

STODDARD HAZARD MITIGATION PLAN UPDATE 2019

Stoddard, New Hampshire

FEMA Approval (add date)



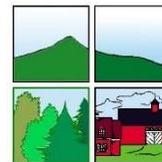
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Prepared by the:

**Town of Stoddard Hazard Mitigation Committee
&
Southwest Region Planning Commission
www.swrpc.org**



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Executive Summary

The Stoddard Hazard Mitigation Plan serves as a means to reduce losses from future natural or man - made hazard events. The Plan was developed by the Stoddard Hazard Mitigation Committee and contains statements of policy adopted by the Board of Selectmen.

Natural hazards are addressed as follows:

- Flooding
- Tornado, Downburst, Severe Wind
- Wildfire
- Hurricane/Tropical Storm
- Severe Winter Weather
- Drought
- Extreme Temperatures
- Earthquakes
- Lightning
- Hazardous Materials
- Dam Failure/Breach

The Stoddard Hazard Mitigation Committee identified “Critical Facilities” as follows:

Critical Facilities

- Emergency Operations Center
- Fire Station
- Police Station
- Dry Hydrants/Fire Ponds/Water Sources
- Evacuation Routes & Bridges (Primary)
- Town Hall
- School
- Communications
- Helicopter Landing Sites
- Emergency Shelters (not Red Cross approved)
- Water Supplies
- Problem Culverts
- Special Needs Populations
- Recreation Areas
- Schools/Daycare
- Historic Buildings/Sites
- Hospital/Medical Supplies
- Gas
- Heavy/Small Equipment
- Snow Removal Services

The Stoddard Hazard Mitigation Committee identified existing hazard mitigation programs as follows:

- National Flood Insurance Program
- School Evacuation Plan
- Emergency Back-up Power
- Local Road Design Standards
- Local Bridge Maintenance Program
- Local Road Maintenance Program
- Winter Storm Operation Plan
- Town Master Plan
- Mutual Aid – Police and Fire
- Fire Pond Program
- Hazardous Materials Spill Prevention Control & Counter Measures Plan
- Town Radio System
- Wild Water Fowl Feeding Prevention Program
- Ambulance
- Fire Warden
- Emergency Services
- Emergency Operations Plan

The Committee prioritized identified hazard mitigation strategies as follows:

Replace and upsize the culvert on Shedd Hill at Carr Road.

Replace and upsize the culvert on Old Forest Road.

Obtain generators for the Town Hall/Office and install a hook - up in the Police Department. Obtain a 15 kw portable generator on wheels.

Keep communications open with NHDES regarding balance of outflow and inflow of floodwaters of Island Pond.

Maintain ditches along Juniper Hill Road and Old Forest Road.

Develop town-sponsored safety awareness program for public workers and public buildings.

Maintain compliance with NIMS training for EMS, EMD, Fire Department, Police, Town Officials.

Provide outreach & education for residents about protecting their homes from wildfires, namely cleaning pine needles off of roofs, cleaning gutters, clearing brush away from homes, putting addresses on homes, etc. (website, newsletter, events).

Update the Emergency Operations Plan.

Conduct fuel load monitoring after severe weather events to prevent wildfires.

North Shore Road: Communicate with Granite Lake Village District Commissioners regarding Dam control.

Communicate with NH Dam Bureau to notify the Stoddard Fire Department prior to water draw downs.

Increase the size of culverts to prevent flooding on King's Highway (2 Locations). Consider raising the road.

Add this plan as a chapter or appendix in the Master Plan.

Continue to communicate with NHDOT to improve maintenance of culverts and shoulders along NH 123 south of NH 9.

Continue to train members of the Fire Department to identify and secure HazMat incidents.

Replace and upsize the culvert on North Shore Road.

Maintain vegetation management of trees over roads.

Develop a town warning system (digital sign, website, etc.).

Consider amending the local road design standards to incorporate access management and sight-line standards.

Maintain communication between Selectboard and State to raise lake level by replacing boards.

CHAPTER 1

INTRODUCTION

Purpose

The Stoddard Hazard Mitigation Plan Update 2019 is a planning tool to be used by the Town of Stoddard, as well as other local, state and federal governments, in their efforts to reduce the effects from natural and man-made hazards. This plan does not constitute any sections of Stoddard's Master Plan or Town Ordinances.

Authority

This Multi-Hazard Mitigation Plan was prepared pursuant to Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, herein enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA) (P.L. 106-390). This Act provides new and revitalized approaches to mitigation planning. Section 322 of DMA 2000 emphasizes the need for State, local and tribal entities to closely coordinate mitigation planning and implementation efforts. The development and periodic update of this plan satisfies the planning requirements of the DMA which amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Funding Source

This Plan was funded by the NH Homeland Security and Emergency Management, with grants from FEMA's Pre-disaster Mitigation Program. The Town of Stoddard provided in-kind service with the hours of attendance of members of the Hazard Mitigation Team throughout this process.

Scope of the Plan

The scope of this Plan includes the identification of past and potential natural and manmade hazards affecting the Town of Stoddard, the determination of vulnerability of existing and future structures to the identified potential hazards, and the identification and discussion of new strategies aimed at mitigating the likely effects of potential hazards before they occur.

Methodology

Using the Local Hazard Mitigation Planning Handbook, the Stoddard Hazard Mitigation Committee developed the content of the Stoddard Hazard Mitigation Plan by following tasks set forth in the handbook. The Committee held monthly meetings, open to the public, in order to develop the Plan.

Task 1: Determine the Planning Area & Resources: This task was conducted by town staff and the Regional Planning Commission. The results of this research were shared with the Committee and can be found in Chapter 2, "Community Profile".

Task 2: Building the Planning Team: The Emergency Management Director contacted town officials, department heads, and residents who might wish to volunteer their time and serve on a committee. The Stoddard Board of Selectmen appointed the committee members.

Task 3: Create an Outreach Program: This task was used throughout the plan and is a vital part of the plan's success. Many of the proposed actions involve a community outreach component for individuals to use as a means to reduce the risk of loss of life and property from future natural and man-made hazards.

Task 4: Review Community Capabilities: The Committee brainstormed on the type of hazards and locations that have sustained damage or could be susceptible to each hazard within the town. The results were the Hazard Identification Map, which can be found at the end of the plan.

The Committee then identified and catalogued all of the critical facilities within the town. The result is found in Chapter 6 with a location map at the end of the plan.

Task 5: Conduct a Risk Assessment: The Committee conducted several assessments to help determine the gaps in coverage. These include Vulnerability Assessments and Assessing Probability, Severity, and Risk. In addition to the assessments, the existing mitigation strategies were reviewed to determine where gaps in coverage exist and areas that need improvement.

Task 6: Develop a Mitigation Strategy: The Committee identified plans and policies that are already in place to reduce the effects of man-made and natural hazards. Then the Committee evaluated the effectiveness of the existing measures to identify where they can be improved. The Committee then developed the Mitigation Action Plan, which is a clear strategy that outlines who is responsible for implementing each project, as well as when and how the actions will be implemented, and the funding source.

Task 7: Keep the Plan Current: It is important to the Town of Stoddard that this plan be monitored and updated annually or after a presidentially declared disaster. Chapter 10 addresses this issue.

Task 8: Review & Adopt the Plan: The Committee members reviewed and approved each section of the plan as it was completed. After acceptance by the Committee, the Plan was submitted to the New Hampshire Homeland Security and Emergency Management (HSEM) for review and Approval Pending Adoption. At a public meeting, the Board of Selectmen formally adopted the plan on (date). The plan was then granted formal approval by HSEM (date) and the Formal Approval letter from the Federal Emergency Management Agency (FEMA) was received on (date).

Task 9: Create a Safe & Resilient Community: The committee discussed the mitigation actions in the Action Plan and the ways in which the implementation of the actions will be beneficial to the community. Annual reviews of the Action Plan by the committee are needed to maintain the timeframes identified for completion of activities. Incorporation of the Action Plan into other land use plans and the Capital Improvement Plan help to ensure that the goals of the plan are met. Implementation of the actions prior to a hazardous event can be funded through a variety of resources found at the end of this plan in Appendix D.

A final draft of this Hazard Mitigation Plan was made available to the Committee and the public for review and comment. The document was also provided to the NH Homeland Security and Emergency Management for their review and comment.

Public Committee Meetings

Working committee meetings were held at Stoddard Town Offices on the following dates: August 22, September 26, December 5, 2018, and January 16, 2019.

An email was sent to each committee member, prior to each meeting that contained information from the previous meeting, an agenda (Appendix E), and information to be covered. Agendas were posted at the Town Office to encourage public participation.

Public Participation:

An article was printed in the Southwest Region Planning Commission Newsletter prior to the first meeting to inform the members of the community as well as surrounding communities and other stakeholders interested in participating in this plan update. Copies of the newsletter were sent to the 34 towns within the region, the County Office, businesses, and other interested parties. It was also available on the Southwest Region Planning Commission website. In addition to the SWRPC newsletter and website, an email of the SWRPC Happenings was sent to approximately 430 addresses, including neighboring communities, counties, businesses, and academia. The email contains notices of public meetings and events. A copy of this mailing is included in Appendix E.

A copy of the draft plan was made available for public review and input at the Town Office from April 30 - May 11, 2018. In addition, the draft plan was also available for public viewing on the town website to reach a broad range of interested parties. A copy of the public notice can be found in Appendix E. There were no comments from the public received during the drafting stage of the plan as well as following the public viewing period.

The public will be invited to participate in the annual reviews and future updates by a notice in the local town webpage and by public notice at the Town Office.

Resource List for Hazard Mitigation Committee

Stoddard's EMD, or designee, reviewed and coordinated with the following agencies in order to determine if any conflicts existed or if there were any potential areas for cooperation. All agencies mentioned below were contacted by Stoddard's EMD, or designee, and either attended committee work sessions or provided valuable input and guidance through telephone conversation or printed data. Training support has been offered by some of those on this resource list.

New Hampshire Homeland Security and Emergency Management:

33 Hazen Drive 1-800-852-3792
Concord, NH 03305

Field Representative: Heather Dunkerley
State Hazard Mitigation Planner: Kayla Henderson

New Hampshire Department of Transportation:

John Kallfelz (District 4) Swanzey, NH 03446 352-2302

Eversource Utility:

Laurel Boivin Keene, NH 357-7309 Ext. 5115

New Hampshire Department of Environmental Services-Dam Bureau

Nancy Baillargeon 271-3406

Plan Updates

During the planning process, the Committee reviewed relevant portions of the previous hazard mitigation plan and updated those portions accordingly. Unchanged sections were incorporated into this Plan while other sections were amended to reflect changes. Particular attention was given to the previous mitigation strategies that have been completed to give a status update on those that remain on the list. The previous

plan was used as a basis to begin the update. Amendments were made in each chapter to reflect changes that have occurred during the five year period. Included in the changes were:

- Ch. 1 – Introduction - updated Methodology, Acknowledgements, etc., and added Plan Updates;
- Ch. 2 - Community Profile - NFIP policies updated, added Continued Compliance with NFIP;
- Ch. 3 - Hazard Identification - updated hazards and their location, updated the Hazards Map;
- Ch. 4 - Assessing Probability, Severity, and Risk - updated risk assessment;
- Ch. 5 - Vulnerability Assessment - estimated potential losses;
- Ch. 6 - Critical Facilities - updated locations;
- Ch. 7 - Existing Mitigation Strategies and Proposed Improvements - updated chart and other data, updated chart for Status of Previous Mitigation Action Items;
- Ch. 8 - Proposed Mitigation Strategies - updated STAPLEE chart;
- Ch. 9 - Prioritized Implementation Schedule - updated Action Plan;
- Ch. 10 - Adoption, Implementation, Monitoring and Updates - Adoption certificate, updated information;
- Appendices - agendas, resources, public documentation.

This update was prepared with assistance from professional planners at Southwest Region Planning Commission trained in Hazard Mitigation Planning. Data and maps used to prepare this plan are available at their office and should be used in preparing future updates.

Acknowledgements

The Stoddard Board of Selectmen extends special thanks to the Stoddard Hazard Mitigation Committee:

Daniel Eaton, *Stoddard Emergency Management Director*
George Preston, *Stoddard Emergency Management Director*
Robert Fee, *Stoddard Selectmen*
Stephen McGerty, *Stoddard Fire Chief*
Brian Michaud, *Stoddard Fire Captain*
David Vaillancourt, *Stoddard Police Chief & Road Agent*

The Stoddard Board of Selectmen offers thanks to the New Hampshire Homeland Security and Emergency Management for developing the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018 (<http://www.nh.gov/safety/divisions/hsem/HazardMitigation/documents/hazard-mitigation-plan.pdf>) which served as a model for this plan. In addition, special thanks are extended to the staff of the Southwest Region Planning Commission for professional services, process facilitation and preparation of this document.

FEMA final approval granted on (add date). The Hazard Mitigation Plan must be updated within five years of this date.

Hazard Mitigation Goals

The Stoddard Hazard Mitigation Committee reviewed the goals set forth in the New Hampshire Multi-Hazard Mitigation Plan Update 2018. The committee generally concurs with those goals and made minor modifications to better meet the Town's goals.

Town of Stoddard, NH

The overall Goals of the Town of Stoddard with respect to Hazard Mitigation are stipulated here:

1. To improve upon the protection of the general population, the citizens of the Town of Stoddard and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the Town of Stoddard's Emergency Response Services, Critical Facilities, and infrastructure.
3. To reduce the potential impact of natural and man-made disasters on the Town of Stoddard's economy, natural resources, historic/cultural treasures, and private property.
4. To improve the Town of Stoddard's Emergency Preparedness and Disaster Response and Recovery Capability.
5. To reduce the Town of Stoddard's risk with respect to natural and man-made hazards through community education.
6. To identify, introduce and implement cost-effective Hazard Mitigation measures so as to accomplish the Town's Goals and Objectives and to raise the awareness of and acceptance of Hazard Mitigation opportunities generally.
7. To address the challenges posed by climate change as they pertain to increasing risks to Stoddard's infrastructure and natural environment.
8. To work in conjunction and cooperation with the State of New Hampshire's Hazard Mitigation Goals.

CHAPTER 2

COMMUNITY PROFILE

Town Overview

The Town of Stoddard is located in the northeastern portion of Cheshire County, in Southwest New Hampshire. Stoddard is bounded on the north side by Washington, easterly by Windsor and Antrim, southerly by Nelson and Sullivan, and westerly by Marlow and Gilsum. The town population is 1,232.¹

Location Map



The Town of Stoddard consists of 53.9 square miles of area of which 3.3%, or 1.8 square miles is inland water. Stoddard has several significant water bodies, such as Highland Lake, Island Pond, and Robb Reservoir. The northern half of Granite Lake is located in Stoddard, whereas the southern half is located in Nelson. Otter Brook begins at the outlet of Chandler Meadow in Stoddard and travels 13.2 miles to join the Minnewawa in Keene to form the Branch River. The North Branch River, a major tributary of the Contoocook River flows 16 miles from Highland Lake in Stoddard to the main stem of the Contoocook River in Hillsboro.²

A majority of Stoddard has a slope greater than 25%. The topography varies, ranging from a series of steep hills located throughout the community, Mt. Stoddard and Pitcher Mountain, to the flatter areas surrounding water bodies referenced above.

¹ Population data from 2010 US Census data

² Data from the Town of Stoddard Master Plan Update (2017)

Stoddard has a mid-latitude climate. According to U.S. Climate Data, the average high temperature in 2017 was 30.2°F in January and 80°F in July. The annual precipitation in 2017 was 45.4 inches of rainfall and 59.47 inches of snowfall.

A three-member Board of Selectmen governs the Town of Stoddard. The town has a part-time Administrative Assistant to the Selectmen, a Fire Chief and Fire Department, a part-time Police Chief, a part-time police officer and a part-time road contractor. Area hospitals include the Cheshire Medical Center/Dartmouth-Hitchcock located in Keene, approximately 19 miles southwest of Stoddard, and the Monadnock Community Hospital is located in Peterborough, approximately 20 miles southeast of Stoddard.

Disaster Risk

Stoddard is prone to a variety of man-made and natural hazards. These include: flooding, drought, extreme temperatures, wildfire, lightning, tornado/downburst/severe wind, hurricane/tropical storm, earthquake, severe winter weather, hazard materials spills, and dam failure/breach.

Flooding, whether from snow run-off or heavy rains, carries the greatest risk for Stoddard. Seasonal flooding of the many small streams and wetlands has not been recorded. Other hazards that rank high in Stoddard include tornado/downburst/severe wind, hurricane/tropical storm, severe winter weather, hazard materials spills, and dam failure/breach.

Development Patterns

The total land area in Stoddard is approximately 30,905 acres, of which 96% is classified as *Residential*. In addition to residential land, *Commercial* acreage is approximately 204 acres (0.7% of total land) and another 876 acres (3% of total land) is *Exempt*. There is also an estimated 35 acres (or 1%) of land that is classified as *Unknown*.

Examination of the town's existing land use as shown in the Stoddard Master Plan indicates that most of Stoddard's land area (about 94%) is undeveloped. A majority of the undeveloped land is conservation land, including land that is in current use. Conservation lands that are protected are undevelopable, while lands that are in current use may have substantial development constraints.

Residential

Residential uses comprise the most significant amount of developed land in terms of "active" development. The pattern of land use has not changed appreciably over the last thirty years; the residential uses have extended along the road frontages in all sections of town, with an increasing rate of conversion of seasonal homes to year-round use.

Protected Lands & Agriculture

Lands in current use, conservation and other undeveloped or wooded lands occupy the largest land area in town. Stoddard has limited designated agricultural land. Agricultural activity consists primarily of small-scale, homestead farming.

Commercial & Industrial

Most of the businesses in Stoddard are of a home-based nature. There are a number of commercial establishments in town. The Mill Village has a general store that has gas pumps, limited grocery items, and houses the Post Office. On Route 9, outside of the village area, are a convenience store with gas pumps, automobile repair facility, land contractors, Champney Meat-Cutting, and a boat sales and repair store. Highland Lake Marina is a full-service marina. Restoration Lumber, Inc. is the only industrial use in town.

Recreational

Recreational uses do not occupy a large amount of land in town. However, the vast undeveloped land areas have interconnected trails used for recreation including hiking and snowmobiling. Stoddard has a number of lakes and ponds, including Highland Lake and Island Pond, used for a variety of recreational purposes: swimming, fishing and boating.

Roads and Highways

While not typically thought of as a land “use”, roads and highways do take up nearly 250 acres of land.

Public and Semi-Public Uses

Public and semi-public uses consist of the Town Hall with offices, Fire Station, Police Department, Transfer Station/Recycling Center, Library, elementary school, and several churches and cemeteries. A post office is housed in the Village Store located in the center of town.

Consideration for Development

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

Current Development Trends

Overall, land use patterns in Stoddard are dominated by single family residential development, with fairly significant seasonal, lakefront residential use. This general pattern is not expected to change. Stoddard has more than 22,000 acres (64%) in conservation agreements or current use designation that will limit development and promote the preservation of habitat for generations to come.

Significant features of the built environment include the Mill Village and Stoddard Center. Stoddard's Master Plan includes a policy for exploring the possibility of establishing a Historic District to preserve these areas. The Master Plan also includes a policy to develop land use regulations that guide development away from viewsheds, many of which are hillsides with steep slopes.

