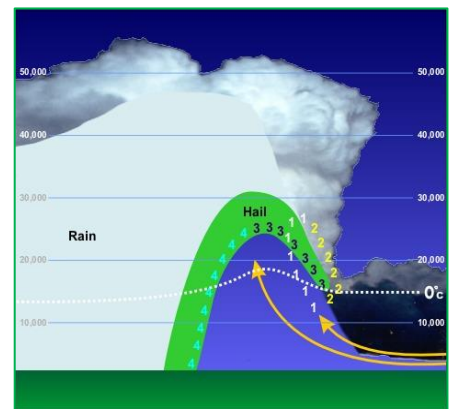
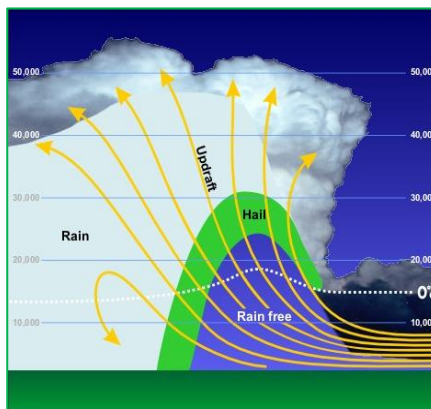
<http://www.prh.noaa.gov/hnl/pages/LAL.php>

**Hailstorm**

Hailstones are balls of ice that grow as they're held up by winds, known as updrafts that blow upwards in thunderstorms. The updrafts carry droplets of supercooled water, water at a below-freezing temperature that is not yet ice. The supercooled water droplets freeze into balls of ice and grow to become hailstones. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. "The largest hailstone recovered in the US fell in Vivian, SD on June 23, 2010 with a diameter of 8 inches and a circumference of 18.62 inches. It weighed 1 lb. 15 oz."<sup>44</sup>

Dime/Penny	0.75	
Nickel	0.88	
Quarter	1.00	
Half Dollar	1.25	
Ping Pong	1.50	
Golf Ball	1.75	
Hen Egg	2.00	
Tennis Ball	2.50	
Baseball	2.75	
Tea Cup	3.00	
Grapefruit	4.00	
Softball	4.50	

Details of how hailstones grow are complicated, but the results are irregular balls of ice that can be as large as baseballs. The chart above shows the relative size differences and a common way to "measure" the size of hail based on diameter.<sup>45</sup> The charts to the right show how hail is formed.<sup>46</sup>



<sup>44</sup> NOAA National Severe Storms Laboratory; <https://www.nssl.noaa.gov/education/svrwx101/hail/>

<sup>45</sup> <http://www.pinterest.com/pin/126171227030590678/>

<sup>46</sup> <http://oceanservice.noaa.gov/education/yos/resource/JetStream/tstorms/hail.htm#hail>

**\*WILDFIRES**

As stated by the National Wildfire Coordinating Group (NWCG), wildfires are designated in seven categories as seen in the top chart to the right:<sup>47</sup> For the purpose of statistical analysis, the US Forest Service recognizes the cause of fires according to the bottom chart to the right:<sup>48</sup>

The definition according to the International Wildland-Urban Interface Code of wildfire is “an uncontrolled fire spreading through vegetative fuels exposing and possibly consuming structures”. In addition, the IWUIC goes on to define the wildland urban interface area as “that geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels.”<sup>49</sup>

There are two main potential losses with a wildfire: the forest itself and the threat to the built-up human environment (the structures within the WUI). In many cases, the only time it is feasible for a community to control a wildfire is when it threatens the built-up human environment.

Class	Acres Burned
Class A	0 to .25 acres
Class B	.26 to 9 acres
Class C	10 to 99 acres
Class D	100 to 299 acres
Class E	300 to 999 acres
Class F	1,000 to 4,999 acres
Class G	5,000 acres or more
Code	Statistical Cause
1	Lightning
2	Equipment Use
3	Smoking
4	Campfire
5	Debris Burning
6	Railroad
7	Arson
8	Children
9	Miscellaneous

**\*TROPICAL & POST-TROPICAL CYCLONES*****Cyclones (Hurricanes)***

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” (next page<sup>50</sup>) 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 and require preventative measures. In the western North Pacific, the term “super typhoon” is used for tropical cyclones with sustained winds exceeding 150 mph.”<sup>51</sup>

Flooding is often caused from the coastal storm surge of the ocean and torrential rains, both of which may accompany a hurricane; these floods can result in loss of lives and property.

***Post-Tropical Cyclones***

A tropical depression becomes a tropical storm when its maximum sustained winds are between 39-73 mph. Although tropical storms have winds of less than 74 miles per hour, like hurricanes, they can do significant damage. The damage most felt by tropical storms is from the torrential rains they produce which cause rivers and streams to flood and overflow their banks.

<sup>47</sup> <http://www.nwcg.gov/pms/pubs/glossary/s.htm>

<sup>48</sup> [https://www.fs.fed.us/cgi-bin/Directives/get\\_dirs/fsh?5109.14](https://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?5109.14)

<sup>49</sup> International Wildland-Urban Interface Code, 2012, International Code Council, Inc.

<sup>50</sup> National Hurricane Center; <http://www.nhc.noaa.gov/aboutsshws.php>

<sup>51</sup> National Hurricane Center, NOAA; <http://www.nhc.noaa.gov/aboutsshws.php>

Rainfall from tropical storms has been reported at rates of up to 6 inches per hour; 43 inches of rain in a 24 hour period was reported in Alvin, TX as a result of Tropical Storm Claudette.<sup>52</sup>

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt. 119-153 km/h	<b>Very dangerous winds will produce some damage:</b> Well-constructed frame homes could have damage to roof, shingles, and vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt. 154-177 km/h	<b>Extremely dangerous winds will cause extensive damage:</b> Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt. 178-208 km/h	<b>Devastating damage will occur:</b> Well-built frame homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt. 209-251 km/h	<b>Catastrophic damage will occur:</b> Well-built frame homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt. or higher 252 km/h or higher	<b>Catastrophic damage will occur:</b> A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

### \*EARTHQUAKES

An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and often cause landslides, flash floods, fires and avalanches. 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 underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is widely determined by the use of two scales, the more commonly used Richter scale (measures strength or magnitude) and the Mercalli Scale (measures intensity or severity). The chart to the right shows the two scales relative to one another. The Richter Scale measures earthquakes starting at 1 as the lowest with each successive unit being about 10 times stronger and more severe than the previous one.<sup>53</sup>

Four earthquakes occurred in New Hampshire between 1924-1989 having a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia and one near the Quebec border. It is well documented that there are fault lines running throughout New Hampshire, but high magnitude earthquakes have not been frequent in NH history.

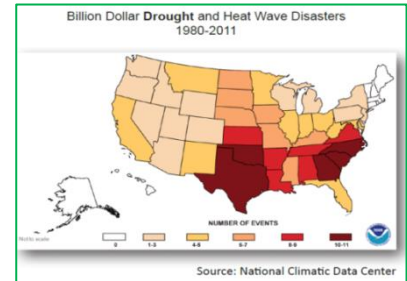
Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7

<sup>52</sup> [http://www.wpc.ncep.noaa.gov/research/mcs\\_web\\_test\\_test\\_files/Page1637.htm](http://www.wpc.ncep.noaa.gov/research/mcs_web_test_test_files/Page1637.htm)

<sup>53</sup> Modified Mercalli Scale/Richter Scale Chart; MO DNR, [http://www.dnr.mo.gov/geosrv/geores/richt\\_mercalli\\_relation.htm](http://www.dnr.mo.gov/geosrv/geores/richt_mercalli_relation.htm)

## \*DROUGHT

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects the growing season or living conditions of plants and animals. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of drought is indicated through measurements of soil moisture, groundwater levels and stream flow.



However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising groundwater levels or increasing stream flow. Low stream flow also correlates with low groundwater levels because groundwater discharge to streams and rivers maintains stream flow during extended dry periods. Low stream flow and low groundwater levels commonly cause diminished water supply.

The US Drought Monitor provides an intensity scale as shown below to indicate the “Category” of drought any given time. During the peak months of the 2016 drought in New Hampshire, the southern part of the state was in Category D3 or Extreme Drought.

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	<ul style="list-style-type: none"> <li>Going into drought: <ul style="list-style-type: none"> <li>short-term dryness slowing planting, growth of crops or pastures</li> </ul> </li> <li>Coming out of drought: <ul style="list-style-type: none"> <li>some lingering water deficits</li> <li>pastures or crops not fully recovered</li> </ul> </li> </ul>	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	<ul style="list-style-type: none"> <li>Some damage to crops, pastures</li> <li>Streams, reservoirs, or wells low, some water shortages developing or imminent</li> <li>Voluntary water-use restrictions requested</li> </ul>	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	<ul style="list-style-type: none"> <li>Crop or pasture losses likely</li> <li>Water shortages common</li> <li>Water restrictions imposed</li> </ul>	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	<ul style="list-style-type: none"> <li>Major crop/pasture losses</li> <li>Widespread water shortages or restrictions</li> </ul>	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	<ul style="list-style-type: none"> <li>Exceptional and widespread crop/pasture losses</li> <li>Shortages of water in reservoirs, streams, and wells creating water emergencies</li> </ul>	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

<https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx>



## LANDSLIDE

Erosion is the wearing away of land, such as loss of riverbank, beach, shoreline or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surge and windstorms but may be intensified by human activities. Long-term erosion is a result of multi-year impacts such as repetitive flooding, wave action, sea level rise, sediment loss, subsidence and climate change. Death and injury are not typically associated with erosion; however, it can destroy buildings and infrastructure.<sup>54</sup>

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

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

There are also multiple types of landslides:

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

Like flooding, landslides are unique in how they affect different geographic, topographic, and geologic areas. Therefore, consideration of a multitude of measurements is required to determine the severity of the landslide event.<sup>55</sup>

## \*INFECTIOUS DISEASES

### ***Bacterial & Viral Infections***

There are many organisms that live inside our bodies and on our skin. These organisms are generally harmless and sometimes may even be helpful, they can cause illnesses. Infectious diseases can be transmitted from one person to another, by bites from animals or insects (zoonotic), from the environment or by consuming food or water that has been contaminated. Infectious diseases may be caused by bacteria, viruses, fungi and parasites.<sup>56</sup>

<sup>54</sup>Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013

<sup>55</sup>State of New Hampshire Multi-Hazard Mitigation Plan Update 2018 & <https://oas.org/dsd/publications/Unit/oea66e/ch10.htm>

<sup>56</sup><https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173>

Some of the more common infectious diseases include Lyme disease, HIV/AIDS, Tuberculosis, Rabies, West Nile Virus, Eastern Equine Encephalitis (EEE), Ebola, Avian Flu, Enterovirus D-68, Influenza, Hepatitis A, Zika Virus, Meningitis, Legionella, Sexually Transmitted Diseases (STD), Hepatitis C, Salmonella, SARS and Staph.<sup>57</sup>

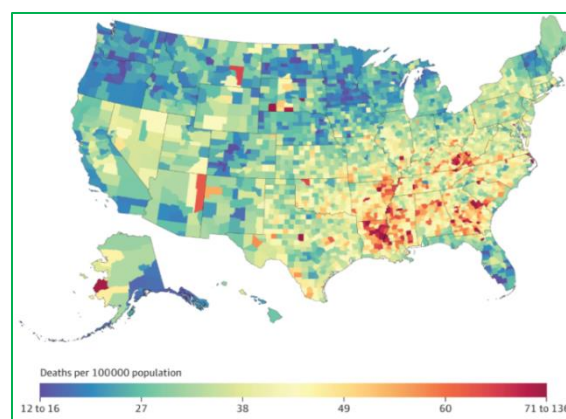
*“Throughout history, millions of people have died of diseases such as bubonic plague or the Black Death, which is caused by Yersinia pestis bacteria, and smallpox, which is caused by the variola virus. In recent times, viral infections have been responsible for two major pandemics: the 1918-1919 “Spanish Flu” epidemic that killed 20-40 million people, and the ongoing HIV/AIDS epidemic that killed an estimated 1.5 million people worldwide in 2013 alone.*