Based on data collected and analyzed in the Land Use Analysis chapter of Stoddard’s Master Plan, certain assumptions can be made in anticipating future development in Stoddard:

- Stoddard should not experience any significant increase in population.
- A caveat to the assumption above, however, is the high proportion of seasonal housing around the lakes. If occupied year-round, this would have the potential to greatly impact the town, in terms of population density around sensitive shorelines, increased numbers of school children, and demand for police, fire, highway, and other municipal services.
- The road network in and through Stoddard will remain unchanged over the next 10-15 years, aside from regular maintenance and improvements. The roads carrying traffic through Stoddard, i.e., NH 9 and NH 123, will continue to serve as sub-regional arterials and local collectors.

Stoddard’s Hazard Mitigation Committee concurred with the Planning Board’s concern that growth is primarily occurring through the addition of single-family homes along existing Class V roads. In addition, the conversion of seasonal homes to year-round use is increasing populations around all of the town’s lakes

and ponds. Some potential still exists for new development along lake and pond shores. The Committee identified four significant cluster developments ranging from 5-15 lots established in town in the last 20-25 years.

1. The Hidden Lake Development, a large subdivision located on the western shore of Highland Lake is an area of concern for erosion and flooding. There are a number of existing structures and the potential for several more homes to be built on predetermined lots.
2. On the east side of Highland Lake, up to the marina, there have been a number of new homes built for year round use.
3. On the northeast and northwest shores of Highland Lake, in the Town of Washington, there has been an increase in year round housing which could have effects in Stoddard.
4. In the southern region of town, just northwest of Granite Lake, there is an area of new year-round housing development.

Housing Trend

The table below shows the number of housing units in each decennial from 1970 to 2010. There was an overall increase of 941 new housing units that were built during that time period. The trend in the table indicates that the peak in building homes in Stoddard was between 1980 and 1990 when the town experienced a 242 % increase during the 10 year period. In the 10 years between the past two census years (2000 and 2010), Stoddard averaged 10-11 new houses per year.

Housing Trends 1970-2010

	1970	1980	1990	2000	2010
Housing Units	103	260	890	939	1044
% Change	----	152%	242%	6%	11%

Source: NH Office of Strategic Initiatives (OSI)

Population Trend

According to the last fifty years of United States Census Bureau figures, and shown in the table below, Stoddard experienced its strongest population growth between 1970 and 1980, when it grew by 99.2%. Stoddard has far outpaced the county, region and state for percentage of population increases between 1970 and 2010. The towns of Windsor, Washington, and Nelson have also experienced higher than average growth rates.

Sub-regional Population Comparison: 1970-2010

	1970	1980	1990	2000	2010	% Change 1970-2010	% Change 2000-2010
New Hampshire	737,681	920,610	1,109,252	1,235,786	1,316,470	78%	6.5%
Cheshire County	52,364	62,116	70,121	73,825	77,117	47%	4.5%
Hillsborough Co.	223,941	276,608	335,838	380,841	400,721	79%	5.2%
Antrim	2,122	2,208	2,360	2,449	2,637	24%	7.7%
Gilsum	570	652	745	777	813	43%	4.6%
Marlow	390	542	650	747	742	90%	-0.7%
Nelson	304	442	535	634	729	140%	15%
Stoddard	242	482	622	928	1,232	409%	32.8%
Sullivan	376	585	706	746	677	80%	-9.2%
Washington	248	411	629	907	1,123	353%	23.8%
Windsor	43	72	107	201	224	421%	11.4%

Population Projections

Population projections are an important component in planning for the future. Projections are beneficial to help communities begin to plan and budget for capital improvement projects. Since population projections are based on a set of assumptions, changes can be significant if the assumptions used in the calculations are not met. For example, a tropical storm that destroys a large employer or causes infrastructure damages to that facility, can cause a significant economic hardship to the business that may ultimately result in its closure and loss of jobs. This can then result in an outward migration of residents from the community. Therefore, population projections should only be used as a basis to begin planning for the future.

The New Hampshire Office of Strategic Initiatives (OSI) prepares population projections every five years for each community in the state. The projections for Stoddard are presented below in five-year intervals up to the year 2040, beginning with population estimates from 2015. Using these projections, Stoddard is expected to grow in population by approximately 14% between 2015 and 2040.

Population Projections

2015	2020	2025	2030	2035	2040	Change 2015-2040
1,256	1,337	1,420	1,426	1,430	1,433	14.1%

Source: NH Office of Strategic Initiatives (OSI)

Development in Hazard Areas

Some hazards identified in this plan are regional risks and, as such, all new development falls into the hazard area. The exception to this is flooding. According to FEMA’s Community Information System (CIS), there are 625 structures in FEMA designated Special Flood Hazard Areas (SFHs) and there have been no development permits nor variances granted within the SFHA since 1987, the earliest records kept in the CIS for the Town of Stoddard. Flooding around Highland Lake and Island Pond has the potential to threaten future development along the shorelines. While the increase in development also increases the vulnerability for hazards that can occur townwide, measures have been taken to reduce the overall impact to the community through actions such as ditch maintenance, tree trimming, monitoring beaver dams, and outreach/education through the town website and newsletter, and NFIP material.

National Flood Insurance Program (NFIP)

After the approval of the 2007 Hazard Mitigation Plan, Stoddard became a participating member of the National Flood Insurance Program. Since it was identified as a priority Mitigation Action item, the town joined the NFIP on August 3, 2010. According to information supplied by FEMA’s CIS, there are six insurance policies with a total value of \$1,202,000. This is an increase of four policies since the previous hazard mitigation plan. There are currently no “Repetitive Loss Properties” within the town. Flood Insurance Rate Maps (FIRM), all bearing the effective date of May 23, 2006, are used for flood insurance purposes and are on file with the Stoddard Planning Board. Original maps were issued on January 1, 1976. The current FIRM maps are dated May 23, 2006.

Continued Compliance with NFIP Requirements

The Town of Stoddard acknowledges the importance of maintaining requirements set forth in the National Flood Insurance Program. As such, the town took several steps related to continued compliance with the program that will help to reduce or eliminate the potential for loss of life and property due to flooding.

- *Participate in NIMS training and other training for emergency personnel*
- *Maintained ditches along Juniper Hill Road and Old Forest Road*
- *Communicated with DOT to raise road and upsize culverts also NH 123. DOT performed the work in 2011*

While this Hazard Mitigation Plan Update continues with structural projects, public outreach and education are also seen as a key to providing information to residents by raising an awareness of measures that they can take. Many of these items will be on-going actions to maintain awareness and continued monitoring.

CHAPTER 3

HAZARD IDENTIFICATION AND PAST EVENTS

The following is a list of natural and manmade disasters, and the areas affected by them, that have or could affect the Town of Stoddard. These hazards were identified from the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018 and the Federal Emergency Management Administration website. The committee determined that landslides and avalanches are not a threat to the town and did not include those hazards in this plan.

Hazards

Flooding - Disaster Declarations	Hurricane/Tropical storm
Flooding - localized areas	Earthquake
Drought	Extreme Winter Weather
Extreme Temperature	Hazardous Materials Incident
Wildfire	Dam Breach/Failure
Lightning	
Tornado/Severe Wind/Downburst	

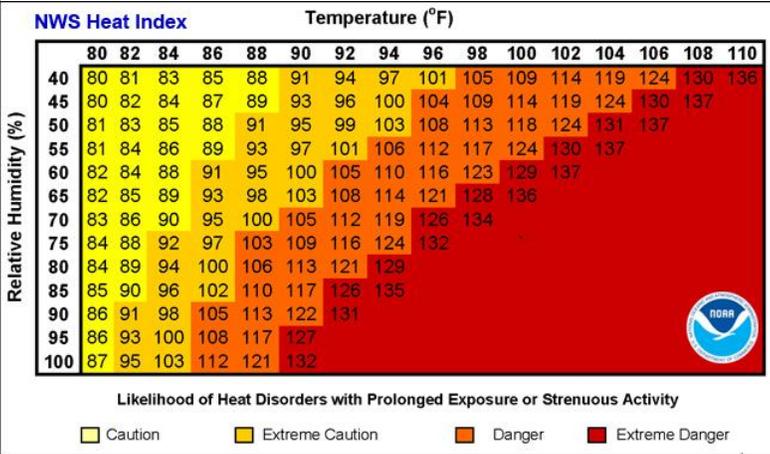
A complete definition of each of these hazards can be found in Appendix A.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
Below is a listing of Disaster Declarations for flooding events within the State of New Hampshire. Several severe events have caused significant damage to structures and roadways within the southwest region. Some of the historic flood events may be listed under Hurricane/Tropical Storm instead of this category.			
FLOODING- DISASTER DECLARATIONS			
Flood	1927	Southern NH	Damage to Road Network. Caused many roads to wash out.
Flood	March 11-21, 1936	All Counties	Damage to Road Network. Flooding caused by simultaneous heavy snowfall totals, heavy rains and warm weather. Run-off from melting snow/rain overflowed rivers.
Flood/Severe Storm	August 27, 1986	Cheshire, Hillsborough Counties	FEMA Disaster #771-DR (Presidentially Declared Disaster) \$1,005,000 in damage
Flood/Severe Storm	April 16, 1987	New Hampshire	FEMA Disaster Declaration #789-DR (Presidentially Declared Disaster). Flooding of low-lying areas along river caused by snowmelt and intense rain. \$4,888,889 in damage. Cheshire, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, & Sullivan Counties.
Flood	August 7-11, 1990	New Hampshire	FEMA Disaster Declaration #876. Flooding caused by a series of storm events with moderate to heavy rains. \$2,297,777 in damage. Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan Counties.
Storms/Flood	January 3, 1996	New Hampshire	FEMA Disaster Declaration #1077-DR. Damage amount \$2,220,384. Carroll, Cheshire, Coos, Grafton, Merrimack, Sullivan Counties.
Flood	July 2, 1998	Southern NH	FEMA Disaster Declaration #1231. Severe storms and flooding.
Heavy Rain/Flood	September 18-19, 1999	Belknap, Cheshire, Grafton Counties	FEMA Disaster Declaration #DR-1305-NH. Heavy rains associated with Tropical Storm/Hurricane Floyd.
Flood/Severe Storm	September 12, 2003	Cheshire and Sullivan Counties	FEMA Disaster Declaration #1489-DR. Damage amount \$1,300,000.
Flood	October 26, 2005	New Hampshire	FEMA Disaster Declaration #1610. Severe storms and flooding. Cheshire, Grafton, Merrimack, Sullivan, and Hillsborough Counties.
Flood	May 26-30, 2011	Coos and Grafton County	FEMA Disaster Declaration #DR- 4006. May flooding event.
Flood	May 29-31, 2012	Cheshire County	FEMA Disaster Declaration #DR-4065.
Flood	June 26-July 3, 2013	Cheshire, Sullivan, and Grafton Counties	FEMA Disaster Declaration #4139; \$6,389,704 (Statewide assistance). No local impact.
Flood	July 1-2, 2017	Grafton County	FEMA Disaster Declaration #4329; No local impact.
Flood	Oct. 29-Nov. 1, 2017	Belknap, Carroll, Sullivan, Grafton and Coos Counties	FEMA Disaster Declaration #4355; No local impact.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
FLOODING – LOCALIZED - HIGH RISK			
<p>Flooding is considered a high risk in Stoddard, although there have been few incidents of weather events that have caused flooding of structures, with the exception of the October 2005 flood. The potential for flooding, however, is considered to be a serious concern and is detailed in Chapter 5.</p>			
Flooding	October 2005	Highland Lake	<p>Flooding occurred in the following areas: Highland Lake, Island Pond, West Shore Road, Center Pond Road, Barrett Pond Road, Treelyn Road, Juniper Hill Road, Old Forest Road, Bridge Hill Road, Mount Stoddard Road, Old Antrim Road, Mill Village, King’s Highway, North Shore Road, NH 123, Shedd Hill Road, Murdough Road. Bailey Brook Road. There were no injuries and no estimate of damage was noted. Some roads caused detours for several days.</p>
DROUGHT - LOW RISK			
<p>Stoddard has had limited experience with severe drought conditions, however, the drought in the summer of 2016 caused some private wells to run dry, some of which had to be redrilled. There is no documentation on the number of wells affected. A greater emphasis is placed on responding to these hazards rather than mitigating for them. Outreach and education on methods of dealing with drought are important. Extreme heat and drought are townwide events, therefore, no specific locations are identified. The severity of droughts can be found by referring to the Palmer Drought Severity Index used by the Climate Prediction Center and can be viewed at: http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml</p>			
<div style="display: flex; align-items: flex-start;"> <div data-bbox="131 1113 860 1764" style="flex: 1;"> </div> <div data-bbox="958 1134 1461 1554" style="flex: 1; padding-left: 20px;"> <p>Map released: Thurs. August 9, 2018 Data valid: August 7, 2018 at 8 a.m. EDT</p> <p>Intensity:</p> <ul style="list-style-type: none"> None D0 (Abnormally Dry) D1 (Moderate Drought) D2 (Severe Drought) D3 (Extreme Drought) D4 (Exceptional Drought) </div> </div> <p style="margin-top: 20px;">Source: NOAA</p>			

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
DROUGHT- LOW RISK			
Drought	1929-1936	Statewide	Regional. Recurrence Interval 10 to > 25 years.
Drought	1939-1944	Statewide	Severe in southeast and moderate elsewhere. Recurrence Interval 10 to > 25 years.
Drought	1947-1950	Statewide	Moderate. Recurrence Interval 10 to > 25 years.
Drought	1960-1969	Statewide	Regional longest recorded continuous spell of less than normal precipitation. Encompassed most of the Northeastern US. Recurrence Interval > 25 years.
Drought	2001-2002	Statewide	Fourth worst drought on record, exceeded only by the drought of 1956 - 1966 and 1941 - 1942.
Drought	Spring 2012	Statewide	Considered to be drier than the drought of 1941.
Drought	2015-2016	Statewide	Severe drought caused many wells to dry up throughout the state. No estimate of the number of wells that needed to be drilled in Stoddard.

EXTREME TEMPERATURE - MEDIUM RISK

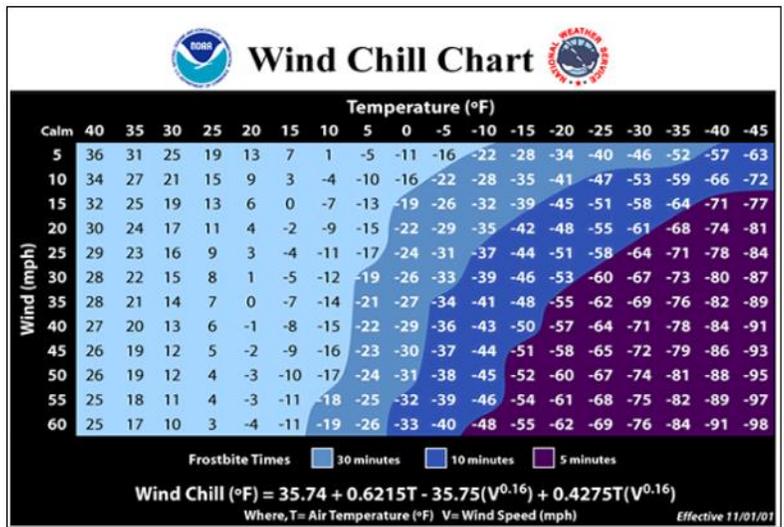


Extreme temperatures are a prolonged period of extreme hot or cold temperatures that pose a danger to people, animals, and crops. Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures and often coincide with high relative humidity. Although it is an infrequent event, it usually occurs on an annual basis between late July and August. The severity of extreme heat can be dangerous to those residents with medical conditions and the elderly. Extreme heat can add to the potential for wildfires and depletion of the water supply for firefighting. Extreme cold temperatures are

characterized by periods of abnormally cold temperatures and are especially dangerous to the elderly and those who are exposed to the weather for extended periods. Power outages can lead to frozen pipes and loss of heat.

These events are townwide. The Hazard Mitigation Committee did not recall any impact to the town services due to this hazard. They also did not recall any death, injury or structural damage as a result of extreme heat or cold.

Source: Both charts-National Weather Service



Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
EXTREME TEMPERATURE - (cont.)			
Extreme Heat	July, 1911	New England	11-day heat wave in New Hampshire.
Extreme Heat	Late June to September, 1936	North America	Temps to mid-90s in the northeast.
Extreme Heat	Late July, 1999	Northeast	13+ days of 90+ degree heat.
Extreme Heat	Early August, 2001	New Hampshire	Mid 90s and high humidity.
Extreme Heat	August 2-4, 2006	New Hampshire	Regional heat wave and severe storms.
WILDFIRE - MEDIUM RISK			
Wildfires are classified according to size: Class A-one-fourth acre or less; Class B - more than one-fourth acre, but less than 10 acres; Class C-10 acres or more, but less than 100 acres; Class D -100 acres or more, but less than 300 acres; Class E-300 acres or more, but less than 1,000 acres; Class F - 1,000 acres or more, but less than 5,000 acres; Class G-5,000 acres or more.			
Wildfire	1941	Marlow, Stoddard NH	A severe wildfire destroyed timber and structures throughout the northwest, northeast and southwest parts of Stoddard in April 1941. The hurricane of 1938 left behind many dry deadfall trees. A portable sawmill brought into the woods to clear the dead trees sparked and ignited the fire. Six buildings in Stoddard were burned during the fire in addition to two sawmills. A smaller second fire in May 1941 burned additional acreage in eastern Stoddard. The Marlow-Stoddard Fire April 28-30 map that shows the area through which the fire spread is located in Appendix F.
Wildfire	1995	East of Shedd Hill Road	A Public Service of New Hampshire wire break started a brush fire that burned 4-5 acres in 1995. No structures were affected.
Wildfire	2000	Western Shore of Highland Lake	A lightning strike caused a .5 acre wildfire in 2000 which did not affect any structures.
Wildfire	2001	Western Shore of Highland Lake Area, South of NH 123 North	An illegal burn caused a .25 acre wildfire in 2001. No structures were affected.
Wildfire	2004	Old Antrim Road	A one acre wildfire was caused by an illegal burn of hazardous materials in 2004. No structures were affected.
Wildfire	2005	Shedd Hill Road by Stacy Hill	A Public Service of New Hampshire wire break caused a quarter acres wildfire in 2005. No structures were affected.
Wildfire	2012	Turtle Rock Road	2 acres burned due to drought conditions.
Wildfire	July 2012	Pickerel Cove	Difficult access/subterranean fire. 2 acres burned, no structures were affected.
Wildfire	April 2015	NH 9, Granite Lake, Juniper Hill	Arson caused wildfires in several locations, causing about 100 acres to burn and the loss of power for several hours. It burned critical fiber optics infrastructure and took 7 days to extinguish.

LIGHTNING - MEDIUM RISK

Lightning is an unpredictable hazard. It could strike anywhere in Stoddard and potentially start a forest fire especially in periods of drought. High elevations and areas around waterbodies may be more susceptible to lightning strike incidents. The table below categorizes lightning hazards according to the Lightning Activity Level (LAL) using cloud conditions and precipitation, and an estimate of lightning strikes per every 15 minutes. There were no specific incidents that the committee documented and no injuries or structural damage identified. There has been some loss of property from lightning strikes, but no record of cost.

LAL	Cloud & Storm Development	Lightning Strikes/15 min
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.	