*Bacterial and viral infections can cause similar symptoms such as coughing and sneezing, fever, inflammation, vomiting, diarrhea, fatigue, and cramping – all of which are ways the immune system tries to rid the body of infectious organisms. But bacterial and viral infections are dissimilar in many other important respects, most of them due to the organisms’ structural differences and the way they respond to medications.”<sup>58</sup>*

The extent of infectious diseases is generally described by the level and occurrence of a particular disease as follows<sup>59</sup>:

Sporadic .....	Disease that occurs infrequently and irregularly
Endemic .....	Disease with a constant presence or usual prevalence in a population within a geographic area
Hyperendemic .....	Disease that is persistent and has high levels of occurrence
Epidemic .....	Disease that shows an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area
Outbreak .....	Disease that has the same definition of epidemic, but is often used for a more limited geographic area
Cluster .....	Refers to an aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.
Pandemic .....	An epidemic that has spread over several countries or continents, usually affecting a large number of people

The map to the right shows the age-standardized mortality rate from all infectious diseases, both sexes, in 2014.<sup>60</sup>



<sup>57</sup> <https://www.dhhs.nh.gov/dphs/cdcs/index.htm>

<sup>58</sup> <https://www.webmd.com/a-to-z-guides/bacterial-and-viral-infections#1>

<sup>59</sup> <https://www.cdc.gov/ophs/csels/dsepd/ss1978/lesson1/section11.html>

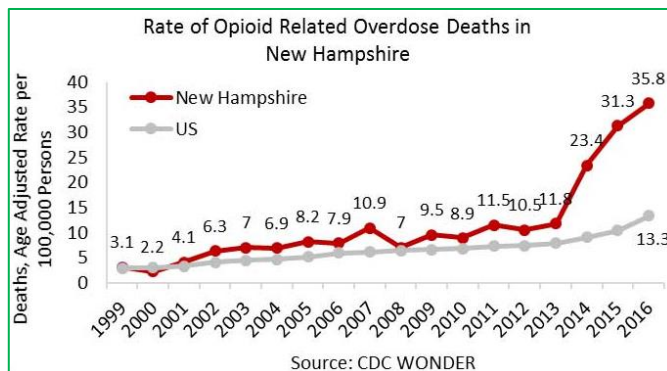
<sup>60</sup> <https://jamanetwork.com/journals/jama/fullarticle/2676111>



## Opioid Crisis

A revised report by the National Institute of Drug Abuse states, “Every day, more than 130 people in the United States die after overdosing on opioids. The misuse of and addiction to opioids—including prescription pain relievers, heroin, and synthetic opioids such as fentanyl - is a serious national crisis that affects public health as well as social and economic welfare. The Centers for Disease Control and Prevention estimates that the total “economic burden” of prescription opioid misuse alone in the United States is \$78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement.”

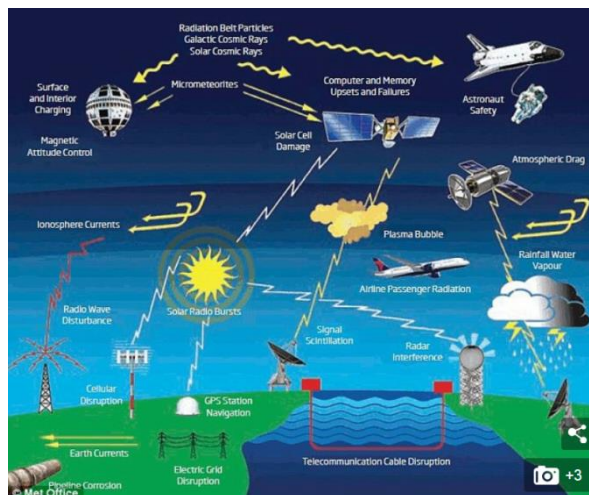
According to the National Institute on Drug Abuse, “New Hampshire has the second highest rate of opioid-related overdose deaths – a rate of 35.8 deaths per 100,000 persons – nearly 3 times higher than the national rate of 13.2 deaths per 100,000. From 2013 through 2016, opioid-related deaths in New Hampshire tripled. This increase was mainly driven by the number of deaths related to synthetic opioids (predominately fentanyl), which increased more than tenfold, from 30 to 363 deaths, during this time.”<sup>61</sup> The chart to the right shows the increase in opioid-related overdose deaths in New Hampshire compared to those in the US overall.<sup>62</sup>



## \*SOLAR STORM & SPACE WEATHER

When sudden amounts of stored magnetic energy and ions are discharged from the Sun’s surface, solar flares, high-speed solar wind streams, solar energetic particles and coronal mass ejections (CMEs) are possible. At times, this magnetic energy finds its way to Earth by following the Sun’s magnetic field. Then, upon collision with the Earth’s magnetic field, these charged particles enter the Earth’s upper atmosphere causing auroras.

Charged magnetic particles can produce their own magnetic field which can disrupt navigation and communication systems and GPS satellites and can potentially produce Geomagnetic Induced Currents (GICs) which can affect the power grid and pipelines. An electromagnetic surge from a solar storm has potential to produce an Electromagnetic Pulse (EMP) which could cause significant damage to infrastructure such as nuclear power plants, banking systems, the electrical grid, sewage treatment facilities, cell phones, landlines and even vehicles. The image above shows the potential impacts from solar storm and space weather.<sup>63</sup>



<sup>61</sup> <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/new-hampshire-opioid-summary>

<sup>62</sup> Ibid

<sup>63</sup> <https://www.dailymail.co.uk/sciencetech/article-3764842/A-solar-storm-destroy-planet-unless-create-massive-magnetic-shield-protect-Earth-warns-expert.html>

**Solar Storm & Space Weather Extent<sup>64</sup>**

Geomagnetic Storms				
Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
G 5	Extreme	<b>Power systems:</b> Widespread voltage control problems and protective system problems can occur; some grid systems may experience complete collapse or blackouts. Transformers may experience damage. <b>Spacecraft operations:</b> May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites. <b>Other systems:</b> Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).	Kp = 9	4 per cycle (4 days per cycle)
G 4	Severe	<b>Power systems:</b> Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. <b>Spacecraft operations:</b> May experience surface charging and tracking problems, corrections may be needed for orientation problems. <b>Other systems:</b> Induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).	Kp = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	<b>Power systems:</b> Voltage corrections may be required; false alarms triggered on some protection devices. <b>Spacecraft operations:</b> Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems. <b>Other systems:</b> Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).	Kp = 7	200 per cycle (130 days per cycle)
G 2	Moderate	<b>Power systems:</b> High-latitude power systems may experience voltage alarms; long-duration storms may cause transformer damage. <b>Spacecraft operations:</b> Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. <b>Other systems:</b> HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).	Kp = 6	600 per cycle (360 days per cycle)
G 1	Minor	<b>Power systems:</b> Weak power grid fluctuations can occur. <b>Spacecraft operations:</b> Minor impact on satellite operations possible. <b>Other systems:</b> Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).	Kp = 5	1700 per cycle (900 days per cycle)

Solar Radiation Storms				
Scale	Description	Effect	Physical Measure (Flux level of $\geq 10$ MeV particles)	Average Frequency (1 cycle = 11 years)
S 5	Extreme	<b>Biological:</b> Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. <b>Satellite operations:</b> Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible. <b>Other systems:</b> Complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.	$10^5$	Fewer than 1 per cycle
S 4	Severe	<b>Biological:</b> Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. <b>Satellite operations:</b> May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded. <b>Other systems:</b> Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	$10^4$	3 per cycle

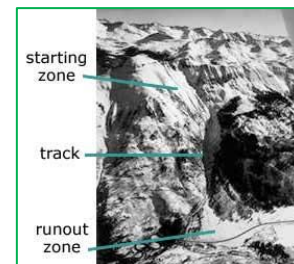
<sup>64</sup> Extent charts taken from <https://www.weather.gov/akq/SpaceWeather>

Solar Radiation Storms				
S 3	Strong	<b>Biological:</b> Radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. <b>Satellite operations:</b> Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely. <b>Other systems:</b> Degraded HF radio propagation through the polar regions and navigation position errors likely.	$10^{-3}$	10 per cycle
S 2	Moderate	<b>Biological:</b> Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk. <b>Satellite operations:</b> Infrequent single-event upsets possible. <b>Other systems:</b> Small effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.	$10^{-2}$	25 per cycle
S 1	Minor	<b>Biological:</b> None. <b>Satellite operations:</b> None. <b>Other systems:</b> Minor impacts on HF radio in the polar regions.	10	50 per cycle

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

## \*AVALANCHES

According to the National Snow & Ice Data Center “An avalanche is a rapid flow of snow down a hill or mountainside. Although avalanches can occur on any slope given the right conditions, certain times of the year and certain locations are naturally more dangerous than others. Wintertime, particularly from December to April, is when most avalanches tend to happen. However, avalanche fatalities have been recorded for every month of the year.”<sup>65</sup>



“All that is necessary for an avalanche is a mass of snow and a slope for it to slide down...A large avalanche in North America might release 230,000 cubic meters (300,000 cubic yards) of snow. That is the equivalent of 20 football fields filled 3 meters (10 feet) deep with snow. However, such large avalanches are often naturally released, when the snowpack becomes unstable and layers of snow begin to fail. Skiers and recreationalists usually trigger smaller, but often more deadly avalanches.”

North American Public Avalanche Danger Scale				
Avalanche danger is determined by the likelihood, size and distribution of avalanches.				
Danger Level		Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
5 Extreme		Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
4 High		Very dangerous avalanche conditions. Travel in avalanche terrain <u>not</u> recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 Considerable		Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 Moderate		Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 Low		Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.
Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.				

There are three main parts to an avalanche (see image above). The first and most unstable is the “starting zone”, where the snow can “fracture” and slide. “Typical starting zones are higher up on slopes. However, given the right conditions, snow can fracture at any point on the slope.”<sup>66</sup>

The second part is the “avalanche track”, or the downhill path that the avalanche follows. The avalanche is evident where large swaths of trees are missing or where there are large pile-ups of rock, snow, trees and debris at the bottom of an incline.

The third part of an avalanche is the “runout zone”. The runout zone is where the avalanche has come to a stop and left the largest and highest pile of snow and debris.

“Several factors may affect the likelihood of an avalanche, including weather, temperature, slope steepness, slope orientation (whether the slope is facing north or south), wind direction, terrain, vegetation and general snowpack conditions. Different combinations of these factors can create low, moderate, or extreme avalanche conditions. Some of these conditions, such as temperature and snowpack, can change on a daily or hourly basis.”<sup>67</sup>

<sup>65</sup> Copyright Richard Armstrong, NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>

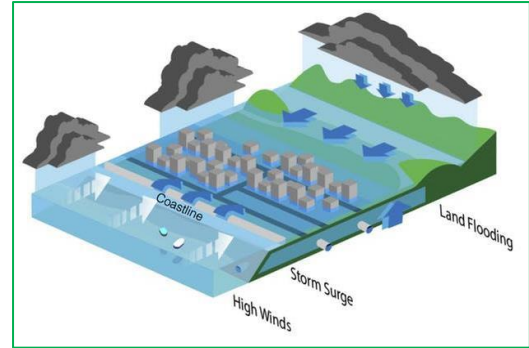
<sup>66</sup> NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>; image credit: Betsy Armstrong