Source: NOAA

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
Lightning	1991	Western Shore of Highland Lake	A lightning strike in 1991 destroyed a house. No cost for repairing or replacing the structure is available.
Lightning	1998	Birch Point (Island Pond)	A lightning strike in 1998 did not cause a fire, but did result in smoke damage to a house.
Lightning	2000	Western Shore of Highland Lake	A lightning strike caused a half-acre wildfire in 2000 which did not affect any structures.

TORNADOS (1950-2003, Fujita Scale given if known)/SEVERE WIND/DOWNBURST-HIGH RISK

The **Enhanced Fujita Scale** is used to rate the intensity of a tornado by examining the damage caused by the tornado once it has passed. (see scale below). *Source:* <http://www.tornadoproject.com/fscale/fscale.htm>

EF - Scale Number, Wind Speed, Frequency, and Type of damage

EF - 0 Wind Speed: 65-85 mph; Frequency: 53.5%

Minor or no damage. Some damage to gutters, siding and roofs; breaks branches off trees; pushes over shallow-rooted trees.

EF - 1 Wind Speed: 86-110 mph; Frequency: 31.6%

Moderate damage. Roofs severely stripped; mobile homes damaged or overturned; windows and glass broken, loss of exterior doors.

EF - 2 Wind Speed: 111-135 mph; Frequency: 10.7%

Considerable damage. Roofs torn off well-constructed homes; foundations of framed homes shifted; mobile homes demolished; large trees snapped or uprooted; light object missiles generated; cars lifted off of ground.

EF - 3 Wind Speed: 136-165 mph; Frequency: 3.4%

Severe Damage. Entire stories of well-constructed houses destroyed; severe damage to large building and malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown.

EF- 4 Wind Speed: 166-200 mph; Frequency: 0.7%

Extreme Damage. Well-constructed houses completely leveled; cars thrown and large missiles generated.

EF- 5 Wind Speed: >200 mph; Frequency: <0.1%

Total Destruction. Strong frame houses lifted off foundations and carried considerable distances to disintegrate; steel reinforced concrete structures are critically damaged; tall buildings collapse.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
TORNADO/SEVERE WIND/DOWNBURST			
Tornado	September 15, 1922	Cheshire County	F2
Tornado	September 13, 1928	Cheshire County	F2
Tornado	August 13, 1963	Cheshire County	F2
Tornado	June 6, 1963	Cheshire County	F2
Severe Wind	1985	Mill Village/Island Pond Area	Wind shear in 1985 near Mill Village caused damage to one structure.
Severe Wind	1991	NH 123 North, North of Cold Spring Pond	Wind shear across NH 123 in 1991 caused no damage to structures.
Severe Wind	1996	Sandy Beach Road	Stoddard experienced a wind shear incident in the late 1996. No structures were affected by the incident. Downed branches and power lines.
Tornado	July 2, 1997	Cheshire County	F1
Tornado	July 3, 1997	Greenfield, NH	An F2 Tornado caused damage to a summer camp, the recycling center and completely destroyed a lumber facility.
Tornado	May 23, 1998	Hillsborough County	F2; No record of damages or injuries locally.
Severe Wind	2003	Walpole	Hooper Hill area - Trees were uprooted; fallen utility lines - roads were blocked by debris, equipment shed roof damaged.
Tornado	July 24, 2008	Deerfield/Northwood	EF2. No impact locally.
Severe Wind	2011	Southwestern New Hampshire	A microburst hit the area causing a temporary loss of power to some locations in the region. No injuries or structural damage reported. No local impact.
Severe Wind	2014	Southwestern New Hampshire	A microburst hit the region causing a temporary loss of power to some locations in the region. No injuries or structural damage reported. No local impact.
Severe Wind	2016	Southwestern New Hampshire	Severe wind hit the region causing a temporary loss of power to some locations in the region. No injuries or structural damage reported. A tree fell on a powerline causing a detour on Shedd Hill and Kings Highway for a few hours.
Downburst	Oct. 29, 2017	Southwestern New Hampshire	A downburst hit several towns along the Connecticut River causing many downed trees and several homes damaged. No estimate of damage. Short-term power outages occurred. There were no injuries. No local impact.
Tornado	July 28, 2018	Stoddard and surrounding towns	Some houses were damaged on Shedd Hill and East Shore Drive, but there were no injuries reported. No estimate of costs.

HURRICANE (Category given if known) and TROPICAL STORM - HIGH RISK

Stoddard’s inland location in southwestern New Hampshire reduces the risk of extremely high winds that are associated with hurricanes, however, tropical storms have occurred. The Hazard Mitigation Committee did not recall specific events that caused any impacts to the town services, injury or death, or structural damage from hurricanes or tropical storms.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating system based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures. (<http://www.nhc.noaa.gov/aboutsshws.php>)

Saffir-Simpson Hurricane Wind Scale: Category, Sustained Winds, and Types of Damage

Category 1

Wind Speed: 74-95 mph, 64-82 knots (kts)

Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles will likely result in power outages that could last hours to several days.

Category 2

Wind Speed: 96-110 mph, 83-95 kts

Extremely dangerous winds will cause extensive damage: 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.

Category 3

Wind Speed: 111-129 mph, 96-112 kts

Devastating damage will occur: Well-built framed 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 may be unavailable for several days to weeks after the storm passes.

Category 4

Wind Speed: 130-156 mph, 113-136 kts

Catastrophic damage will occur: Well-built framed 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.

Category 5

Wind Speed: 157 mph or higher, 137 kts or higher

Catastrophic damage will occur: 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.

Source: <http://www.nhc.noaa.gov/aboutsshws.php>

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
Hurricane	September 21, 1938	Southern New England	Flooding caused damage to road network and structures. 13 deaths, 494 injured throughout NH. Disruption of electric and telephone services for weeks. 2 billion feet of marketable lumber blown down. Total storm losses of \$12,337,643 (1938 dollars). 186 mph max winds.
Hurricane (Carol)	August 31, 1954	Southern New England	Category 3, winds 111-130 mph. Extensive tree and crop damage in NH, localized flooding.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
HURRICANE/TROPICAL STORM (cont.)			
Hurricane (Edna)	September 11, 1954	Southern New England	Category 3 in Massachusetts. Heavy rain in New Hampshire.
Hurricane (Donna)	September 12, 1960	Southern and Central NH	Category 1 in NH. Heavy flooding in some parts of the State.
Tropical Storm (Daisy)	October 7, 1962	Coastal NH	Heavy swell and flooding along the coast.
Tropical Storm (Doria)	August 28, 1971	New Hampshire	Center passed over NH resulting in heavy rain and damaging winds.
Hurricane (Belle)	August 10, 1976	Southern New England	Category 1. Primarily rain with resulting flooding in New Hampshire.
Hurricane (Gloria)	September, 1985	Southern New England	Category 2. Electric structures damaged; tree damages. Heavy rains, localized flooding, and minor wind damage in New Hampshire.
Hurricane (Bob)	August 19, 1991	Southern New England	Structural and electrical damage in region from fallen trees. 3 people were killed and \$2.5 million in damages were suffered along coastal New Hampshire. Federal Disaster FEMA-917-DR.
Hurricane (Edouard)	September 1, 1996	Southern New England	Winds in NH up to 38 mph and 1 inch of rain along the coast. Roads and electrical lines damaged.
Tropical Storm (Floyd)	September 16-18, 1999	Southern New England	FEMA DR-1305-NH. Heavy Rains.
Tropical Storm (Tammy)	October 5-13, 2005	East Coast of US	Remnants of Tammy contributed to the October 2005 floods which dropped 20 inches of rain in some places in NH.
Tropical Storm (Irene)	2011	New England states	FEMA Disaster Declaration #DR-4026 and EM- 3333. Some temporary power outages were experienced in the Southwest region of NH.
Tropical St. (Sandy)	Oct. 26 -Nov. 8, 2012	Eastern United States	FEMA Disaster Declaration # DR-4095; NH Counties that received the most damage were Belknap, Carroll, Coos, Grafton, Rockingham, and Sullivan. No local impact.

EARTHQUAKE – LOW RISK		
Modified Mercalli Scale vs. Richter Scale		
Mercalli Intensity	Mercalli Observations	Richter Magnitude
I	Not felt by people	1-2
II	Felt by only a few people, especially on upper floors of buildings	3
III	Felt by people lying down, seated on hard surface, or in tall buildings	3.5
IV	Felt indoors by many, dishes and windows rattle	4
V	Generally felt by everyone; may wake from sleep	4.5
VI	Trees sway, objects fall from walls & tables	5
VII	Walls crack, some structural damage	5.5
VIII	Building damage noticeable	6
IX	Some buildings collapse	6.5
X	Ground cracks and landslides	7
XI	Few buildings survive, bridge damage, severe landslide	7.5
XII	Total destruction, objects thrown into the air	8

There have been no reported injuries or structural damage from earthquakes in Stoddard. The table on the next page is used to categorize earthquakes using two different scales: Mercalli Scale and Richter Scale. The Richter Scale is more scientific and is based on the magnitude (amplitude of the largest seismic wave). The Mercalli Scale is based on observations by people who experienced the earthquake to describe its intensity.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
Earthquake	1638	Central NH	6.5-7
Earthquake	October 29, 1727	Off NH/MA coast	Widespread damage Massachusetts to Maine.
Earthquake	Dec. 29, 1727	Off NH/MA coast	Widespread damage Massachusetts to Maine.
Earthquake	Nov. 18, 1755	Cape Ann, MA	6.0, much damage.
Earthquake	1800s	New Hampshire	83 felt earthquakes in New Hampshire.
Earthquake	1900s	New Hampshire	200 felt earthquakes in New Hampshire.
Earthquake	March 18, 1926	Manchester, NH	Felt in Hillsborough County.
Earthquake	December 20 and 24 1940	Ossipee, NH	Both earthquakes of magnitude 5.5, both felt for 400,000 sq. miles, structural damage to homes, damage in Boston MA, water main rupture. 4.5
Earthquake	December 28, 1947	Dover NH - Foxcroft, ME	
Earthquake	June 10, 1951	Kingston, RI	4.6
Earthquake	April 26, 1957	Portland, ME	4.7
Earthquake	April 10, 1962	Middlebury, VT	4.2

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
EARTHQUAKE - cont.			
Earthquake	June 15, 1973	Near NH Quebec Border, NH	4.8
Earthquake	Jan.19, 1982	Gaza (west of Laconia), NH	4.5, walls and chimneys cracked, damage up to 15 miles away in Concord.
Earthquake	Oct. 20, 1988	Near Berlin, NH	4
Earthquake	January 3, 2011	Northwest of Laconia	2.5
Earthquake	Aug. 23, 2011	Virginia to New Hampshire	5.8
Earthquake	Oct. 16, 2012	Maine	4.0
Earthquake	Feb. 15, 2018	East Kingston, NH area	2.7, no injuries or structural damage reported.
Earthquake	March 19, 2018	Concord, NH area	2.9, no injuries or structural damage reported.
Earthquake	2014	New Hampshire	9 small earthquakes ranging from 1.3 - 2.7*. No damage or impact locally. (*data from Weston Observatory, Boston College).
Earthquake	2015	New Hampshire	16 small earthquakes ranging from 1.0 - 2.5*. No damage or impact locally. (*data from Weston Observatory, Boston College).
Earthquake	2016	New Hampshire	9 small earthquakes ranging from 1.3 - 2.5*. No damage or impact locally. (*data from Weston Observatory, Boston College).
Earthquake	Feb. 15, 2018	East Kingston, NH area	2.7, no injuries or structural damage reported.
Earthquake	March 19, 2018	Concord, NH area	2.9, no injuries or structural damage reported.
SEVERE WINTER WEATHER - HIGH RISK			
<p>Winter events include heavy snow and ice storms. Occasionally heavy snow will collapse buildings. Ice storms have disrupted power and communication services. The randomness of these events makes it difficult to set a cost to repair or replace any of the structures or utilities affected. The next chart is an indicator of the severity of ice storms and can assist emergency management officials in predicting the length of power outages based on wind speed and amount of ice accumulation during the storm. This index is similar to those that are used to predict the severity of tornados and hurricanes. Planning ahead will mitigate the damage and prepare communities for severe ice events days in advance.</p>			

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
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	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	
2	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	
3	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	
4	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	
5	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.)

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
Ice Storm	December 17-20, 1929	New Hampshire	Unprecedented disruption and damage to telephone, telegraph, and power system. Comparable to 1998 Ice Storm (below).
Blizzard	February 14-17, 1958	New Hampshire	20-30 inches of snow in parts of NH.
Snow Storm	March 18-21, 1958	New Hampshire	Up to 22 inches of snow in south central NH.
Snow Storm	December 10-13, 1960	New Hampshire	Up to 17 inches of snow in southern NH.
Snow Storm	January 18-20, 1961	New Hampshire	Up to 25 inches of snow in southern NH.
Snow Storm	February 2-5, 1961	New Hampshire	Up to 18 inches of snow in southern NH.
Snow Storm	January 11-16, 1964	New Hampshire	Up to 12 inches of snow in southern NH.
Blizzard	January 29-31, 1966	New Hampshire	Third and most severe storm of 3 that occurred over a 10-day period. Up to 10 inches of snow across central NH.
Snow Storm	December 26-28, 1969	New Hampshire	Up to 41 inches of snow in west central NH.

Hazard	Date	Location	Severity Remarks/Description of Areas Impacted
SEVERE WINTER WEATHER - (cont.)			
Snow Storm	February 18-20, 1972	New Hampshire	Up to 19 inches of snow in southern NH
Snow Storm	January 19-21, 1978	New Hampshire	Up to 16 inches of snow in southern NH.
Blizzard	February 5-7, 1978	New Hampshire	New England-wide. Up to 25 inches of snow in central NH.
Ice Storm	Jan. 8-25, 1979	New Hampshire	Major disruptions to power and transportation.
Snow Storm	February, 1979	New Hampshire	President's Day storm.
Snow Storm	April 5-7, 1982	New Hampshire	Up to 18 inches of snow in southern NH.
Ice Storm	February 14, 1986	New Hampshire	Fiercest ice storm in 30 years in the higher elevations in the Monadnock region. It covered a swath about 10 miles wide from the MA border to New London.
Extreme Cold	Nov-Dec, 1988	New Hampshire	Temperature was below 0 degrees F for a month.
Ice Storm	March 3-6, 1991	New Hampshire	Numerous outages from ice-laden power lines in southern NH.
Snow Storm	1997	New Hampshire	Power outages throughout town due to heavy snowfall.
Ice Storm	January 15, 1998	New Hampshire	Federal disaster declaration DR-1199-NH, 20 major road closures, 67,586 without electricity, 2,310 without phone service, \$17+ million in damages to Public Service of NH alone.
Ice Storm	2004	New Hampshire	Ice storm resulted in treacherous travel throughout town.
Snow Storm	2006	New Hampshire	Power outages throughout town due to heavy snowfall.
Ice Storm	December 8, 2008	New Hampshire	Local power outage for 9-21 days; downed power lines, restricted access to homes, significant amount of downed timber.
Snow Storm	October 29-30, 2011	New Hampshire	FEMA Disaster Declaration # DR-4049 (Hillsborough and Rockingham Counties). Severe snowstorm event. Snowfall 34" in a 24-hour period.
Snow Storm	Feb. 8-11, 2013	New Hampshire	FEMA Disaster Declaration # DR-4105 \$6,153,471 statewide. Severe winter storm and snowstorm. No impact on town services except for snow removal.
Snow Storm	November 2014	New Hampshire	"Thanksgiving Storm"- was declared the 4 th largest power outage in NH history. Many communities received over 12" of snow. Locally - no injuries or structural damage. No impact on town services except for snow removal.
Snow Storm	Jan. 26-29, 2015	Hillsborough, Rockingham, and Strafford Counties, NH	FEMA Disaster Declaration # DR-4049; \$4,939,215 Severe winter storm and snowstorm. No local impact.
Snow Storm	March 14-15, 2017	Belknap, Carroll Counties, NH	FEMA Disaster Declaration # DR-4316 \$74,935; no local impact except for minor power outages.
Snow Storm	March 13-14, 2018	Carroll, Rockingham, and Strafford Counties, NH	FEMA Disaster Declaration # DR-4371 \$74,935; no local impact except for minor power outages.

HAZARDOUS MATERIALS SPILL - HIGH RISK			
Transportation of chemicals and bio-hazardous materials through town on NH 9 and NH 123 by truck is a concern. There is limited history of hazardous materials spills in Stoddard.			
HAZMAT Spills	1970s	NH 123 North, East of Highland Lake Bridge	An oil truck drove off the road into a house, leaking exhaust and gas, and pushed tanks from the house into Highland Lake on the south side of NH 123 North.
HAZMAT Spills	1991	NH 9	An accident on NH 9 resulted in a gas leak but no spill. No structures were affected.
HAZMAT Spills	2002	NH 9, East of Old Center Road	Oil from a tractor trailer leaked into the swamp south of NH 123 North. No structures were affected.
HAZMAT Spills	2006	NH 123 North, East of Highland Lake Bridge	Oil tank in a house leaked into the lake, north of NH 123.
DAM FAILURE/BREACH - HIGH RISK			

The State of New Hampshire classifies dams into the following four categories:

NM - Non-menace S - Significant hazard Blank - Non-Active
 L - Low hazard H - High hazard

Detailed description of classification terms:

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

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

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

- no possible loss of life;
- low economic loss to structures or property;
- structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services;
- the release of liquid industrial, agricultural, or commercial wastes, septage, or contaminated sediment if the storage capacity is less than 2 ac.-ft. & is located more than 250 ft. from a water body or water course;
- and reversible environmental losses to environmentally-sensitive sites.

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

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

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

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

Generally, all Class H dams need to have Emergency Action Plans, and most Class S dams also require them. According to the Department of Environmental Services Dam Bureau, there is one Class H dam in Stoddard, and no Class S dams. The table shows all dams in the Town of Stoddard. There have been no incidents of dam failure or breach since the previous plan.

Dam #	Class	Status	Name	Owner	Height (ft)	Impdt (Acres)
223.01	H	Active	Highland Lake Dam/Dike	NH DES Water Division	11	711
223.02	L	Active	Robb Reservoir Dam	NH Fish & Game Dept.	11	97
223.03	---	Ruins	Island Pond Dam	Private	8	---
223.04	L	Active	Island Pond Dam	NH DES Water Division	7	158
223.05	---	Ruins	Upper Falls Hydro Dam	Private	---	---
223.06	---	Ruins	Unnamed Stream Dam	Unknown	---	---
223.07	NM	Active	Otter Brook @ Woods Mill Dam	Private	9	5
223.08	---	Ruins	Lower Chandler Meadow Dam	Unknown	5.5	---
223.09	L	Active	Cold Spring Pond Dam	Private	9	30
223.10	NM	Active	Andorra Pond Dam	Private	10	4.38
223.11	---	Breached	Chandler Pond Dam	Private	10	---
223.12	---	Removed	By Pass Pond Dam	Town of Stoddard	8	0.08
223.13	L	Active	Hidden Pond Dam	Private	15.5	16.4
223.14	---	Exempt	Upton Pond Dam	Private	3	14.96
223.15	NM	Active	Williams Dam	Private	16	0.25
223.16	NM	Active	Pratt Wildlife Pond Dam	Private	8	3.5
223.17	L	Active	Pioneer Lake Dam	Private	17	49
223.18	---	Exempt	Recreation Pond Dam	Private	4	0.02
223.19	---	Exempt	Center Pond Fish Barrier	NH Fish & Game Dept.	4	0.01
223.20	---	Exempt	Reads Pond Dam	Private	5	5
223.21	NM	Active	Highland Lake South Dike	NH DES Water Division	5.5	712

Source: Dam information provided by the NH Dam Bureau in 2018 and will be verified by town officials

The following two pages include maps of the dams, bridges and culverts in Stoddard.