<sup>67</sup> Copyright Richard Armstrong, NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>

When the possibility of an avalanche is evident, an “avalanche advisory” is issued. This preliminary notification warns hikers, skiers, snowmobilers and responders that conditions may be favorable for the development of avalanches. The chart above shows avalanche danger as determined by likelihood, size & distribution.<sup>68</sup>

### COASTAL FLOODING

Coastal areas are particularly susceptible to the hazards such as flooding, erosion, storm surge and sea-level rise as a result of tropical and post-tropical cyclones, heavy rain events and gale-force winds and other natural phenomena. The flooding that results is “determined by a combination of several factors such as storm intensity, forward speed, storm area size, coastline characteristics, angle of approach to the coast, tide height.”<sup>69</sup>



The severity of the flooding can vary depending on “both the speed of onset (how quickly the floodwaters rise) and the flood duration. Nor’easters can impact the region for several days and produce storm surge with or without the addition of inland runoff from heavy precipitation.”<sup>70</sup> As shown in the image above, not only storm surge but also inland flooding can affect the severity of flooding along the shore.<sup>71</sup>

<sup>68</sup> [http://www.avalanche.org/danger\\_card.php](http://www.avalanche.org/danger_card.php)

<sup>69</sup> NH Multi-hazard Mitigation Plan-2018, page 55

<sup>70</sup> Ibid

<sup>71</sup> Ibid, page 53, “Understanding compound flooding from land and ocean sources”, Theodore Scontras, University of Maine)

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**APPENDIX D: NH MAJOR DISASTER & EMERGENCY DECLARATIONS****Major Disaster (DR) & Emergency Declarations (EM)**

This list includes one Fire Management Assistance Declaration (FM)  
 Declarations are arranged chronologically, the most recent disaster is listed first

Number	Hazard	Date of Event	Counties	Description
DR-4457	Severe Storm & Flooding	July 11-12, 2019	Grafton	<b>Major Disaster Declaration, DR-4457:</b> The Federal Emergency Management Agency announced a major disaster declaration for a period of severe storms and flooding from July 11-12, 2019 in one New Hampshire County.
DR-4371	Severe Winter Storm & Snowstorm	March 13-14, 2018	Carroll, Strafford & Rockingham	<b>Major Disaster Declaration, DR 4371:</b> The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018 for a period of a severe winter storm from March 13-14, 2018.
DR-4370	Severe Storm & Flooding	March 2-8, 2018	Rockingham	<b>Major Disaster Declaration, DR 4370:</b> The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018 for a period of severe storms and flooding from March 2-8, 2018.
DR-4355	Severe Storms, Flooding	October 29-November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	<b>Major Disaster Declaration, DR-4355:</b> The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the State of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from October 29-November 1, 2017 in five New Hampshire Counties.
DR-4329	Severe Storms, Flooding	July 1-2, 2017	Grafton & Coos	<b>Major Disaster Declaration DR-4329:</b> The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the State of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from July 1, 2017 to July 2, 2017 in Grafton County
DR-4316	Severe Winter Storm and Snowstorm	March 14-15, 2017	Belknap & Carroll	<b>Major Disaster Declaration DR-4316:</b> Severe winter storm and snowstorm in Belknap & Carroll Counties; disaster aid to supplement state and local recovery efforts.
FM-5123	Forest Fire	April 21-23, 2016	Cheshire	<b>Fire Management Assistance Declaration, FM-5123: Stoddard, NH</b>
DR-4209	Severe Winter Storm and Snowstorm	January 26-28, 2015	Hillsborough, Rockingham & Stafford	<b>Major Disaster Declaration DR-4209:</b> Severe winter storm and snowstorm in Hillsborough, Rockingham and Strafford Counties; disaster aid to supplement state and local recovery efforts.
DR-4139	Severe Storms, Flooding	July 9-10, 2013	Cheshire, Sullivan & Grafton	<b>Major Disaster Declaration DR-4139:</b> Severe storms, flooding, and landslides during the period of June 26 to July 3, 2013 in Cheshire, Sullivan and southern Grafton Counties.
DR-4105	Severe Winter Storm	February 8, 2013	All Ten NH Counties	<b>Major Disaster Declaration DR-4105:</b> Nemo; heavy snow in February 2013.
DR-4095	Hurricane Sandy	October 26-November 8, 2012	Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan	<b>Major Disaster Declaration DR-4095:</b> The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides and flooding over the period of October 26-November 8, 2012.