Map of Dams in Stoddard



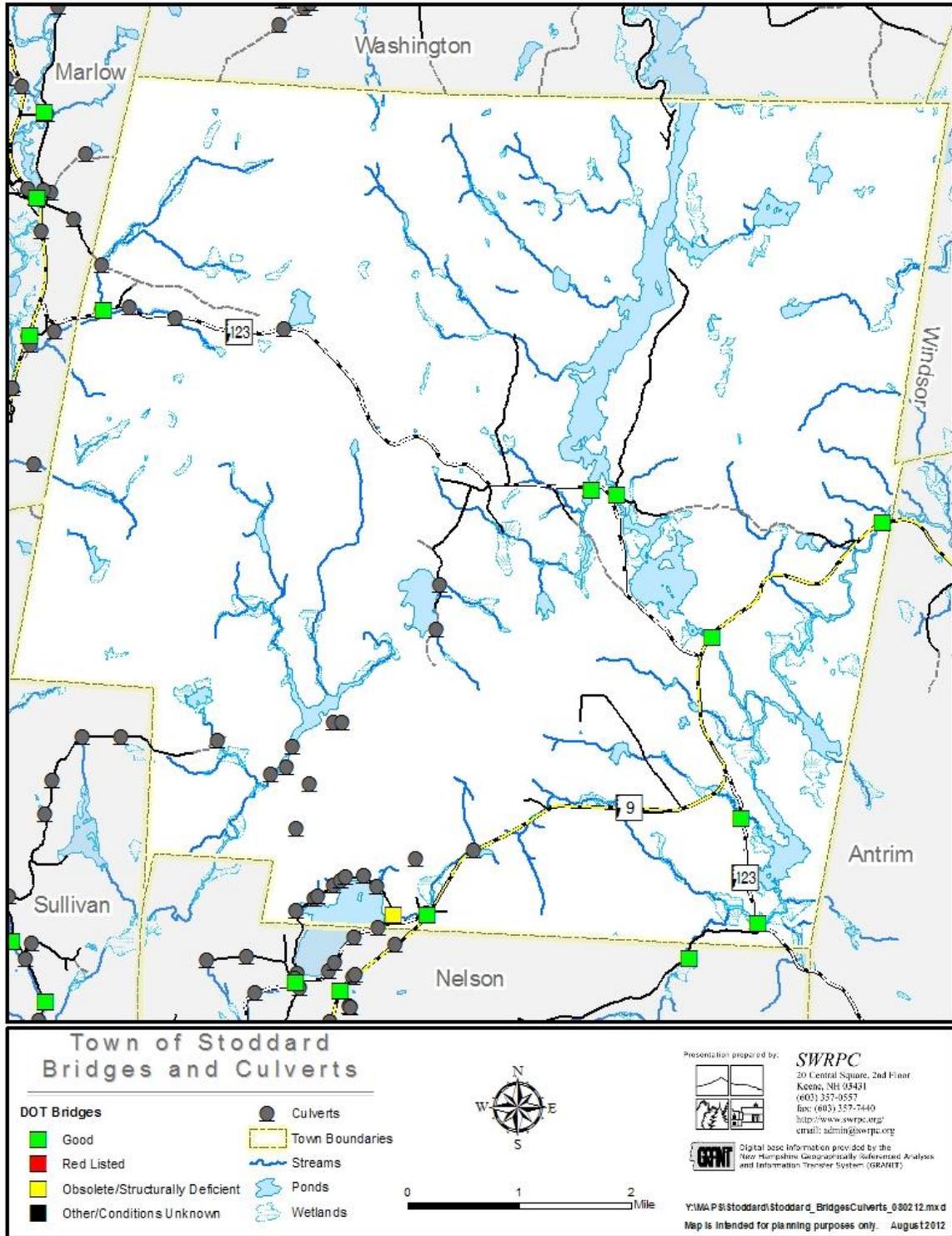
Town of Stoddard Dams

Dams	Streams
Town Boundaries	Ponds
100-year Floodplain	Wetlands
Dam Inundation	NWI Wetlands

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Digital base map provided courtesy of the State of New Hampshire Department of Resources and Planning (DORIS).
 August 2012
 Map is intended for planning purposes only.
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Map of Bridges and Culverts in Stoddard



CHAPTER 4

ASSESSING PROBABILITY, SEVERITY & RISK

Vulnerability and Risk Assessment

The Vulnerability and Risk Assessment provides information to enable the town to identify and prioritize appropriate mitigation actions to reduce losses from the identified hazards. For each hazard type shown in the table below, the committee assigned a value (1-5) to reflect the human, property and business impact of each hazard to determine the vulnerability. Then, the committee assigned a probability value (1-5) reflecting the likelihood that this hazard will occur in the next 25 years. The severity and risk was calculated from the inputted values. The final column indicates the risk of each hazard, allowing the committee to see which hazards pose the greatest risk to the community. Very Low to Very High risk was assigned as shown below.

Human Impact, Property Impact, Business Impact and Probability Rating



Risk Level:

1-5 Very

	Human Impact	Property Impact	Business Impact	Probability	Severity	Risk	Risk
	Probability of death or injury	Physical Losses and damages	Interruption of Service	Likelihood this will occur in 25 years	Avg. of Human/Property/Business	Severity x Probability (Relative Threat)	
Flooding	4	4	2	5	3.3	17	High
Drought	2	2	1	5	1.6	8	Low
Extreme Temperature	2	2	3	5	2.3	12	Med
Wild Fire	2	3	3	5	2.7	13	Med
Lightning	2	3	3	5	2.7	13	Med
Tornado/Downburst/Severe Wind	3	4	4	5	3.7	18	High
Hurricane/Tropical Storm	3	4	4	5	3.7	18	High
Earthquake	2	2	2	3	2	6	Low
Extreme Winter Weather	3	3	4	5	3.3	17	High
HazMat Spills	4	3	4	5	3.7	18	High
Dam Failure	4	4	4	5	4	20	High

Low 6-10 Low 11-15 Medium 16-20 High 21-25 Very High

CHAPTER 5

POTENTIAL HAZARDS: ESTIMATING POTENTIAL LOSSES

The following is a list of natural and man-made disasters, and the areas that could be affected within the Town of Stoddard. These hazards and locations were identified by the Hazard Mitigation Planning Committee. The Hazards Map at the end of this Plan (printed version) reflects the contents of this list.

Estimating Losses

In order to determine estimated losses due to natural and man-made hazards in Stoddard, each hazard area was analyzed with results shown below. Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Most of these figures exclude both the land value and contents of the structure. According to town records, the value of all structures in 2018, including exempt structures such as schools and churches, is \$247,561,209. The median value of a home in Stoddard is \$223,400 according to the US Census 2013-2017 American Community Survey (ACS) five year estimates. The data below was calculated using FEMA's Understanding Your Risks: Identifying Hazards and Estimating Losses.

Potential Hazards

Flooding-High Risk-see estimate of cost below

Island Pond - estimate of cost: \$16,755,000. There are approximately 50-75 residences that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, an estimated cost of repairing or replacing these structures is \$16,755,000.

Highland Lake - estimate of cost: \$10,053,000. Approximately 45 structures have the potential to be affected by flood waters in this area. Assuming 100% damage to 100% of the structures, an estimated cost of repairing or replacing these structures is \$10,053,000.

NH 123 North at Boat Landing - estimate of cost: \$4,468,000. There are approximately 20 residences that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$4,468,000.

West Shore Road - estimate of cost: \$4,468,000. There are approximately 20 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$4,468,000.

Center Pond Road - estimate of cost: \$893,600. There are 4 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$893,600.

NH 123 North near Marlow Town Line - estimate of cost \$2,680,800: There are 12 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$2,680,800.

NH 123 North (King's Highway area) - estimate of cost: \$2,234,000. There are 10 residences located in this area that have the potential to be affected by floodwaters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$2,234,000.

Highland Lake Marina - estimate of cost: \$1,340,400. There are 6 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$1,340,400.

North Shore Road - estimate of cost: \$17,872,000. There are approximately 60-80 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$17,872,000.

Murdough Road - estimate of cost: \$2,010,600. There are 9 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$2,010,600.

Shedd Hill Road - estimate of cost: \$44,680,000. The Stoddard Fire Station and approximately 200 residences located in this area that have the potential to be affected by flood waters. Assuming 100% damage to 100% of the structures, the estimated cost of repairing or replacing these structures is \$44,680,000.

In addition to the areas of concern above with potential structural damage, the following are areas that have potential for damage to the access-way of the homes, but not likely to have structural damage to the home itself. No estimate of damage is calculated. These include:

NH 123 south of NH 9 - Occasional road repair is required due to spring storm patterns, plugged culverts during spring runoff and mud season. Snow melt and accumulated runoff from heavy rains causes erosion of conveyance ditch and road along NH 123 South.

Barrett Pond Road - Flooding of the road has the potential to occur annually in this area due to accumulation of heavy rain and runoff.

Treelyn Road - Access to 40-50 homes was and could be affected by a future event. The culvert was replaced with 2 larger culverts in 2006.

Juniper Hill Road - Access to 20 homes could be impacted.

Old Forest Road - Access to 6 homes could be impacted.

Bridge Hill Road - Access to 3-5 homes could be impacted.

Mount Stoddard Road - Access to 10 homes has been a flood-related problem and is a potential.

King's Highway - Access to 160 homes would be threatened if severe flooding occurred.

Bailey Brook Road - Access to 4 homes could be affected.

Drought-Low Risk - no estimate of cost: Drought will increase the risk of wildfire, especially in areas of high recreational use. As more timberland is set aside as non-harvested timberland, the potential for the risk of wildfire will increase.

- Some private wells may run dry;
- Minimal impact to town services;
- Forested areas with high fuel content have more potential to burn; and
- This is a townwide event.

Extreme Temperature - Medium Risk-no estimate of cost: Elderly are at risk. Approximately 20% of the town population is 65 and over.

- Minimal impact to town services;
- Extreme heat can cause power outages and brown-outs due to the increased draw on the electrical usage of air conditioners; extreme cold can freeze pipes; and
- This is a townwide event.

Wildfire - Medium Risk - no estimate of cost. As timber harvesting is reduced, the wood roads are closed and debris builds up on the ground leaving the potential for wildfires to increase townwide. Also, the ice storms of 1998 and 2008 left a significant amount of woody debris throughout town that could fuel future forest fires. Hurricanes and severe wind events have also contributed to this risk.

- Entire town has minimal forest fire protection (dependence on on-call firefighters and problems with accessibility);
- Wildfires pose a risk of life and property loss as well as disruption of utility service.

Lightning - Medium Risk-no estimate of cost. There have been some undocumented lightning strikes and no record of cost.

- There is a potential for interruption of utility services and damage to structures;
- There is a potential for injury or death; and
- This could occur townwide.

Tornado/Downburst/Severe Wind - High Risk-estimate of cost: \$4,951,224. Tornados are hard to predict where they will touch down and what path they will take, making it difficult to estimate potential damages. Assuming estimated damages to 10% of all structures with 20% damages could cost \$4,951,224. Buildings in Stoddard have not been built to Zone 2, Design Wind Speed Codes.

- This could occur townwide, however, river corridors and hill tops are most susceptible;
- There is a potential for interruption of utility services and damage to structures, roads and bridges; and
- There is a potential for injury or death.

Hurricane/Tropical Storm-High Risk - estimate of cost: \$6,189,030. Stoddard's location in southwestern New Hampshire reduces the risk of extremely high winds that are associated with hurricanes. The town has experienced small blocks of downed timber and uprooting of trees onto structures. With wind damage to 5% of the structures with 10% damage the estimated loss is \$1,237,806. Hurricanes can also cause flooding. Flood damage to 10% of the structures with 20% damage is estimated \$4,951,224.

- This could occur townwide, however, river corridors and hill tops are most susceptible;
- There is a potential for interruption of utility services, and damage to structures, roads and bridges; and
- There is a potential for injury or death.

Earthquake - Low Risk - estimate of cost: \$12,378,060. Moderate potential for serious damage in the village portion of town. Structures are mostly of wood frame construction. Assuming a moderate earthquake in Stoddard resulting in 5% of structural damage throughout town, property losses could be estimated at \$12,378,060. This does not include the costs of repairing or replacing roads, bridges, power lines, telephone lines, or the contents of the structures.

- There is a potential for collapse of structures, roads and bridges;
- There is a potential for injury or death; and
- This could occur townwide.

Severe Winter Weather - High Risk - no estimate of cost. Occasionally heavy snow years will collapse buildings. Ice storms have disrupted power and communication services. Timber has been severely damaged. In recent history, Stoddard has not recorded any loss of life due to the extreme winter weather. These chance events with random damage make it difficult to set a cost to repair or replace any of the structures or utilities affected.

- This could occur townwide;
- There is a potential for interruption of service, and damage to structures; and
- There is a potential for injury or death.

Man-Made Hazards/Hazardous Materials - High Risk-no estimate of cost. Potential spills or leakage from the transportation of chemicals and bio-hazardous materials carried through town on NH 9 by truck is a concern. However, this accident could occur anywhere in town. A spill could cause water contamination or airborne pollutants to residents which may cause illness or death. The potentially high cost of clean-up after a property is contaminated can make the property unusable for years.

Man-Made Hazards/Dam Breach - High Risk - see below for estimate of cost: The Stoddard Hazard Mitigation Committee identified the following dams which would cause damage in the event of a dam breach.

- Flooding is a potential;
- There is a potential for interruption of utility services, and damage to structures; and
- There is a potential for injury or death.

Potential risk:

- Highland Lake Dam - potential for damage to 500 structures: \$111,700,000
- Island Pond Dam - potential for damage to 1 structure: \$223,400
- Hidden Pond Dam - potential for damage to 60 structures: \$13,404,000
- Pioneer Lake Dam - potential for damage to 50 structures: \$11,170,000
- Center Pond Dam - potential for damage to 1 structure: \$223,400

CHAPTER 6

CRITICAL FACILITIES

A Critical Facility is defined as a building, structure, or location which:

- Is vital to the hazard response effort
- Maintains an existing level of protection from hazards for the community
- Would create a secondary disaster if a hazard were to impact it

Critical Facilities Within Hazard Areas

Hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding.

The Critical Facilities List for the Town of Stoddard has been identified utilizing a Critical Facilities List provided by the State Hazard Mitigation Officer. Stoddard's Hazard Mitigation Committee has broken up this list of facilities into four categories. The first category contains facilities needed for Emergency Response in the event of a disaster. The second category contains Non-Emergency Response Facilities that have been identified by the Team as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Stoddard. The third category contains Facilities/Populations that the Committee wishes to protect in the event of a disaster. The fourth category contains Potential Resources, which can provide services or supplies in the event of a disaster.

Category 1 - Emergency Response Services:

Stoddard has identified the Emergency Response Facilities and Services as the highest priority in regards to protection from natural and man-made hazards.

1. Emergency Operations Center

James Faulkner Elementary School - 200 School Street

2. Fire Station

NH 123 North

3. Police Station

Old Forest Road

6. Red Cross Approved Emergency Shelters

There are no Red Cross approved shelters. The school could be used as a limited shelter since it has installed a generator.

8. Primary Evacuation Routes

NH 123 South to NH 9

NH 123 North to NH 10

9. Bridges Located on Primary Evacuation Routes

NH 9 near Antrim town line

Shedd Hill Road in Mill Village

NH 123 South near Nelson town line

10. Town Hall

NH 123 North

11. School

NH 123 North

12. Communications

Pitcher Mountain tower for State Police, NH Division of Forests & Lands, and Mutual Aid
Cell tower being constructed in 2019 on Richer Road (First Net)

13. Helicopter Landing Sites

Fields at Pitcher Mountain (either side of NH 123 North)
James Faulkner Elementary School (School Street)
Intersection of NH 123 North and NH 9
Intersection of NH 123 South and NH 9
Mr. Mike's Gas Station, NH 9 (requires gas tanks to be shut down)
At the bottom of Nelson bypass on NH 9 near the NH State Highway Garage

Category 2 - Non-Emergency Response Facilities:

The town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Stoddard.

1. Water Supply

Lakes and Ponds (Highland Lake, Island Pond, Granite Lake, Center Pond, Robb Reservoir)

2. Problem Culverts

Kings Highway - 2 locations, each with undersized double culverts

Category 3 - Facilities/Populations to Protect:

The third category contains people and facilities that need to be protected in event of a disaster.

1. Special Needs Populations

Aten Road

2. Recreation Areas

Highland Lake Marina/Carr's Landing
Pitcher Mountain (includes snowmobiling, hiking, ATV riding, blueberry picking)
Granite Lake
Island Pond
Ballfields at Elementary School (School Street)
Hidden Lake - Tennis/Pool facilities (Private facilities, east of Kings Highway)

3. School/Daycare

James Faulkner Elementary School (School Street)

4. Historic Buildings/Sites

Twin Stone Arch Bridge (NH 9)
Town Hall

Category 4 - Potential Resources:

Contains facilities that provide potential resources for services or supplies.

1. Hospitals/Medical Supplies

- Cheshire Medical Center (Keene)
- Monadnock Community Hospital (Peterborough)
- Concord Hospital (Concord)

2. Gas

- State facilities in Hillsborough and also Swanzey (NH DOT on Base Hill Road)
- Mr. Mike's (NH 9)

3. Heavy Equipment Suppliers

- Joe Sarcione
- Frank Stuckey
- Town road contractor
- John Lightbody
- Phil Hamilton

4. Small Equipment

- Town road contractor
- John Lightbody
- Phil Hamilton
- Geoff Jones
- Frank Stuckney

5. Snow Removal

- Joe Sarcione
- Town road contractor
- Frank Stuckney
- John Lightbody
- Phil Hamilton

Critical Facilities within Hazard Areas

Some hazards identified in this plan are regional risks and, as such, all critical facilities fall into the hazard area. The exception to this is flooding. There are no identified critical facilities that fall within the 100-year floodplain.

Critical Facilities and Evacuation Routes Potentially Affected by Hazard Areas

Hazard Type	Hazard Area	Critical Facilities Affected	Evacuation Routes Affected
Flooding	NH 123 east of Doe Road	None Affected	NH 123 (P*)
	NH 123 South	Primary Evacuation Route Bridge	NH 123 (P)
	King's Highway	Critical Culvert	None
	King's Highway	Critical Culvert	None
	NH 123 and Old Forest Road	Police Station	NH 123 (P)
	NH 123 by Highland Lake	Critical Culvert	NH 123 (P)
	Highland Lake Flooding	Areas of Population- Recreational Facilities	None
	NH 9, South of Island Pond	None Affected	NH 123 (P)
	NH 123 and Kings Street	None Affected	NH 123 (P)
	Murdough Road and NH 123 North	None Affected	NH 123 (P)

*(P)= primary evacuation

CHAPTER 7

EXISTING MITIGATION STRATEGIES AND PROPOSED IMPROVEMENTS

Below is a description of the strategies currently being used by the Town of Stoddard. These are further reviewed in the Existing Protection Matrix to determine the effectiveness and changes needed.