Number	Hazard	Date of Event	Counties	Description
EM-3360	Hurricane Sandy	October 26-31, 2012	All Ten NH Counties	<b>Emergency Declaration EM-3360:</b> Hurricane Sandy came ashore in NJ and brought high winds, power outages and heavy rain to NH. Declared in all ten counties in the State of New Hampshire.
DR-4065	Severe Storm & Flooding	May 29-31, 2012	Cheshire	<b>Major Disaster Declaration DR-4065:</b> Severe Storm and Flood Event May 29-31, 2012 in Cheshire County.
DR-4049	Severe Storm & Snowstorm	October 29-30, 2011	Hillsborough & Rockingham	<b>Major Disaster Declaration DR-4049:</b> Severe Storm and Snowstorm Event October 29-30, 2011 in Hillsborough and Rockingham Counties.
EM-3344	Severe Snowstorm	October 29-30, 2011	All Ten NH Counties	<b>Emergency Declaration EM-3344:</b> Severe storm during the period of October 29-30, 2011; all ten counties in the State of New Hampshire. (Snowtober)
DR-4026	Tropical Storm Irene	August 26-September 6, 2011	Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	<b>Major Disaster Declaration DR-4026:</b> Tropical Storm Irene Aug 26th- Sept 6, 2011 in Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan Counties.
EM-3333	Tropical Storm Irene	August 26-September 6, 2011	All Ten NH Counties	<b>Emergency Declaration EM-3333:</b> Emergency Declaration for Tropical Storm Irene for in all ten counties.
DR-4006	Severe Storm & Flooding	May 26-30, 2011	Coos & Grafton Counties	<b>Major Disaster Declaration DR-4006:</b> May Flooding Event, May 26th-30th 2011 in Coos & Grafton County. (Memorial Day Weekend Storm)
DR-1913	Severe Storms & Flooding	March 14-31, 2010	Hillsborough & Rockingham	<b>Major Disaster Declaration DR-1913:</b> Flooding to two NH counties including Hillsborough and Rockingham counties.
DR-1892	Severe Winter Storm, Rain & Flooding	February 23 - March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	<b>Major Disaster Declaration: DR-1892:</b> Flood and wind damage to most of southern NH including six counties; 330,000 homes without power; more than \$2 million obligated by June 2010.
DR-1812	Severe Winter Storm & Ice Storm	December 11-23, 2008	All Ten NH Counties	<b>Major Disaster Declaration DR-1812:</b> Damaging ice storms to entire state including all ten NH counties; fallen trees and large scale power outages; five months after December's ice storm pummeled the region, nearly \$15 million in federal aid had been obligated by May 2009.
EM-3297	Severe Winter Storm	December 11, 2008	All Ten NH Counties	<b>Emergency Declaration EM-3297:</b> Severe winter storm beginning on December 11, 2008.
DR-1799	Severe Storms & Flooding	September 6-7, 2008	Hillsborough	<b>Major Disaster Declaration: DR-1799:</b> Severe storms and flooding beginning on September 6-7, 2008.
DR-1787	Severe Storms & Flooding	July 24-August 14, 2008	Belknap, Carroll & Grafton & Coos	<b>Major Disaster Declaration DR-1787:</b> Severe storms, tornado, and flooding on July 24, 2008.

Number	Hazard	Date of Event	Counties	Description
DR-1782	Severe Storms, Tornado, & Flooding	July 24, 2008	Belknap, Carroll, Merrimack, Strafford & Rockingham	<b>Major Disaster Declaration DR-1782:</b> Tornado damage to several NH counties.
DR-1695	Nor'easter, Severe Storms & Flooding	April 15-23, 2007	All Ten NH Counties	<b>Major Disaster Declaration DR-1695:</b> Flood damages; FEMA & SBA obligated more than \$27.9 million in disaster aid following the April nor'easter. (Tax Day Storm)
DR-1643	Severe Storms & Flooding	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	<b>Major Disaster Declaration DR-1643:</b> Flooding in most of southern NH; May 12-23, 2006. (Mother's Day Storm)
DR-1610	Severe Storms & Flooding	October 7-18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack & Sullivan	<b>Major Disaster Declaration DR-1610:</b> To date, state and federal disaster assistance has reached more than \$3 million to help residents and business owners in New Hampshire recover from losses resulting from the severe storms and flooding in October 2015.
EM-3258	Hurricane Katrina Evacuation	August 29-October 1, 2005	All Ten NH Counties	<b>Emergency Declaration EM-3258:</b> Assistance to evacuees from the area struck by Hurricane Katrina and to provide emergency assistance to those areas beginning on August 29, 2005, and continuing; The President's action makes Federal funding available to the state and all 10 counties of the State of New Hampshire.
EM-3211	Snow	March 11-12, 2005	Carroll, Cheshire, Hillsborough, Rockingham & Sullivan	<b>Emergency Declaration EM-3211:</b> March snowstorm; more than \$2 million has been approved to help pay for costs of the snow removal; Total aid for the March storm is <b>\$2,112,182.01</b> (Carroll: \$73,964.57; Cheshire: \$118,902.51; Hillsborough: \$710,836; Rockingham: \$445,888.99; Sullivan: \$65,088.53; State of NH: \$697,501.41)
EM-3208	Snow	February 10-11, 2005	Carroll, Cheshire, Coos, Grafton & Sullivan	<b>Emergency Declaration EM-3208:</b> FEMA had obligated more than \$1 million by March 2005 to help pay for costs of the heavy snow and high winds; Total aid for the February storm is <b>\$1,121,727.20</b> (Carroll: \$91,832.72; Cheshire: \$11,002.18; Coos: \$11,6508.10; Grafton: \$213,539.52; Sullivan: \$68,288.90; State of NH: \$521,536.78)
EM 3208-002	Snow	Winter of 2005	All Ten NH Counties	<b>EM 3208-002:</b> The Federal Emergency Management Agency (FEMA) has obligated more than \$6.5 million to reimburse state and local governments in New Hampshire for costs incurred in three snowstorms that hit the state earlier this year, according to disaster recovery officials. Total aid for all three storms is \$6,892,023.87 (January: \$3,658,114.66; February: \$1,121,727.20; March: \$2,113,182.01)