Description of Existing Programs

National Flood Insurance Program (NFIP) - The town is a participating member of the National Flood Insurance Program.

School Evacuation Plan - The designated plan to evacuate the Elementary schools in the event of an emergency or disaster addressing bussing, transportation routes (primary and alternative), traffic & crowd control, end destination and parental notification. Stoddard's School Evacuation Plan has served as a model plan for several surrounding communities. The Stoddard Fire, Police, and School Departments are responsible for implementing this plan.

Emergency Back-up Power - The town has one 11+/- KW generator for emergency back-up power at the school which serves as the Emergency Operation Center. The Fire Department has two portable generators and a larger one for the fire station.

Local Road Design Standards - Standards set by the town and the Highway Department to ensure a constant construction benchmark.

Local Bridge Maintenance Program - All local bridges in Stoddard are inspected annually and maintained by the NH Department of Transportation (NHDOT). Guidelines and schedules for annual upkeep are established by NHDOT.

Local Road Maintenance Program - Stoddard allocates funds each year to various roadway projects, such as resurfacing, culvert replacement and repair.

Winter Storms Operations - A set of guidelines for the Highway Department and town personnel to follow during times of extreme winter weather.

Town Master Plan - A guidance document to ensure that overall development in town is sustainable, meeting the needs of the citizens by setting forth steps and guidelines for a sound living environment through well planned growth. Reviewed annually by Planning Board.

Mutual Aid - Provides assistance to all aspects of Stoddard's Emergency Management Services in town. Southwest New Hampshire Fire Mutual Aid (SWNHFMA) and the Cheshire County Sheriff's Department provide mutual aid to Stoddard. SWNHFMA serves 83 cities and towns and the Cheshire County Sheriff's Department serves all communities within Cheshire County.

Fire Pond Management Plan - This designates a maintenance schedule for the local dry hydrants used by the Fire Department for water supply for fire prevention and suppression.

Hazardous Materials Spill Prevention Control and Counter Measures Plan - This Plan is on hand with the Fire Department. in the event that there is an incident. Personnel in the Fire

Department receive regular training for handling hazardous materials spills. SWNHFMA’s Haz-Mat Team is called upon in the event of a major spill.

Town Radio System - The town has both mobile and portable radios for the Police Department. The Fire Department utilizes analog radios with digital capabilities.

Wild Water Fowl Feeding Prevention Policy - The Water Fowl Feeding Policy is meant to deter people from feeding the fowl, causing them to linger. The water fowl defecate about 20 times a day, according to NHDES. They pose a hazard to the water quality by the large amounts of E Coli bacteria that come from their waste. Causing them to linger, awaiting the next hand-out is a serious health problem.

Ambulance Service - Diluzio Ambulance Service is the primary ambulance service. Additional ambulance service is provided by Antrim, Keene Fire, and Marlow.

Forest Fire Warden - Duties of the Forest Fire Warden(s) include fire prevention, preparedness and suppression. The Warden also grants burn permits to residents.

Emergency Operations Plan - The town’s Emergency Operations Plan establishes protocol for all town departments in the event of an emergency.

Emergency Services - Fire, Police and Emergency Management.

Existing Protection Matrix

The Stoddard Hazard Mitigation Committee has developed a summary matrix of existing hazard mitigation strategies presented below and on the following pages. This matrix, a summary of the preceding information, includes the type of existing protection (Column 1), area covered (Column 2), the responsible local agent (Column 3), the effectiveness and/or enforcement of the strategy (Column 4), comments on the identified improvements or changes needed (Column 5). Effectiveness of the existing protection is rated Poor, Average, Good or Unknown: Poor - needs improvements; Average - meets general expectations; Good - meets and sometimes exceeds expectations; Unknown - not yet used or unable to quantify effectiveness.

Existing Protection	Area Covered	Responsible Local Agent	Effectiveness	Proposed Improvements and Comments
NFIP Member	Townwide	Emergency Management Director	Good	Continue to make outreach materials available for the public.
School Evacuation Plan	Elementary School	School Superintendent SAU 24	Good	This was updated in 2018. No changes needed at this time.
Emergency Back-up Power	School and 4 portable generators	Fire Department	Poor	Need additional generators for Town Hall/Offices, and Fire Station. Also need a hook-up for Police Department
Local Road Design Standards	Townwide	Planning Board	Average	Follow State standards and incorporate access management and road cut specifications into regulations for Town Class V highways.

Existing Protection	Area Covered	Responsible Local Agent	Effectiveness	Proposed Improvements and Comments
Local Bridge Maintenance Program	Shedd Hill Road North Shore Road	Town Selectmen	Good	Both replaced recently Shedd Hill Road-10 years North Shore Road-20 years No changes needed at this time.
Local Road Maintenance Program	Townwide	Selectmen/ Town Meeting Vote	Average	Project prioritized annually by Selectmen with input from public and Road contractor Most roads are gravel and dirt. No changes needed at this time.
Winter Storms Operations Plan	Townwide	Selectmen/ Contractor	Good	DOT plans NH 9/123 clearing. Contractor has routine for clearing local roads during school time of day.
Town Master Plan	Townwide	Planning Board	Average	Recently updated some chapters in 2017.
Mutual Aid	Townwide	Fire and Police	Good	No changes needed at this time.
Fire Pond Management Plan	Townwide Large Ponds	Fire Department	Good	Occasionally request Selectmen to ask State to raise lake level by replacing boards for dams.
Hazardous Materials Spill Prevention Control and Counter Measures Plan	Townwide	Fire Department	Good	Fire Department is trained to identify and secure HazMat incidents; Keene HazMit Team responds. No changes needed at this time.
Town Radio System	Townwide	Fire Department Police Department	Good	Mobiles and Portables. Fire on analog but capable of going digital. Grant funding provided new radios. EMD has pager. Antenna has been added to EOC.
Wild Water Fowl Feeding Prevention Policy	Townwide	Selectmen	Good	Stoddard passed an ordinance against feeding waterfowl to protect surface water quality. No changes needed.
Ambulance Service	Townwide	Diluzio	Good	Backup service is Antrim, Keene Fire, and Marlow. No changes needed at this time.
Forest Fire Warden	Townwide	Fire Warden	Good	Lots of forested and wooded land Good communication/cooperation with Police and Fire Depts. Five deputy wardens with specific tasks.
Emergency Operations Plan	Townwide	Selectmen Emergency Management Director	Average	Put to use during '05-'06 flood, 2008 ice storm, and 2011 Tropical Storm Irene. Review per state regulations annually and 5-year updates.
Emergency Services	Townwide	Fire, Police, EMD	Good	Updates have been made to Police & Fire.

Status of Previous Priority Mitigation Actions

The following table provides a status update for the Priority Mitigation Actions identified in the original Plan. Previously identified mitigation actions are noted as completed, deleted, or deferred to the updated Plan’s new mitigation strategies list.

MITIGATION ACTION	STATUS	EXPLANATION OF STATUS
Continue to develop and implement Dry Hydrant Plan.	Completed	Dry hydrants have been installed.
Fire Department needs to be notified by NH Dam Bureau prior to water draw downs.	Continue	Continue to develop communications with NHDES.
Increase size of culverts to prevent flooding on King’s Highway (2 Locations).	Continue	Funding needed. Continue as a priority action.
Add Future Land Use Plan to Master Plan.	Continue	Add this plan as a chapter or appendix.
Communicate with NHDOT to improve maintenance of culverts/shoulders along NH 123 south of NH 9.	Continue	Maintain communications with NH DOT.
Outreach efforts on Waterfowl Feeding Ordinance-including newsletter to lake associations, signs, etc.	Completed	This has been completed.
Develop a town warning system (digital sign, website, etc.).	Continue	Consider options and implement.
Fuel load monitoring after severe weather events to prevent wildfires.	Continue	This is an ongoing action and should continue into this plan.
Keep Communications open with NHDES regarding balance of outflow and inflow of floodwaters of Island Pond.	Continue	This is an ongoing action and should continue into this plan.
Maintain ditches along Juniper Hill Road & Old Forest Rd.	Completed & Continue	This is an ongoing action and should continue into this plan.
North Shore Road: Communicate with Granite Lake Village District Commissioners regarding Dam control.	Continue	Continue communications.
Maintain compliance with NIMS training for EMS, EMD, Fire Department, Police, Town Officials.	Completed & Continue	This is an ongoing action and should continue into this plan.
Raise the road and replace existing culverts with larger ones in the Old Antrim Road Mill Village Area.	Delete	Funding needed. Not considered a viable project in the next 5 years.
Develop town-sponsored safety awareness program for public workers and public buildings.	Completed & Continue	This is an ongoing action and should continue into this plan.
Outreach & education for residents about protecting their homes from wildfires such as cleaning pine needles off of roofs, clean gutters, clear brush away from homes, etc. (website, newsletter, events).	Completed & Continue	This is an ongoing action and should continue into this plan.
Public outreach & education on fire safety: carbon monoxide and smoke detectors, fire extinguishers, burn permit requirements, etc.	Completed & Continue	This is an ongoing action and should continue into this plan.
Outreach & education of emergency preparedness and hazard mitigation methods for residents.	Continue	This is an ongoing action and should continue into this plan.
Continue FEMA and state emergency management training.	Continue	This is an ongoing action and should continue into this plan.
Build a sub fire station.	Continue	Funding needed. Continue as a priority action.

CHAPTER 8

EXISTING AND POTENTIAL MITIGATION STRATEGIES

Identifying Gaps in Coverage

In addition to the programs and activities that Stoddard is currently undertaking to protect its residents and property from natural and manmade disasters, a number of additional strategies were identified by the Local Hazard Mitigation Committee for consideration. The process of compiling a comprehensive list of all mitigation strategies currently in place throughout the town helped the committee to identify gaps in the existing coverage and improvements which could be made to the strategies. Existing and potential strategies were identified for each general hazard type using the following categories: Prevention (programs and policies), Property Protection, Emergency Services, and Public Information. Each strategy was discussed to determine realistic strategies to be included in the STAPLEE chart.

Potential Mitigation Strategies

Hazard Type	Prevention	Property Protection	Emergency Services	Public Information
Flooding	Annual bridge and road maintenance program.	Upsize culverts/bridges at: North Shore Road, Old Forest Road, and Shedd Hill at Carr Rd.	Update & adopt Emergency Operations Plan.	Provide information to residents on flood proofing/elevating homes in flood prone areas.
Drought	Contact the elderly and special needs populations.	Consider adding water conservation regulation & water ban if necessary.	Assess fire ponds and other water sources.	Provide information to residents on water conservation/drought resistant landscaping and/or rain gardens.
Extreme Temperature	Contact the elderly and special needs populations.	-----	Provide a cooling center.	Provide information to residents on ways to mitigate the impact of extreme heat and maintain health.
Wildfire	Clear out underbrush; establish BMPs for timber harvesting.	Install dry hydrants.	Continue training for firefighters.	Use existing information produced by the State and Urban Interface. Increase fire awareness by using a Smokey Bear sign.
Lightning	Continue to enforce Building Codes.	Install grounding equipment on public & historic buildings.	-----	Provide outreach material on safety during lightning and storm events. Include a link of FEMA's website on the town website.
Tornado/ Severe Wind/ Downburst	Coordinate with Eversource to enhance vegetation management.	Trim tree branches near critical facilities, town structures, and roadways.	Continue mutual aid pacts with surrounding communities to share resources.	Provide information for residents to understand ways to mitigate potential damage during a tornado/severe wind/downbursts.
Hurricane/ Tropical Storm	Coordinate with Eversource to enhance vegetation management.	Consider requirement for new construction to withstand severe wind speeds.	Continue mutual aid pacts with surrounding communities to share resources.	Provide information for residents to understand ways to mitigate potential damage during a hurricane/tropical storm event.
Earthquake	-----	Retrofit public buildings with earthquake standards.	Continue mutual aid pacts with surrounding communities to share resources.	Provide information to the public about reducing damage due to earthquakes. Include a link of FEMA's website on the town website.

Hazard Type	Prevention	Property Protection	Emergency Services	Public Information
Severe Winter Weather	Coordinate with Eversource to enhance vegetation management.	Trim tree branches near critical facilities, town structures, and roadways.	Review current and future needs for emergency backup power.	Disseminate information to residents about proper use of generators and the importance of maintaining the heating system to prevent carbon monoxide poisoning and fires.
Hazardous Materials	Spill Prevention Control and Counter Measures Plan.	-----	Annual reporting to Fire Department of local hazardous material storage.	Disseminate outreach material on proper disposal of hazardous household materials and medicines; provide notification to residents for the Stoddard hazardous materials days at the Keene Transfer Station.
Dams	Inspect dams, bridges and culverts prior to heavy rain events.	Identify beaver dam eradication options.	Dam Emergency Action Plans.	Provide information to the public on emergency evacuation routes.
All Hazards	School Evacuation Plan.	-----	Annual training for fire, police, and public works staff and volunteers.	Educate the public about the Shoreland Water Quality Protection Act.

Proposed Mitigation Strategies Prioritized

Each proposed mitigation strategy identified in the previous section was ranked in order to determine a prioritized list of strategies to implement. The method of ranking used for this Hazard Mitigation Plan was the STAPLEE method.

STAPLEE is an acronym for a general set of criteria common to public administration officials and planners. It stands for the Social, Technical, Administrative, Political, Legal, Economic and Environmental criteria for making planning decisions. Questions to ask about suggested actions include:

- **Social:** Is the proposed action socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical:** Will the proposed action work? Will it create more problems than it solves?
- **Administrative:** Can the community implement the action? Is there someone to coordinate and lead the effort?
- **Political:** Is the action politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal:** Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- **Economic:** What are the costs and benefits of this action? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental:** How will the action impact the environment? Will the action need environmental regulatory approvals?

Each mitigation strategy was evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the STAPLEE criteria. The committee filled in the following table to reach a total score. Each strategy is prioritized according to the total score. The highest scoring strategies are determined to be of most importance, economically, socially, technically, administratively, politically, legally, economically and environmentally.

STAPLEE Chart

Mitigation Strategy	Is it Socially acceptable?	Is it Technically feasible & potentially successful?	Is it Administratively workable?	Is it Politically acceptable?	Is there Legal authority to implement?	Is it Economically beneficial?	Is it Environmentally beneficial?	Total Score
Replace and upsize Shedd Hill culvert on Carr Road.	3	3	3	3	3	3	3	21
Replace and upsize the culvert on Old Forest Road.	3	3	3	3	3	3	3	21
Obtain generators for the Town Hall/Office and install a hook-up in the Police Department. Obtain a 15 kw portable generator on wheels.	3	3	3	3	3	3	3	21
Keep communications open with NHDES regarding balance of outflow and inflow of floodwaters of Island Pond.	3	3	3	3	3	3	3	21
Maintain ditches along Juniper Hill Road and Old Forest Road.	3	3	3	3	3	3	3	21
Develop a town-sponsored safety awareness program for public workers and public buildings.	3	3	3	3	3	3	3	21
Maintain compliance w/NIMS training for EMS, EMD, Fire Department, Police, Town Officials.	3	3	3	3	3	3	3	21
Provide outreach & education for residents about protecting their homes from wildfires such as cleaning pine needles off of roofs, clean gutters, clear brush away from homes, put addresses on homes, etc. (website, newsletter, events).	3	3	3	3	3	3	3	21
Update the Emergency Operations Plan.	3	3	3	3	3	3	3	21
Conduct fuel load monitoring after severe weather events to prevent wildfires.	3	3	3	3	3	3	3	21
North Shore Road: Communicate with Granite Lake Village District Commissioners regarding dam control.	3	3	3	3	3	3	3	21
Communicate with NH Dam Bureau to notify the Stoddard Fire Department prior to water draw downs.	3	3	3	3	3	3	3	21
Increase the size of culverts to prevent flooding on King's Highway (2 Locations). Consider raising the road.	3	3	3	3	3	3	3	21
Add this plan as a chapter or appendix in the Master Plan.	3	3	3	3	3	3	3	21

Mitigation Strategy	Is it Socially acceptable?	Is it Technically feasible & potentially	Is it Administratively workable?	Is it Politically acceptable?	Is there Legal authority to	Is it Economically beneficial?	Is it Environmentally beneficial?	Total Score
Continue to communicate with NHDOT to improve maintenance of culverts and shoulders along NH 123 south of NH 9.	3	3	3	3	3	3	3	21
Continue to train members of the Fire Department to identify and secure HazMat incidents.	3	3	3	3	3	3	3	21
Replace and upsize culvert on North Shore Road.	2	3	3	3	3	3	3	20
Maintain vegetation management of trees over roads.	2	3	3	2	3	3	3	19
Develop a town warning system (digital sign, website, etc.).	2	3	3	2	3	3	3	19
Consider amending the local road design standards to incorporate access management and sight-line standards.	2	3	3	2	3	3	3	19
Maintain communication between Selectboard and State to raise lake level by replacing boards.	2	3	3	2	3	3	3	19

CHAPTER 9

IMPLEMENTATION SCHEDULE AND ACTION PLAN

The Hazard Mitigation Committee developed an action plan that outlines who is responsible for implementing each of the prioritized strategies determined in the previous chapters, as well as when and how the actions will be implemented. The following questions were asked to develop the implementation schedule for the identified priority mitigation strategies:

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?

Each strategy's total score from the ranking process is included in the table. As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

Each strategy's total score from the ranking process is included in the table. As additional information becomes available regarding project leadership, timeline, funding sources, and/or cost estimates, the Plan will be reviewed and amended accordingly.

In the *When* column: Short-term is 1-2 years; Mid-term is 2-3 years; Long-term is 4-5 years

Mitigation Action	Who (Leadership)	When (Deadline)	How (Cost and Funding Source)
Replace and upsize the culvert on Shedd Hill at Carr Road.	Road Agent/Board of Selectmen	Mid-term	Town budget/grants \$8,000
Replace and upsize the culvert on Old Forest Road.	Road Agent/Board of Selectmen	Mid-term	Town budget/grants \$6,000
Obtain generators for the Town Hall/Office and install a hook-up in the Police Department. Obtain a 15 kw portable generator on wheels.	Emergency Management Director (EMD)	Short-term	Town budget/grants \$15,000
Keep communications open with NHDES regarding balance of outflow and inflow of floodwaters of Island Pond.	Road Agent	Short-term	Town budget under \$100
Maintain ditches along Juniper Hill Road and Old Forest Road.	Road Agent	Short-term	Town budget \$15,000
Develop a town-sponsored safety awareness program for public workers and public buildings.	Town Administrator	Short-term	Town budget \$500
Maintain compliance with NIMS training for EMS, EMD, Fire Department, Police, and Town Officials.	EMD	Short-term	Town budget \$4,000/year

Mitigation Action	Who (Leadership)	When (Deadline)	How (Cost and Funding Source)
Provide outreach & education for residents about protecting their homes from wildfires such as cleaning pine needles off of roofs, clean gutters, clear brush away from homes, put addresses on homes, etc. (website, newsletter, events).	Town Administrator	Short-term	Town budget \$500
Update the Emergency Operations Plan.	EMD	Short-term	Town budget/grants \$10,000
Conduct fuel load monitoring after severe weather events to prevent wildfires.	EMD	Short-term	Town budget \$2,000-\$10,000
North Shore Road: Communicate with Granite Lake Village District Commissioners regarding dam control.	Town Administrator	Short-term	Town budget under \$100
Communicate with NH Dam Bureau to notify the Stoddard Fire Department prior to water draw downs.	EMD	Short-term	Town budget Under \$100
Increase the size of culverts to prevent flooding on King's Highway (2 Locations). Consider raising the road.	Road Agent	Short-term	Town budget \$15,000-\$50,000
Add this plan as a chapter or appendix in the Master Plan.	Planning Board	Mid-term	Town budget Under \$100
Continue to communicate with NHDOT to improve maintenance of culverts and shoulders along NH 123 south of NH 9.	Town Administrator/ Road Agent/Board of Selectmen	Mid-term	Town budget Under \$100
Continue to train members of the Fire Department to identify and secure HazMat incidents.	Fire Chief	Short-term	Town budget/grants \$5,000/year
Replace and upsize the culvert on North Shore Road.	Road Agent/Board of Selectmen	Mid-term	Town budget/grants \$15,000
Maintain vegetation management of trees over roads.	Board of Selectmen	Short-term	Town budget \$30,000
Develop a town warning system (digital sign, website, etc.).	EMD/ Board of Selectmen	Short-term	Town budget/grants \$15,000-\$20,000
Consider amending the local road design standards to incorporate access management and sight-line standards.	Town Administrator	Mid-term	Town budget \$5,000-\$10,000
Maintain communication between Selectboard and State to raise lake level by replacing boards.	Board of Selectmen	Short-term	Town budget Under \$100

CHAPTER 10

ADOPTION, MONITORING, UPDATES AND IMPLEMENTATION

Adoption

The Stoddard Board of Selectmen adopted the Stoddard Hazard Mitigation Plan Update 2019 on (date). A copy of the resolution can be found at the end of this chapter. Adopted policy addresses the actions for implementation set forth in the chart “Implementation Strategy for Priority Mitigation Actions” in Chapter 9 and in the “Monitoring & Updates” sub-section contained in this Chapter (10). All other sections of this Plan are supporting documentation for information purposes only and are not included as the statement of policy.

Monitoring & Updates

Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the Plan where necessary.

In order to track progress and update the Mitigation Strategies identified in the Action Plan (Chapter 10), the town Hazard Mitigation Committee will revisit the Stoddard Hazard Mitigation Plan Update 2019 annually, or after a hazard event. The Emergency Management Director is responsible for initiating this review and needs to consult with the Board of Selectmen and other key local officials. Changes should be made to the Plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community’s priorities, and funding resources. Priorities that did not make the implementation list, but are identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this Plan to determine feasibility of future implementation. In keeping with the process of adopting the Stoddard Hazard Mitigation Plan Update 2019, a public viewing period to receive public comment on Plan maintenance and updating should be held during the annual review period and the final product adoption by the Board of Selectmen.

The Stoddard Hazard Mitigation Plan Update 2019 must be reviewed, revised as appropriate, and resubmitted to FEMA for approval every **five years** in order to maintain eligibility for all Hazard Mitigation Assistance (HMA) funding. This update was prepared with assistance from Planners at Southwest Region Planning Commission trained in Hazard Mitigation Planning. Data and maps used to prepare this plan are available at their office and should be used in preparing future updates.

FEMA final approval granted on (add date). The Stoddard Hazard Mitigation Plan Update 2019 must be updated within five years of this date.

Continued Public Involvement

In keeping with the process of adopting the Stoddard Hazard Mitigation Plan Update 2019, the Emergency Management Director, under direction of the Board of Selectmen will be responsible for ensuring that the town departments and the public have adequate opportunity to participate in the maintenance and update of the Hazard Mitigation Plan. A public viewing period will be held to receive public comment during the annual review period, and the final product adoption by the Board of Selectmen.

During the maintenance, implementation, monitoring, evaluation and update process of the Stoddard Hazard Mitigation Plan Update 2019, the following techniques may be used to ensure continued public involvement:

- Provide invitations to the Board of Selectmen;
- Provide invitations to the town department heads;
- Post on social media and interactive websites;
- Post notices of meetings at the Town Office, Library, and the town website.

Implementation of the Plan through Existing Programs

The previous Stoddard Hazard Mitigation Plan was used as a template to update this plan. It has also been used in the recent updating of some sections of the Stoddard Master Plan and the Emergency Operations Plan.

To best implement the Stoddard Hazard Mitigation Plan Update 2019, there should be coordination of some of the Action Plan items into other documents. Some of the Action Plan items from the previous Stoddard Hazard Mitigation Plan have been deferred into this plan since they were not completed during that time period.

Master Plan

Implementation of the Master Plan has been ongoing since its most recent adoption. Recommendations from the Stoddard Hazard Mitigation Plan Update 2019 should be considered for insertion into future updates of the Master Plan. The Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to encourage the adoption of the Stoddard Hazard Mitigation Plan Update 2019 as a chapter or appendix of the Master Plan.

Zoning Ordinance and Regulations

Occasionally, implementation strategies involve revisions to the Subdivision Regulations and/or the Site Plan Review Regulations as well as the Zoning Ordinance. As these occur, the Local Hazard Mitigation Committee will oversee the process to begin working with the Planning Board to develop appropriate language for the recommended modifications.

A number of Implementation Action items which will be undertaken relate to public education and involvement. Additionally, members of the public including area business owners, schools, communities, and organizations will be invited to participate in the yearly process of updating the Stoddard Hazard Mitigation Plan. These outreach activities will be undertaken during the Plan's annual review and during any Hazard Mitigation Committee meetings that the Board of Selectmen calls to order.

CERTIFICATE OF ADOPTION
STODDARD, NEW HAMPSHIRE
BOARD OF SELECTMEN
A RESOLUTION ADOPTING THE
STODDARD HAZARD MITIGATION PLAN UPDATE 2019

WHEREAS, the Town of Stoddard has developed and received conditional approval from the Federal Emergency Management Agency (FEMA) for its Hazard Mitigation Plan Update 2019 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held between August 22, 2018 and January 16, 2019 regarding the development and review of the Stoddard Hazard Mitigation Plan Update 2019; and

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

WHEREAS, the Plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Stoddard, 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 Stoddard eligible for funding to alleviate the impacts of future hazards; now, therefore, be it **RESOLVED** by the Board of Selectmen:

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

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Stoddard this ___ day of _____, **2019**

Stoddard Board of Selectmen Chairman

Board of Selectmen

Board of Selectmen

ATTEST _____

APPENDIX A

HAZARD DESCRIPTIONS

The following list describes hazards that have occurred or have the potential to occur in the Town of Stoddard. The descriptions provided are those used in the State of NH Hazard Mitigation Plan.

Flooding

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.

100-year Floodplain Events

- Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100-year flood does not mean that a flood will occur once every 100 years. Rather, 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 of flood.” What this means is that there is a 1% chance of a flood of that size happening in a year.

Rapid Snow Pack Melt

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

River Ice Jams

- Rising waters in early spring breaks ice into chunks, which float downstream and often pile up, causing flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice collecting in river bends and against structures presents significant flooding threats to bridges, roads, and the surrounding lands.

Severe Storms

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

Beaver Dams and Lodging

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

Drought

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. 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 droughts 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 ground-water levels or increasing stream-flow. Low stream-flow correlates with low ground-water levels because ground-water discharge to streams and rivers maintains stream flow during extended dry periods. Low stream-flow and low ground-water levels commonly cause diminished water supply.

Extreme Temperatures

Extreme temperatures are a prolonged period of extreme hot or cold temperatures that pose a danger to people, animals, and crops. Extreme heat is characterized by abnormally high temperatures and/or longer than average time periods of high temperatures and often coincide with high relative humidity. Although it is an infrequent event, it usually occurs on an annual basis between late July and August. The severity of extreme heat can be dangerous to those residents with medical conditions and the elderly. Extreme heat can add to the potential for wildfires and depletion of the water supply for firefighting. Extreme cold temperatures are characterized by periods of abnormally cold temperatures and are especially dangerous to the elderly and those who are exposed to the weather for extended periods. Power outages can lead to frozen pipes and loss of heat.

Wildfire

Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassy areas.

Earthquake

New England is considered a moderate risk earthquake zone. 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, water 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 determined by the use of scales such as the Richter scale and Mercalli scale.

Tornado, Downburst, Severe Wind

Tornado: A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. They 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 Enhanced 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.

Severe Wind: Significantly high winds occur especially during tornadoes, hurricanes, winter storms and thunderstorms. Falling objects and downed power lines are potential hazards associated with

high winds. In addition, property damage and downed trees are common during severe wind occurrences.

Downburst: A severe, localized wind blasting down from a thunderstorm. These “straight line” winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories:

- Microburst, which covers an area less than 2.5 miles in diameter, and
- Macrobust, which covers an area at least 2.5 miles in diameter.

Hurricane/Tropical Storm

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 while the storm may extend over 400 miles. High winds and flooding are primary causes of hurricane-inflicted loss of life and property damage. A tropical storm is a downgraded form of a hurricane with slower wind speeds.

Lightning

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

Severe Winter Weather

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

Heavy Snow Storms: A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are defined as a storm which contains large amounts of snow OR blowing snow, with winds in excess of 35 mph and visibilities of less than 1/4 mile for an extended period of time (at least 3 hours). A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

Ice Storms: An ice storm involves rain, which freezes on impact. Ice coating at least one-fourth inch of thickness is heavy enough to damage trees, overhead wires and similar objects. Ice storms often produce widespread power outages.

Nor'easter: A Nor'easter is a large weather system traveling from South to North passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas from a Northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours (or days) in terms of duration.

Man-Made Hazards

Hazardous Materials: Hazardous materials spills or releases can cause damage of loss to life and property. Short or long-term evacuation of local residents and businesses may be required, depending on the nature and extent of the incident.

Dam Breach and Failure: Dam failure results in rapid loss of water that is normally held by the dam. These kinds of floods are extremely dangerous and pose a significant threat to both life and property.

APPENDIX B

RISK ASSESSMENT

The following terms are used to analyze the hazards considered. *Very Low, Low, Medium, High,* or *Very High* correlate with 1, 2, 3, 4 and 5, respectively.

Vulnerability

An adjective description (Very Low, Low, Medium, High, and Very High) of the potential impact a hazard could have on the town relating to human, business and property impacts. It is the ratio of population, property, commerce, infrastructure and services at risk relative to the entire town. Vulnerability is an estimate generally based on a hazard's characteristics, information obtained by the various town departments.

Very Low (1): Little or no area or segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of minor proportions.

Low (2): A limited area or segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of minor to moderate proportions.

Medium (3): (1) The total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard of moderate influence; or (2) the total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard, but not all to the same degree; or (3) an important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case scenario there could be a disaster of moderate proportions.

High (4): The total population, property, commerce, infrastructure and services of the town are exposed to some effects of a hazard of potentially moderate to great magnitude. In a worst case scenario there could be a disaster of major proportions.

Very High (5): The total population, property, commerce, infrastructure and services of the town are exposed to the effects of a hazard of potentially great magnitude. In a worst case scenario there could be a disaster of major to catastrophic proportions.

Probability of Occurrence

An adjective description (Very Low, Low, Medium, High, and Very High) of the probability of a hazard impacting the town within the next 25 years. Probability is based on a limited objective appraisal of a hazard's frequency using information provided by relevant sources, observations and trends.

Very Low (1): There is very little likelihood that a hazardous event will occur within the next 25 years (1 event in 25 years), however, the potential still exists.

Low (2): There is little likelihood that a hazardous event will occur within the next 25 years (1 event in 25 years).

Medium (3): There is moderate likelihood that a hazardous event will occur within the next 25 years (1-2 events each 5-10 years).

High (4): There is good likelihood that a hazardous event will occur within the next 25 years (1-2 events within 5 years).

Very High (5): It is highly likely that a hazardous event will occur within the next 25 years (1-2 events each year).

Severity

Calculated by taking the average of the vulnerability for human, business and property impacts of each hazard type.

Risk Level

An adjective description (Very Low, Low, Medium, High, or Very High) of the overall threat posed by a hazard over the next 25 years. It is calculated by multiplying the probability of occurrence and vulnerability. The result is then compared to a scale from 1-25 to determine the level of risk for each hazard.

Very Low (1-5): There is very little potential for a disaster during the next 25 years. The threat is so minor that it warrants no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard need not be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

Low (6-10): There is little potential for a disaster during the next 25 years. The threat is such as to warrant no special effort to prepare for, respond to, recover from, or mitigate against this hazard. This hazard need not be specifically addressed in the town's emergency management training and exercise program except as generally dealt with during hazard awareness training.

Medium (11-15): There is moderate potential for a disaster of less than major proportions during the next 25 years. The threat is great enough to warrant modest effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be included in the town's emergency management training and exercise program.

High (16-20): (1) There is moderate to strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate proportions during the next 25 years. The threat is significant enough to warrant major program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a major focus of the town's emergency management training and exercise program.

Very High (21-25): (1) There is strong potential for a disaster of major proportions during the next 25 years; or (2) history suggests the occurrence of multiple disasters of moderate to severe proportions during the next 25 years. The threat is significant enough to warrant serious program effort to prepare for, respond to, recover from, and mitigate against this hazard. This hazard should be a priority focus of the town's emergency management training and exercise program.

APPENDIX C

RESOURCES USED IN THE PREPARATION OF THIS PLAN

HSEM’s *State of New Hampshire Multi-Hazard Mitigation Plan*
 FEMA’s *Understanding Your Risks: Identifying Hazards and Estimating Losses*
 FEMA’s *Local Multi-Hazard Mitigation Planning Guidance*
 Town of Stoddard, NH’s *Hazard Mitigation Plan (2013)*
 Stoddard Town Report (2017)
 Town of Stoddard Master Plan

New Hampshire Homeland Security and Emergency Management (HSEM):.....271-2231
 Field Representative Hillsborough County.....271-2231
 Field Representative Cheshire County271-2231
Federal Emergency Management Agency (FEMA) 877-336-2734
NH Regional Planning Commissions:
 Central NH Regional Planning Commission226-6020
 Lakes Region Planning Commission279-8171
 Nashua Regional Planning Commission424-2240
 North Country Council444-6303
 Rockingham Planning Commission778-0885
 Southern New Hampshire Planning Commission669-4664
 Southwest Region Planning Commission357-0557
 Strafford Regional Planning Commission994-3500
 Upper Valley Lake Sunapee Regional Planning Commission448-1680
NH Executive Department:
 Governor’s Office of Energy and Community Services271-2611
NH Department of Cultural Resources:271-2540
 Division of Historical Resources271-3483
NH Department of Environmental Services:271-3503
 Air Resources271-1370
 Air Toxins Control Program.....271-0901
 Asbestos Program.....271-1373
 Childhood Lead Poisoning Prevention Program271-5733
 Environmental Health Tracking Program.....271-4072
 Environmental Toxicology Program271-3994
 Health Risk Assessment Program.....271-6909
 Indoor Air Quality Program271-3911
 Occupational Health and Safety Program.....271-2024
 Radon Program.....271-4764
 Geology Unit.....271-3503
 Pollution Preventive Program.....271-6460
 Waste Management271-2900
 Water Supply and Pollution Control271-3414
 Rivers Management and Protection Program271-8801
NH Office of Strategic Initiatives (OSI):.....271-2155
 Jennifer Gilbert, State Coordinator, Floodplain Management.....271-1762
NH Municipal Association224-7447
NH Fish and Game Department:271-3421
 Region 1, Lancaster788-3164
 Region 2, New Hampton744-5470
 Region 3, Durham868-1095
 Region 4, Keene352-9669

NH Department of Business and Economic Affairs:	
Economic Development	271-2591
Travel and Tourism	271-2665
NH Department of Natural and Cultural Resources:	
Division of Forests and Lands	271-2214
Division of Parks and Recreation	271-3556
NH Department of Transportation	271-3734
Northeast States Emergency Consortium, Inc. (NESEC)	(781) 224-9876
US Department of Commerce:	(202) 482-2000
NOAA: National Weather Service; Gray, ME	(207) 688-3216
US Department of the Interior:	202-208-3100
US Fish and Wildlife Service	225-1411
US Geological Survey	225-4681
US Army Corps of Engineers.....	(978) 318-8087
US Department of Agriculture:	
Natural Resource Conservation Service	868-7581
Cheshire County, Walpole.....	756-2988
Sullivan County, Newport.....	863-4297
Hillsborough County, Milford.....	673-2409 Ext. #4

Mitigation Funding Resources

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

[‡]NESEC - Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH HSEM for more information or visit the Consortium’s website at <http://www.nesec.org/index.cfm>.

[†] Note regarding **National Flood Insurance Program (NFIP)** and **Community Rating System (CRS)**:
 The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community’s floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property

owners. The NH Office of Strategic Initiatives can provide additional information regarding participation in the NFIP-CRS Program.

FEMA Region I Mitigation Planning Webliography

Hazard Mitigation is sustained action taken to reduce or eliminate risk to people and their property from natural hazards over the longest possible term.

Regulatory Information

Final Rule: 44 CFR 201.6

<http://www.fema.gov/pdf/help/fr02-4321.pdf>

Disaster Mitigation Act of 2000 (DMA 2K)

<http://www.fema.gov/library/viewRecord.do?id=1935>

Disasters and Natural Hazards Information

FEMA-How to deal with specific hazards

<http://www.ready.gov/natural-disasters>

Natural Hazards Center at the University of Colorado

<http://www.colorado.edu/hazards>

National Oceanic and Atmospheric Administration (NOAA): Information on various projects and research on climate and weather.

<http://www.websites.noaa.gov>

National Climatic Data Center: active archive of weather data.