Number	Hazard	Date of Event	Counties	Description
EM-3207	Snow	January 22-23, 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan	<b>Emergency Declaration EM-3207:</b> More than \$3.5 million has been approved to help pay for costs of the heavy snow and high winds; Total aid for the January storm is <b>\$3,658,114.66</b> (Belknap: \$125,668.09; Carroll: \$52,864.23; Cheshire: \$134,830.95; Grafton: \$137,118.71; Hillsborough: \$848,606.68; Merrimack: \$315,936.55; Rockingham: \$679,628.10; Strafford: \$207,198.96; Sullivan: \$48,835.80; State of NH: \$1,107,426.59)
EM-3193	Snow	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	<b>Emergency Declaration EM-3193:</b> The declaration covers jurisdictions with record and near-record snowfall that occurred over the period of December 6-7, 2003
DR-1489	Severe Storms & Flooding	July 21-August 18, 2003	Cheshire & Sullivan	<b>Major Disaster Declaration DR-1489:</b> Floods stemming from persistent rainfall and severe storms that caused damage to public property occurring over the period of July 21 through August 18, 2003.
EM-3177	Snowstorm	February 17-18, 2003	Cheshire, Hillsborough, Merrimack, Rockingham & Strafford	<b>Emergency Declaration EM-3177:</b> Declaration covers jurisdictions with record and near-record snowfall from the snowstorm that occurred February 17-18, 2003
EM-3166	Snowstorm	March 5-7, 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	<b>Emergency Declaration EM-3166:</b> Declaration covers jurisdictions with record and near-record snowfall from the late winter storm that occurred March 2001
DR-1305	Tropical Storm Floyd	September 16-18, 1999	Belknap, Cheshire & Grafton	<b>Major Disaster Declaration DR-1305:</b> The declaration covers damage to public property from the storm that spawned heavy rains, high winds and flooding over the period of September 16-18.
DR-1231	Severe Storms & Flooding	June 12-July 2, 1998	Belknap, Carroll, Grafton, Hillsborough, Merrimack & Rockingham	<b>Major Disaster Declaration DR-1231:</b>
DR-1199	Ice Storm	January 7-25, 1998	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford & Sullivan	<b>Major Disaster Declaration DR-1199:</b>
DR-1144	Severe Storms/Flooding	October 20-23, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	<b>Major Disaster Declaration DR-1144:</b>
DR-1077	Storms/Floods	October 20-November 15, 1995	Carroll, Cheshire, Coos, Grafton, Merrimack & Sullivan	<b>Major Disaster Declaration DR-1077:</b>

Number	Hazard	Date of Event	Counties	Description
EM-3101	High Winds & Record Snowfall	March 13-17, 1994	All Ten NH Counties	Emergency Declaration EM-3101:
DR-923	Severe Coastal Storm	October 30-31, 1991	Rockingham	Major Disaster Declaration DR-923:
DR-917	Hurricane Bob, Severe Storm	August 18-20, 1991	Carroll, Hillsborough, Rockingham & Strafford	Major Disaster Declaration DR-917:
DR-876	Flooding, Severe Storm	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Sullivan	Major Disaster Declaration DR-876:
DR-789	Severe Storms & Flooding	March 30-April 11, 1987	Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-789
DR-771	Severe Storms & Flooding	July 29-August 10, 1986	Cheshire, Hillsborough & Sullivan	Major Disaster Declaration DR-771:
EM-3073	Flooding	March 15, 1979	Coos	Emergency Declaration EM-3073:
DR-549	High Winds, Tidal Surge, Coastal Flooding & Snow	February 16, 1978	All Ten NH Counties	Major Disaster Declaration DR-549: Blizzard of 1978
DR-411	Heavy Rains, Flooding	January 21, 1974	Belknap, Carroll, Cheshire & Grafton	Major Disaster Declaration DR-411:
DR-399	Severe Storms & Flooding	July 11, 1973	All Ten NH Counties	Major Disaster Declaration DR-399:
DR-327	Coastal Storms	March 18, 1972	Rockingham	Major Disaster Declaration DR-327:
DR-11	Forest Fire	July 2, 1953	Carroll	Major Disaster Declaration DR-11:

**Source:**

Disaster Declarations for New Hampshire

[http://www.fema.gov/disasters/grid/state-tribal-government/33?field\\_disaster\\_type\\_term\\_tid\\_1=All](http://www.fema.gov/disasters/grid/state-tribal-government/33?field_disaster_type_term_tid_1=All)

**APPENDIX E: ACRONYMS****Hazard Mitigation Planning  
List of Acronyms**

ACS .....	American Community Survey (Census)
BFE .....	Base Flood Elevation
BOCA .....	Building Officials and Code Administrators International
CIKR .....	Critical Infrastructure & Key Resources
CIP .....	Capital Improvements Program
CWPP .....	Community Wildfire Protection Plan
EMD .....	Emergency Management Director
EMS .....	Emergency Medical Services
EOC .....	Emergency Operations Center
ERF .....	Emergency Response Facility
FEMA .....	Federal Emergency Management Agency
FIRM .....	Flood Insurance Rate Map
FPP .....	Facilities & Populations to Protect
GIS .....	Geographic Information System
HFRA .....	Healthy Forest Restoration Act
HMGP .....	Hazard Mitigation Grant Program
ICS .....	Incident Command System
LEOP .....	Local Emergency Operations Plan
MOU .....	Memorandum of Understanding
NOAA .....	National Oceanic and Atmospheric Association
NSSL .....	National Severe Storms Laboratory (NOAA)
MAPS .....	Mapping and Planning Solutions
NERF .....	Non-Emergency Response Facility
NFIP .....	National Flood Insurance Program
NGVD .....	National Geodetic Vertical Datum of 1929
NH DNCR .....	NH Department of Natural & Cultural Resources
NH DOT .....	NH Department of Transportation
NH HSEM .....	NH Homeland Security & Emergency Management
NH OSI .....	NH Office of Strategic Initiatives (formerly OEP)
NIMS .....	National Incident Management System
PR .....	Potential Resources
SPNHF .....	Society for the Protection of New Hampshire Forests
USDA .....	US Department of Agriculture
USDA-FS .....	USDA-Forest Service
USGS .....	United States Geological Society
WMNF .....	White Mountain National Forest
WUI .....	Wildland Urban Interface

**APPENDIX F: POTENTIAL MITIGATION IDEAS<sup>72</sup>****Drought**

- D1 ..... Assess Vulnerability to Drought Risk
- D2 ..... Monitoring Drought Conditions
- D3 ..... Monitor Water Supply
- D4 ..... Plan for Drought
- D5 ..... Require Water Conservation during Drought Conditions
- D6 ..... Prevent Overgrazing
- D7 ..... Retrofit Water Supply Systems
- D8 ..... Enhance Landscaping & Design Measures
- D9 ..... Educate Residents on Water Saving Techniques
- D10 .... Educate Farmers on Soil & Water Conservation Practices
- D11 .... Purchase Crop Insurance