<http://lwf.ncdc.noaa.gov/oa/ncdc.html>

Northeast Snowfall Impact Scale

<http://www.erh.noaa.gov/rnk/Newsletter/Fall%202007/NESIS.htm>

Weekend Snowstorm Strikes The Northeast Corridor Classified As A Category 3 "Major" Storm

<http://www.publicaffairs.noaa.gov/releases2006/feb06/noaa06-023.html>

Flood Related Hazards

FEMA Coastal Flood Hazard Analysis & Mapping

<http://www.fema.gov/national-flood-insurance-program-0/fema-coastal-flood-hazard-analyses-and-mapping-1>

Floodsmart

<http://www.floodsmart.gov/floodsmart/>

National Flood Insurance Program (NFIP)

<http://www.fema.gov/nfip>

Digital quality Level 3 Flood Maps

<http://msc.fema.gov/MSC/statemap.htm>

Flood Map Modernization

<http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/map-modernization>

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Reducing Damage from Localized Flooding: A Guide for Communities, 2005 FEMA 511

<http://www.fema.gov/library/viewRecord.do?id=1448>

Fire Related Hazards

Firewise

<http://www.firewise.org>

NOAA Fire Event Satellite Photos

<http://www.osei.noaa.gov/Events/Fires>

U.S. Forest Service, USDA

<http://www.fs.fed.us/land/wfas/welcome.htm>

Wildfire Hazards - A National Threat

<http://pubs.usgs.gov/fs/2006/3015/2006-3015.pdf>

Geologic Related Hazards

USGS Topographic Maps

<http://topomaps.usgs.gov/>

Building Seismic Safety Council

<http://www.nibs.org/?page=bssc>

Earthquake hazard history by state

<http://earthquake.usgs.gov/earthquakes/states/>

USGS data on earthquakes

<http://earthquake.usgs.gov/monitoring/deformation/data/download/>

USGS Earthquake homepage

<http://quake.wr.usgs.gov>

National Cooperative Geologic Mapping Program (NCGMP)

<http://ncgmp.usgs.gov/>

Landslide Overview Map of the Conterminous United States

<http://landslides.usgs.gov/learning/nationalmap/>

Kafka, Alan L. 2008. Why Does the Earth Quake in New England? Boston College, Weston

Observatory, Department of Geology and Geophysics

http://www2.bc.edu/~kafka/Why_Quakes/why_quakes.html

Map and Geographic Information Center, 2010, "Connecticut GIS Data", University of Connecticut

http://magic.lib.uconn.edu/connecticut_data.html

2012 Maine earthquake

http://www.huffingtonpost.com/2012/10/17/maine-earthquake-2012-new-england_n_1972555.html

Wind-Related Hazards

ATC Wind Speed Web Site

<http://www.atcouncil.org/windspeed/index.php>

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U.S. Wind Zone Maps

<http://www.fema.gov/safe-rooms/wind-zones-united-states>

Tornado Project Online

<http://www.tornadoproject.com/>

National Hurricane Center

<http://www.nhc.noaa.gov>

Community Hurricane Preparedness Tutorial

<http://meted.ucar.edu/hurricane/chp/hp.htm>

National Severe Storms Laboratory, 2009, "Tornado Basics",

http://www.nssl.noaa.gov/primer/tornado/tor_basics.html

Determining Risk And Vulnerability

HAZUS

<http://www.hazus.org>

FEMA Hazus Average Annualized Loss Viewer

<http://fema.maps.arcgis.com/home/webmap/viewer.html?webmap=cb8228309e9d405ca6b4db6027df36d9&extent=-139.0898,7.6266,-48.2109,62.6754>

Vulnerability Assessment Tutorial: On-line tutorial for local risk and vulnerability assessment.
<http://www.csc.noaa.gov/products/nchaz/htm/mitigate.htm>

Case Study: an example of a completed risk and vulnerability assessment.
<http://www.csc.noaa.gov/products/nchaz/htm/case.htm>

Geographic Information Systems (Gis) And Mapping

The National Spatial Data Infrastructure & Clearinghouse (NSDI) and Federal Geographic Data Committee (FGDC): Source for information on producing and sharing geographic data.
<http://www.fgdc.gov>

The Open GIS Consortium: Industry source for developing standards and specifications for GIS data
<http://www.opengis.org>

Northeast States Emergency Consortium (NESEC): Provides information on various hazards, funding resources, and other information.
<http://www.nesec.org>

US Dept of the Interior Geospatial Emergency Management System (IGEMS): Provides the public with both an overview and more specific information on current natural hazard events. It is supported by the Department of the Interior Office of Emergency Management.
<http://igems.doi.gov/>

FEMA GeoPlatform: Geospatial data and analytics in support of emergency management.
<http://fema.maps.arcgis.com/home/index.html>

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Data Gathering

National Information Sharing Consortium (NISC): Brings together data owners, custodians, and users in the fields of homeland security, public safety, and emergency management and response. Members leverage efforts related to the governance, development, and sharing of situational awareness and incident management resources, tools, and best practices.
<http://nisconsortium.org/>

The Hydrologic Engineering Center (HEC): an organization within the Institute for Water Resources, is the designated Center of Expertise for the US Army Corps of Engineers.
<http://www.hec.usace.army.mil/>

National Water & Climate Center
<http://www.wcc.nrcs.usda.gov/>

WinTR-55 Watershed Hydrology
<http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/?&cid=stelprdb1042901>

USACE Hydrologic Engineering Center (HEC)

<http://www.hec.usace.army.mil/software/>

Stormwater Manager's Resource Center SMRC

<http://www.stormwatercenter.net>

USGS Current Water Data for the Nation

<http://waterdata.usgs.gov/nwis/rt>

USGS Water Data for the Nation

<http://waterdata.usgs.gov/nwis/>

Topography Maps and Aerial photos

<http://www.terraserver.com/view.asp?tid=142>

National Register of Historic Places

<http://www.nps.gov/nr/about.htm>

National Wetlands Inventory

[http://www.fws.gov/wetlands/ICLUS Data for Northeast Region](http://www.fws.gov/wetlands/ICLUS>Data%20for%20Northeast%20Region)

http://www.epa.gov/ncea/global/iclus/inclus_nca_northeast.htm

Planning

American Planning Association

<http://www.planning.org>

PlannersWeb - Provides city and regional planning resources

<http://www.plannersweb.com>

FEMA Resources

Federal Emergency Management Agency (FEMA)

www.fema.gov

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National Mitigation Framework

<http://www.fema.gov/national-mitigation-framework>

Federal Insurance and Mitigation Administration (FIMA)

<http://www.fema.gov/fima>

Community Rating System (CRS)

<http://www.fema.gov/national-flood-insurance-program/national-flood-insurance-program-community-rating-system>

FEMA Building Science

<http://www.fema.gov/building-science>

National Flood Insurance Program (NFIP)

<http://www.fema.gov/national-flood-insurance-program>

Floodplain Management & Community Assistance Program

<http://www.fema.gov/floodplain-management>

Increased Cost of Compliance (ICC): ICC coverage allows homeowners whose structures have been repeatedly or substantially damaged to cover the cost of elevation and design requirements for rebuilding with their flood insurance claim up to a maximum of \$30,000.

<http://www.fema.gov/national-flood-insurance-program-2/increased-cost-compliance-coverage>

National Disaster Recovery Framework

<http://www.fema.gov/national-disaster-recovery-framework>

Computer Sciences Corporation: contracted by FIMA as the NFIP Statistical Agent, CSC provides information and assistance on flood insurance to lenders, insurance agents and communities.

www.csc.com

Integrating the Local Natural Hazard Mitigation Plan into a Community's Comprehensive Plan: A Guidebook for Local Governments.

<https://www.fema.gov/ar/media-library/assets/documents/89725>

Mitigation Best Practices Portfolio

<http://www.fema.gov/mitigation-best-practices-portfolio>

FEMA Multi-Hazard Mitigation Planning Website

<http://www.fema.gov/multi-hazard-mitigation-planning>

FEMA Resources Page

<http://www.fema.gov/plan/mitplanning/resources.shtm>

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Local Mitigation Plan Review Guide

<http://www.fema.gov/library/viewRecord.do?id=4859>

Local Mitigation Planning Handbook: Complements and liberally references the Local Mitigation Plan Review Guide above.

<http://www.fema.gov/library/viewRecord.do?id=7209>

HAZUS

<http://www.fema.gov/protecting-our-communities/hazus>

Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards

<http://www.fema.gov/library/viewRecord.do?id=6938>

Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials.

<http://www.fema.gov/library/viewRecord.do?id=7130>

IS-318: Mitigation Planning for Local and Tribal Communities: Independent Study Course

<http://training.fema.gov/EMIWeb/IS/is318.asp>

Region I Mitigation Planning Contacts

Melissa Surette, Senior Planner

Phone: (617) 956-7559

Email: melissa.surette@fema.dhs.gov

Josiah (Jay) Neiderbach

FEMA Region I – Mitigation Division

Phone: 617-832-4926 desk / 202-285-7769 cell

Email: josiah.neiderbach@fema.dhs.gov

Other Federal Resources

U.S. Army Corps of Engineers: Provides funding for floodplain management planning and technical assistance and other water resources issues.

www.nae.usace.army.mil

Natural Resources Conservation Service: Technical assistance to individual land owners, groups of landowners, communities, and soil and water conservation districts.

www.nrcs.usda.gov

NOAA Coastal Services Center

<http://www.coast.noaa.gov/>

Rural Economic and Community Development: Technical assistance to rural areas and smaller communities in rural areas on financing public works projects.

www.rurdev.usda.gov

Farm Service Agency: Manages the Wetlands Reserve Program (useful in open space or acquisition projects by purchasing easements on wetlands properties) and farmland set aside programs.

www.fsa.usda.gov

National Weather Service: Prepares and issues flood, severe weather and coastal storm warnings. Staff hydrologists can work with communities on flood warning issues; can give technical assistance in preparing flood-warning plans.

www.weather.gov/gyx

Economic Development Administration (EDA): Assists communities with technical assistance for economic development planning.

www.osec.doc.gov/eda/default.htm

National Park Service: Technical assistance with open space preservation planning; can help facilitate meetings and identify non-structural options for floodplain redevelopment.

www.nps.gov

Fish and Wildlife Services: Can provide technical and financial assistance to restore wetlands and riparian habitats.

www.fws.gov

Department of Housing & Urban Development

www.hud.gov

Small Business Administration(SBA): The SBA can provide additional low-interest funds (up to 20% above what an eligible applicant would qualify for) to install mitigation measures. It can also loan the cost of bringing a damaged property up to state or local code requirements.

www.sba.gov/disaster

Environmental Protection Agency

www.epa.gov

Sustainability/Adaptation/Climate Change

Why the Emergency Management Community Should be Concerned about Climate Change: A discussion of the impact of climate change on selected natural hazards.

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<http://www.cna.org/sites/default/files/research/WEB%2007%2029%2010.1%20Climate%20Change%20and%20the%20Emergency%20Management%20Community.pdf>

Resilient Sustainable Communities: Integrating Hazard Mitigation & Sustainability into Land Use

<http://www.earth.columbia.edu/sitefiles/file/education/documents/2013/Resilient-Sustainable-Communities-Report.pdf>

U.S. EPA

<http://www.epa.gov/climatechange/>

NOAA National Ocean Service (NOS)

<http://oceanservice.noaa.gov/>

The Northeast Climate Research Center (NCRC): Heavily involved in climate data in the NCA, it has a wealth of historic climate data and weather information, trends, etc.

<http://www.nrcc.cornell.edu/>

NOAA RISA for the Northeast (Regional Integrated Sciences and Assessments)

<http://ccrun.org/home>

Community and Regional Resilience: Perspectives from hazards, disasters, and emergency management.

http://www.resilientus.org/library/FINAL_CUTTER_9-25-08_1223482309.pdf

National Fish, Wildlife and Plants Climate Adaptation Strategy

www.wildlifeadaptationstrategy.gov

ICLEI Local Governments for Sustainability

<http://www.icleiusa.org/>

Kresge Foundation Survey

<http://www.kresge.org/news/survey-finds-communities-northeast-are-trying-plan-for-changes-climate-need-help-0>

New England's Sustainable Knowledge Corridor

<http://www.sustainableknowledgecorridor.org/site/>

The Strategic Foresight Initiative (SFI)

http://www.fema.gov/pdf/about/programs/oppa/findings_051111.pdf

Northeast Climate Choices

http://www.climatechoices.org/ne/resources_ne/nereport.html

Northeast Climate Impacts Assessment

<http://www.northeastclimateimpacts.org/>

Draft National Climate Assessment Northeast Chapter released early 2013

<http://ncadac.globalchange.gov/>

Northeast Chapter of the National Climate Assessment of 2009:

<http://www.globalchange.gov/images/cir/pdf/northeast.pdf>

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NEclimateUS.org

ClimateNE

www.climatenortheast.com

Scenarios for Climate Assessment and Adaptation

<http://scenarios.globalchange.gov/>

Northeast Climate Science Center

<http://necsc.umass.edu/>

FEMA Climate Change Adaptation and Emergency Management

<https://www.fhmis.dhs.gov/content/climate-change-adaptation-and-emergency-management-0>

Climate Central

<http://www.climatecentral.org>

Other Resources

New England States Emergency Consortium (NESEC): NESEC conducts public awareness and education programs on natural disaster and emergency management activities throughout New England. Resources are available on earthquake preparedness, mitigation, and hurricane safety.

www.nesec.org

Association of State Floodplain Managers (ASFPM): ASFPM has developed a series of technical and topical research papers, and a series of Proceedings from their annual conferences.

www.floods.org

National Voluntary Organizations Active in Disaster (NVOAD): NVOAD is a non-profit, nonpartisan membership organization that serves as the forum where organizations share knowledge and resources throughout the disaster cycle—preparation, response, recovery and mitigation.

<http://www.nvoad.org/>

APPENDIX D

HAZARD MITIGATION RESOURCE PROFILES

The following are fact sheets about the various hazard mitigation grant programs.

U.S. Army Corps of Engineers

Contacts:

John Kennelly, Chief, Special Studies Section (for Flood Plain Management Services activities),
Phone: (978) 318-8505, Fax: (978) 318-8080, E-mail: John.R.Kennelly@usace.army.mil

Mike Keegan, Chief, Project Planning Section (for Section 14, 103, and 205 authorities),
Phone: (978) 318-8087, Fax: (978) 318-8080, E-mail: Michael.F.Keegan@usace.army.mil

Address: US Army Corps of Engineers
New England District
696 Virginia Road
Concord, Massachusetts 01742-2751

Description and Mission:

The Corps of Engineers is a multi-disciplinary engineering and environmental organization that has been identifying and meeting the water resources needs of the nation. These needs have been in the areas of flood damage reduction, flood plain information and management, navigation, shore protection, environmental restoration, water supply, streambank protection, recreation, and fish and wildlife resources conservation, as well as technical assistance in other water resources areas.

The New England District (NAE) of the Corps of Engineers is responsible for managing the Corps' civil responsibilities in a 66,000 square-mile region encompassing the [six New England states](#) east of the Lake Champlain drainage basin. The District and its [leadership](#) are headquartered in Concord, Massachusetts. The missions of the New England District are many and varied. They include:

- flood damage reduction
- navigation improvements and maintenance
- natural resource management
- streambank and shoreline protection
- disaster assistance
- environmental remediation and engineering
- engineering and construction management support to other agencies

Flood Mitigation Involvement:

As a result of the catastrophic floods in 1936, 1938 and 1955, the Corps was called upon to undertake a comprehensive flood damage reduction program. Since then the Corps has built many flood control structures throughout New England. These include 35 dams and reservoirs, five hurricane protection barriers (two are operated by the Corps) and approximately 60 local flood

protection projects. The New England District has also completed two nonstructural projects involving the relocation of flood prone

property and the acquisition of natural flood storage areas. The Corps also provides technical assistance to states and municipalities in locally constructed flood damage mitigation projects and to promote wise and informed use of floodplain and natural retention areas in order to minimize potential future flood damages.

Mitigation Goals and Objectives:

The New England District has two primary mitigation objectives with respect to flood damage reduction. The first objective is the operation and maintenance of the 35 flood control reservoirs and two hurricane barriers that provide protection to the Connecticut, Merrimack, Thames, Naugatuck, and Blackstone River Basins. The second objective is to continue to work with the states and communities in New England to address flooding problems affecting the region.

Projects Desired: The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Flood damage reduction projects constructed by the Corps of Engineers must demonstrate, based on current Federal guidelines, that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria.

COE Resources with Respect to Hazard Mitigation:

The New England Division assists in meeting national, regional and local needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance investigation, is 100 percent Federally funded and must be completed within twelve months. The second phase, the Feasibility investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. In a Water Resources Development Act, Congress must specifically authorize construction of any project resulting from a General Investigation study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps many structural and non-structural local protection projects that reduce or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities that do not require specific congressional authorization are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation:

Section 14 - Emergency Stream Bank & Shoreline Protection: This work consists of evaluating alternatives to provide emergency protection to public facilities, such as highways and bridges, which are threatened due to erosion. The current Federal limit on Section 14 projects is \$500,000. The local sponsor is required to provide 25 percent of the cost of developing plans and specifications and of construction.

Section 103 - Beach Erosion: Investigations conducted under this authority are to determine methods of protecting public facilities that have been threatened by beach erosion. Currently there is a Federal limit of \$2,000,000 and the local sponsor is required to contribute 35 percent of plans, specifications and construction. The local sponsor is also required to cost-share equally the cost of the feasibility investigation that exceeds \$100,000. The first \$100,000 is at full Federal expense.

Section 205 - Flood Damage Reduction: Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds \$100,000 and the Federal limit is \$5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

Section 208 - Snagging and Clearing: This emergency program is designed to reduce flood damage potential by identifying and removing obstructions that contribute to flooding by causing higher flood stages in the floodways. The Federal limit under this program is \$500,000 and the local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

The New England Division also has two Planning Assistance Programs, which provide opportunities for the States to obtain assistance in addressing water resource issues. These programs are the Section 22, Planning Assistance to the States (PAS) program and the Section 206, Flood Plain Management Services (FPMS) program.

Planning Assistance to States Program (PAS): The PAS Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are \$300,000 per state and a national budget not to exceed \$5,000,000.

Flood Plain Management Services (FPMS): The FPMS Program is designed for the Corps to assist States and local communities improve management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

Ice Engineering Research Division
U.S. Army Cold Regions Research and Engineering Laboratory

Contact:

Dr. J-C Tatinclaux, Chief, Ice Engineering Research Division
Phone: (603) 646-4187 Fax: (603) 646-4477
E-mail: Jean-Claude.Tatinclaux@cr102.usace.army.mil
Website: <http://www.crrel.usace.army.mil/ierd/>

Address: US Army Cold Regions Research and Engineering Laboratory
Ice Engineering Research Division
72 Lyme Road
Hanover, NH 03755-1290

Description and Mission:

The US Army Cold Regions Research and Engineering Laboratory (CRREL) is a Corps of Engineers research laboratory that is dedicated to multi-disciplinary engineering and research that addresses the problems and opportunities unique to the world's cold regions. CRREL exists largely to solve the technical problems that develop in cold regions, especially those related to construction, transport, and military operations. Most of these problems are caused by falling and blowing snow, snow on the ground, ice in the air and on the ground, river ice, ice on seas and lakes, and ice affects on manmade materials. CRREL serves the Corps of Engineers and its clients in three main areas:

- Traditional military engineering, which deals with problems that arise during conflict;
- Military construction and operations technology, i.e., the building and maintenance of military bases, airfields, roads, ports, and other facilities; and
- Civil works, which involves the Corps in such things as flood protection, navigation on inland waterways and coastal engineering.

CRREL also deals with cold regions problems for the other defense services, for civilian agencies of the federal government, and to some extent for state agencies, municipalities, and private industry.

CRREL's Ice Engineering Research Division (IERD) was created to research, analyze and solve ice problems in and around water bodies, including ice jam flooding and ice accumulation in lock chambers, to ice buildup at water intakes and the destructive forces that moving ice exerts on riverine or coastal structures. In cooperation with the New England District (NAE) of the Corps of Engineers (located in Concord, MA), IERD personnel provide technical assistance before, during, and after ice jam flood emergencies. IERD research has resulted in the design and construction of a number of low-cost ice control structures as well as nonstructural mitigation measures. IERD also provides instruction on dealing with river ice problems to local emergency management agencies.

Flood Mitigation Involvement:

IERD is frequently called upon by the various Corps Districts to provide technical assistance to states and municipalities in the form of emergency mitigation. IERD is also involved with Corps and local agencies in developing locally constructed flood damage mitigation projects and promoting wise and informed use of floodplain areas in order to minimize potential future flood damages.

Mitigation Goals and Objectives:

The IERD has two primary mitigation objectives with respect to flood damage reduction. The first objective is to work with the Corps and other federal, state, and local agencies to design and implement ice control methods to reduce ice-related flood potential. The second is to work with the states and communities in nationwide as well as in New England to address ice-related emergency flooding problems affecting the region.