**Earthquake**

- EQ1 ... Adopt & Enforce Building Codes
- EQ2 ... Incorporate Earthquake Mitigation into Local Planning
- EQ3 ... Map & Assess Community Vulnerability to Seismic Hazards
- EQ4 ... Conduct Inspections of Building Safety
- EQ5 ... Protect Critical Facilities & Infrastructure
- EQ6 ... Implement Structural Mitigation Techniques
- EQ7 ... Increase Earthquake Risk Awareness
- EQ8 ... Conduct Outreach to Builders, Architects, Engineers and Inspectors
- EQ9 ... Provide Information on Structural & Non-Structural Retrofitting

**Erosion**

- ER1 ... Map & Assess Vulnerability to Erosion
- ER2 ... Manage Development in Erosion Hazard Areas
- ER3 ... Promote or Require Site & Building Design Standards to Minimize Erosion Risk
- ER4 ... Remove Existing Buildings & Infrastructure from Erosion Hazard Areas
- ER5 ... Stabilize Erosion Hazard Areas
- ER6 ... Increase Awareness of Erosion Hazards

**Extreme Temperatures**

- ET1 .... Reduce Urban Heat Island Effect
- ET2 .... Increase Awareness of Extreme Temperature Risk & Safety
- ET3 .... Assist Vulnerable Populations
- ET4 .... Educate Property Owners about Freezing Pipes

**Hailstorm**

- HA1 .... Locate Safe Rooms to Minimize Damage
- HA2 .... Protect Buildings from Hail Damage
- HA3 .... Increase Hail Risk Awareness

**Landslide**

- LS1 .... Map & Assess Vulnerability to Landslides
- LS2 .... Manage Development in Landslide Hazard Areas
- LS3 .... Prevent Impacts to Roadways
- LS4 .... Remove Existing Buildings & Infrastructure from Landslide

**Lightning**

- L1 ..... Protect Critical Facilities
- L2 ..... Conduct Lightning Awareness Programs

**Flood**

- F1 ..... Incorporate Flood Mitigation in Local Planning
- F2 ..... Form Partnerships to Support Floodplain Management
- F3 ..... Limit or Restrict Development in Floodplain Areas
- F4 ..... Adopt & Enforce Building Codes and Development Standards
- F5 ..... Improve Stormwater Management Planning
- F6 ..... Adopt Policies to Reduce Stormwater Runoff
- F7 ..... Improve Flood Risk Assessment
- F8 ..... Join or Improve Compliance with NFIP
- F9 ..... Manage the Floodplain beyond Minimum Requirements
- F10 .... Participate in the CRS
- F11 .... Establish Local Funding Mechanism for Flood Mitigation
- F12 .... Remove Existing Structures from Flood Hazard Areas
- F13 .... Improve Stormwater Drainage System Capacity
- F14 .... Conduct Regular Maintenance for Drainage Systems & Flood Control Structures
- F15 .... Elevate or Retrofit Structures & Utilities
- F16 .... Flood proof Residential & Non-Residential Structures
- F17 .... Protect Infrastructure
- F18 .... Protect Critical Facilities
- F19 .... Construct Flood Control Measures
- F20 .... Protect & Restore Natural Flood Mitigation Features
- F21 .... Preserve Floodplains as Open Space
- F22 .... Increase Awareness of Flood Risk & Safety
- F23 .... Educate Property Owners about Flood Mitigation Techniques

**Severe Wind**

- SW1 ... Adopt & Enforce Building Codes
- SW2 ... Promote or Require Site & Building Design Standards to Minimize Wind Damage
- SW3 ... Assess Vulnerability to Severe Wind
- SW4 ... Protect Power Lines & Infrastructure
- SW5 ... Retrofit Residential Buildings
- SW6 ... Retrofit Public Buildings & Critical Facilities
- SW7 ... Increase Severe Wind Awareness

**Severe Winter Weather**

- WW1.. Adopt & Enforce Building Codes
- WW2.. Protect Buildings & Infrastructure
- WW3.. Protect Power Lines
- WW4.. Reduce Impacts to Roadways
- WW5.. Conduct Winter Weather Risk Awareness Activities
- WW6.. Assist Vulnerable Populations

**Tornado**

- T1 ..... Encourage Construction of Safe Rooms
- T2 ..... Require Wind-Resistant Building Techniques
- T2 ..... Conduct Tornado Awareness Activities

<sup>72</sup> Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013

**Wildfire**

- WF1 ... Map & Assess Vulnerability to Wildfire
- WF2 ... Incorporate Wildfire Mitigation in the Comprehensive Plan
- WF3 ... Reduce Risk through Land Use Planning
- WF4 ... Develop a Wildland Urban Interface Code
- WF5 ... Require or Encourage Fire-Resistant Construction Techniques
- WF6 ... Retrofit At-Risk Structure with Ignition-Resistant Materials
- WF7 ... Create Defensible Space around Structures & Infrastructure
- WF8 ... Conduct Maintenance to Reduce Risk
- WF9 ... Implement a Fuels Management Program
- WF10. Participate in the Firewise® Program
- WF11 . Increase Wildfire Awareness
- WF12. Educate Property Owners about Wildfire Mitigation Techniques

**Multi-Hazards**

- MU1 ... Assess Community Risk
- MU2 ... Map Community Risk
- MU3 ... Prevent Development in Hazard Areas
- MU4 ... Adopt Regulations in Hazard Areas
- MU5 ... Limit Density in Hazard Areas
- MU6 ... Integrate Mitigation into Local Planning
- MU7 ... Strengthen Land Use Regulations
- MU8 ... Adopt & Enforce Building Codes
- MU9 ... Create Local Mechanisms for Hazard Mitigation
- MU10 . Incentivize Hazard Mitigation
- MU11 . Monitor Mitigation Plan Implementation
- MU12 . Protect Structures
- MU13 . Protect Infrastructure & Critical Facilities
- MU14 . Increase Hazard Education & Risk Awareness
- MU15 . Improve Household Disaster Preparedness
- MU16 Promote Private Mitigation Efforts



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*Jackson Village  
Photo Credit: The Wentworth Inn*

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