Projects Desired: CRREL and IERD are a national resource ready to apply our unique facilities and capabilities to solve problems and conduct innovative, state-of-the-art research and technical support. There are a number of mechanisms that enable IERD and the rest of CRREL to partner with various Federal, non-DoD and private sector entities. The Federal Technology Transfer Act of 1986 (15 USC 3710a) allows CRREL to collaborate with any non-Federal partner on research and technical support consistent with the mission of the laboratory. The Intergovernmental Cooperation Act (31 USC 6505) lets CRREL work with state and local governments on a broad range of reimbursable projects. Under the "Authority to Sell" (10 USC 2539b), CRREL can provide test and evaluation services to the states and the private sector. This includes the testing and evaluation of materials, equipment, models, computer software, and other items. The laboratory can also provide support to other Federal agencies via the Economy in Government Act (31 USC 1535) through MOUs/MOAs that establish a framework for the partnership and provide a concise description of the planned work. CRREL's 35 active Cooperative Research and Development Agreements (CRADAs) with industry and academia and 17 Intergovernmental Cooperation Agreements with states and local governments in 1998 demonstrate a robust program in this area and the relevance of CRREL's research to many segments of American society beyond DoD.

The Corps of Engineers has several programs available under its Civil Works authorities to address flooding problems. These programs provide assistance either through the construction of structural and nonstructural projects to mitigate the flooding problem or by providing technical information to assist mitigation performed at the state or local level. Based on current Federal guidelines, flood damage reduction projects constructed by the Corps of Engineers must demonstrate that the flood damages prevented by the project's construction exceed its total cost. The Corps must also demonstrate that the 10-year frequency flood discharge at the point of concern is equal to or greater than 800 cubic-feet per second (cfs). Technical assistance provided by the Corps does not need to meet the above criteria. Through the Corps, IERD has been involved in projects under the Section 205 Flood Damage Reduction program, the Section 22 Planning Assistance to States Program (PAS), the Section 206 Flood Plain Management Services (FPMS) program funded jointly with FEMA, and numerous instances of technical assistance.

CRREL IERD Resources with Respect to Hazard Mitigation:

Corps: CRREL works jointly with the Corps' New England Division to address regional and local ice-related hazard mitigation needs through a variety of means. Congressionally authorized water resources investigations have resulted in the planning, design and implementation of many flood control and flood damage reduction projects. Work conducted under a Congressional authorization can be extensive and there is currently no monetary limit of funding. Typically there is a 1-2 year minimum delay in the identification of a proposed investigation and the funding of that work. The first phase of study, the Reconnaissance Investigation, is 100 percent federally funded and must be completed within twelve months. The second phase, the Feasibility Investigations, must be cost-shared with a local sponsor where the sponsor provides 50 percent of the cost of the feasibility study. Congress in a Water Resources Development Act must specifically authorize construction of any project resulting from a General Investigation study. The cost of implementation for flood damage reduction projects is generally 65 percent Federal and 35 percent non-Federal.

Through the Continuing Authorities Programs of the Corps, many structural and non-structural local protection projects reducing or eliminating damages from flooding have been constructed. Investigations initiated under the Corps Continuing Authorities do not require specific congressional authorization and are initiated simply with a request from the State or community to the New England District. The following is a list of Continuing Authorities applicable to flood mitigation:

Section 205 - Flood Damage Reduction: Investigations are conducted under this program to assist local communities to identify flooding problems and to formulate and construct alternatives for flood damage reduction. The local sponsor is required to cost-share equally in the cost of the feasibility investigation that exceeds \$100,000 and the Federal limit is \$5,000,000. The local sponsor is required to contribute 25 percent of the cost of plans, specifications and construction.

Section 22 - Planning Assistance to States Program (PAS): The PAS Program is designed to assist the States in developing comprehensive plans to meet State planning goals. The program is extremely flexible in the type and the methodology of investigations. Studies conducted under the PAS program require a 50/50 cost share with a local sponsor. The existing funding limits are \$300,000 per state and a national budget not to exceed \$5,000,000.

Section 206 - Flood Plain Management Services (FPMS): The FPMS Program is designed for the Corps to assist States and local communities improve management of flood plains by performing technical assistance and conducting special investigations. Cost recovery has been implemented in this program effective in FY 1991. Under cost recovery, assistance provided to Federal agencies and private interests must be fully reimbursed by those customers. States and local communities are still provided technical assistance at 100 percent Federal cost. One of the major efforts being conducted under the FPMS program at this time is the preparation of Hurricane Evacuation Studies. These studies are jointly funded with the Federal Emergency Management Agency.

Personnel: IERD was created to research, analyze and solve ice problems in and around water bodies. The technical experience of the staff and their in-depth research and field capabilities combine with CRREL's unique Ice Engineering Facility to form one of the premier ice engineering organizations in the world. IERD has a staff of 15 engineers and technicians experienced in technical analyses, methods, and engineering solutions to ice problems -- that is, any situation where the effects of ice cause flooding, increase operational and maintenance requirements of water control projects, impede navigation, or adversely impact the environment in cold regions.

Equipment and Facilities: The Ice Engineering Facility was built to increase the research capabilities of the U.S. Army Cold Regions Research and Engineering Laboratory. It is a two-story building approximately 160 by 210 feet containing three primary cold spaces: the test Basin, Flume, and Research Area and now a new Wind Tunnel Facility. In addition there is a machine room in the basement, an instrumentation corridor separating the flume and test basin spaces, a shop/storage area, and one sample-storage cold room.

The Test Basin was designed primarily for large-scale work on ice forces on structures, such as drill platforms and bridge piers, and for tests using model icebreakers. The Basin is 30 feet wide, 8 feet deep and 120 feet long. The room is designed to operate at any temperatures between +65° and -10°F with very even temperature distribution, which results in uniform ice thickness. Other studies conducted in the Test Basin concern the formation of ice pressure ridges, ice problems in and around navigation locks, and vertical uplift forces.

The Flume is situated in a room where the temperature can be regulated between +65° and -20° F. The Flume is 2 by 4 feet in cross section and 120 feet long. It can tilt from +2° to -1° slope, has a flow capacity of nearly 14 cubic feet per second and has a refrigerated bottom. Some other studies conducted in the Flume are the formation of ice covers and frazil ice, the hydraulics of ice-covered rivers, the formation of ice jams, and the effect of ice covers on sediment transport and scour.

Possibly the most versatile portion of the Ice Engineering Facility is the Research Area. This room is 80 by 160 feet clear span and has a temperature range of +65° to -10°F. Piping capable of providing a flow of 1, 2, 4 or 8 cubic feet per second is located on one side of the room, and a large drain trough is on the other. The floor is designed for loads up to 400 pounds per square foot. Models of reaches can be constructed in this area to test ways to alleviate ice jams through channel modification. Tests of the bearing capacity of large ice sheets and cold-testing of vehicles and structures are a few of the other potential uses of this space. Tests conducted in this room will help to alleviate much of the flooding caused by ice jams.

USDA, Natural Resources Conservation Service

Contacts:

Gerald J. Lang, Technology Leader; Phone: (603) 868-7581, Fax: (603) 868-5301
E-mail: gerald.lang@nh.usda.gov

Edward Hansalik, Civil Engineer; Phone: (603) 868-7581, Fax: (603) 868-5301
E-mail: ehansalik@nh.usda.gov

Address: Federal Building
2 Madbury Road
Durham, NH 03824

Description and Mission

The Natural Resources Conservation Service (NRCS) is a Federal agency within the US Department of Agriculture. The mission of the NRCS is to help people conserve, improve and sustain our natural resources and environment. NRCS, formerly the Soil Conservation Service, is the lead federal agency for conservation on private land. NRCS provides conservation technical assistance through local conservation districts and Resource Conservation and Development Councils to individuals, communities, watershed groups, tribal governments, federal, state, and local agencies, and others. NRCS has an interdisciplinary staff of professional engineers, planners, biologists, foresters, agronomists, and soil scientists working together to provide the necessary technical assistance to solve resource or environmental problems. NRCS products typically include conservation plans, study reports, engineering designs, and resource maps.

Authorities and Funding

NRCS state and field offices derive funding from two possible sources, direct Federal appropriations and reimbursable agreements with agencies and units of government. NRCS manages several programs - Environmental Quality Incentive Program, Wildlife Habitat Incentives Program, Wetland Reserve Program, Forestry Incentives Program, and Farmland Protection Program - which each provide cost-share assistance to landowners and users (primarily agricultural or forestry land) to install conservation practices to restore and protect natural resources. NRCS can also provide technical assistance ranging from preliminary reviews to complete detail designs to landowners/users solving resource problems even if financial assistance is not being provided for the installation of conservation practices. This assistance is dependent on staff availability and priorities.

NRCS also manages the Emergency Watershed Protection program, which can provide financial and technical assistance to units of government and groups to repair damages sustained from a

natural disaster (flood, fire, hurricane, tornado) creating an imminent hazard to life and property. The restoration efforts must be environmentally and economically cost effective and typically includes clearing debris from clogged stream channels, stabilizing eroded stream banks and restoring vegetation for stabilization purposes. NRCS can also provide technical assistance to watershed associations or groups to develop comprehensive plans for improving or protecting the watershed environment (water quality, flood reduction, wildlife habitat).

Mitigation Involvement

The NRCS can provide technical assistance to conduct inventories, to complete watershed or site-specific plans, or to develop detail engineering and construction designs for conservation applications that will help reduce future damages from natural disasters. Some examples of past mitigation efforts include: floodplain management studies for towns, site assessments of stream flow impairments, stabilization designs to protect structures which could sustain severe damages from another storm event, and small watershed plans addressing flooding problems. Some of these products can be provided through other conservation assistance efforts. However, the major jobs would require a reimbursable agreement with the state or towns to complete the work.

Mitigation Goals and Objectives

With respect to hazard mitigation, the goal of the NRCS in New Hampshire is to meet the needs of the State and local governments by providing timely technical assistance to support recovery and restoration efforts. NRCS can contribute this technical assistance by interacting directly with NHHSEM at the state level and having our field staff working directly with town Emergency Management officials at the local level. Short-term goals are to establish contacts with local officials and the conservation districts at the field office level to facilitate quicker response times. Intermediate and long-term objectives are to improve the cooperative efforts of working with NHHSEM and establish additional contacts for providing timely technical assistance at the local level.

Projects/Planning Desired: NRCS would like to work with local watershed associations to develop comprehensive plans addressing resource and environmental needs and opportunities in the priority watersheds as identified in the Unified Watershed Assessment. These plans can provide the basis for targeting and requesting special funding to meet the needs of the local watershed association. Technical assistance for planning and designing along with public information dissemination are the typical activities this agency provides in this effort.

NRCS Resources with respect to Hazard Mitigation

Personnel: NRCS in New Hampshire has a workforce of 45 staff members along with 5 multi-state staff members. Approximately 22 staff members consisting of engineers, biologists, foresters, conservation planners, and technicians are available to provide some assistance in mitigation efforts. Support staff of a GIS specialist, computer specialist, and public information specialist could assist in providing information for public outreach. This staff is available to provide limited assistance under our present program funding authorities. However, larger projects would require reimbursement for planning and design assistance.

Equipment, Physical Facilities and Other Capabilities: All of our field offices and the State office have computers and access to the internet. All of the field offices have survey equipment and all engineers have the use of CADD software. All field offices have access to small meeting rooms and access to the Federal Telecommunications System. Government vehicles are located at all field offices for use by government employees and could be made available in emergencies.

Northeast States Emergency Consortium

Contact:

Edward S. Fratto, Executive Director: Phone: (781) 224-9876, Fax: (781) 224-4350
E-Mail: www.nesec.org

Address: Northeast States Emergency Consortium
1 West Water Street, Suite 205
Wakefield, MA 01880

Organization Description

The Northeast States Emergency Consortium, Inc. (NESEC) is a 501(c)(3) not-for-profit natural disaster mitigation and emergency management organization, located in Wakefield, Massachusetts. NESEC is the only multi-hazard consortium of its kind in the country and is supported and funded by the Federal Emergency Management Agency (FEMA). The eight Northeast States of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island and Vermont form the consortium. NESEC has a full-time Executive Director and Assistant. It is governed by a Board of Directors. The Board is comprised of the Directors of the State Emergency Management Agencies from each of the six New England States and the States of New York and New Jersey.

Organization Mission

NESEC works in partnership with government and private organizations to reduce losses of life and property from natural disasters in the Northeast United States. The Northeast States are vulnerable to most of the natural hazards, including hurricanes, earthquakes, coastal and inland flooding, tornadoes and micro-bursts, forest fires, drought, lightning, blizzards and other forms of severe weather. Developed urban areas as well as developed waterfront property have increased the degree of risk from natural hazards.

Mitigation Programs

HAZUS: NESEC assists FEMA PROJECT IMPACT Communities in the use of HAZUS as a planning platform for incorporating multi-hazard disaster prevention initiatives. NESEC can produce a HAZUS report using default data for each of the initial PROJECT IMPACT Communities. Priority is given to PROJECT IMPACT communities, however assistance may be provided to other communities as resources allow. The NESEC HAZUS report provides an excellent starting point for communities wishing to utilize HAZUS to identify potential hazards. It is multi-hazard and usually contains information on earthquakes, tornadoes, flood and wind.

There is no fee or charge for producing the default HAZUS Report and meeting with the community to discuss the results. All HAZUS support is arranged in cooperation with the New Hampshire Homeland Security and Emergency Management (NHHSEM). Communities interested in participating should contact NHHSEM.

Emergency Generators: NESEC assists communities to establish a partnership with their electric utilities and service companies. The partnership would conduct an energy efficiency audit of the community, recommend cost saving measures, and implement a cost saving plan. Monthly savings could be used to fund emergency generator(s) for local critical facilities. The utility or energy service company could then lease, install, and maintain generator(s) in a community.

The community would pay a monthly charge for the lease agreement. This charge would not exceed the savings derived through energy efficiency measures, so there would be no capital outlay or additional cost to the community. In fact, some communities may be able to reduce their monthly electric bills in an amount that exceeds the cost of the generator(s) lease agreement.

Monthly savings and utility participation will vary from state to state and community-to-community depending on present electric power usage and efficiency measures and deregulation. There is no fee or charge for assisting communities in establishing partnerships with electric utilities. NESEC assistance will be provided as resources allow. All emergency generator support is arranged in cooperation with the New Hampshire office of HSEM. Communities interested in participating should contact HSEM.

Federal Mitigation Grant Programs

Pre-Disaster Mitigation Grant Program

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, 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.
<http://www.fema.gov/government/grant/pdm/index.shtm>

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. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

<http://www.fema.gov/government/grant/hmgrp/index.shtm>

Flood Mitigation Assistance Program

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

FEMA provides FMA funds to assist states and communities in implementing 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.
<http://www.fema.gov/government/grant/fma/index.shtm>

APPENDIX E

DOCUMENTATION OF THE PLANNING PROCESS

Stoddard Hazard Mitigation Meeting

August 22, 2018

6:30 p.m.

Stoddard Fire Station

Route 123N

Stoddard, NH 03464

- I. Introductions and Overview of the Hazard Mitigation Plan Update
- II. Review of Previous Mitigation Actions
 - a. Review the list of actions listed in the current Hazard Mitigation Plan and determine if they need to continue into the update.
- III. Identification of Hazards
 - a. Determine the natural hazards that pose a threat to the town
 - b. Identify the past occurrences for each hazard
 - c. Identify areas of concern for potential hazards
- IV. Risk Assessment
 - a. Rate each hazard to determine the risk/vulnerability
- V. Next Meeting- Potential Date: September 19 (or October 3), and October 24 at 6:30

Name	Title/affiliation	Email
Stephen McGerty	Stoddard Fire Chief	simpala@yahoo.com
David Vaillancourt	Stoddard Police Chief	stoddardpd@gmail.com
Bob Fee	Stoddard Board of Selectmen	rfee@myfairpoint.net
George Preston	Stoddard EMD	georgepreston@gmail.com
Brian Michaud	Stoddard Fire Captain	brian@dowhillrealty.com

Stoddard Hazard Mitigation Meeting

September 26, 2018

6:30 p.m.

Stoddard Fire Station

Route 123N

Stoddard, NH 03464

Agenda- Meeting 2

- I. Identification of Hazards on map
 - a. Determine potential areas where hazards pose a threat
 - b. Identify the past occurrences for each hazard on the map
- II. Critical Facilities
 - a. Review and update the Critical Facilities listed in the existing plan
- III. Existing Mitigation Strategies and Proposed Improvements
 - a. Review the list of existing strategies and programs. Determine any needed improvements.
- IV. Hazard Mitigation Goals
 - a. Determine the goals for the updated hazard mitigation plan.
- V. Future Meeting Dates- October 24 at 6:30 p.m.

Name	Title/affiliation	Email
Stephen McGerty	Stoddard Fire Chief	simpala@yahoo.com
David Vaillancourt	Stoddard Police Chief	stoddardpd@gmail.com
Brian Michaud	Stoddard Fire Captain	brian@dowhillrealty.com
Bob Fee	Stoddard Board of Selectmen	rfee@myfairpoint.net
Daniel Eaton	Stoddard EMD	
George Preston	Stoddard EMD	georgepreston@gmail.com

Stoddard Hazard Mitigation Committee

**December 5 at 6:30 p.m.
Stoddard Fire Station
Route 123N
Stoddard, NH 03464
Agenda- Meeting 3**

- I. Identify Gaps in Coverage
 - a. Review the existing coverage for mitigation strategies and determine if there are any gaps.

- II. Identify and Prioritize Mitigation Actions for Each Hazard
 - a. Identify specific locations that should be added to the Action Plan.
 - b. Use the STAPLEE Chart to identify and rank actions for each hazard.

- III. Prepare an Action Plan
 - a. Determine the *Who*, *When*, and *Funding Source* for each action identified in the STAPLEE Chart.

- IV. Future Meeting Date- January 2 at 6:30 p.m.

Name	Title/affiliation	Email
David Vaillancourt	Stoddard Police Chief	stoddardpd@gmail.com
Brian Michaud	Stoddard Fire Captain	brian@dowhillrealty.com
Bob Fee	Stoddard Board of Selectmen	rfee@myfairpoint.net
Stephen McGerty	Stoddard Fire Chief	simpala@yahoo.com

Stoddard Hazard Mitigation Committee

January 16, 2019 at 6:30 p.m.

Stoddard Fire Station

Route 123N

Stoddard, NH 03464

Agenda- Meeting 4

- I. Review of the Draft Stoddard Hazard Mitigation Plan Update.
 - a. Determine any edits that are needed.
- II. Discuss the next steps in the approval process and potential timelines.

Name	Title/affiliation	Email
Stephen McGerty	Fire Chief	simpala@yahoo.com
Brian Michaud	Fire Captain	brian@dowhillrealty.com
Bob Fee	Board of Selectmen	rfee@myfairpoint.net
Dan Eaton	Stoddard EMD	

Other Meetings

August 7

The **Monadnock Alliance for Sustainable Transportation (MAST) Bicycle Friendly Community Subcommittee** will meet at 4:30 p.m. at 37 Ashuelot Street in Keene, NH. For more information, please contact [Henry Underwood](#) of SWRPC staff.

August 14

The **Nelson Hazard Mitigation Committee** will meet at 5:30 p.m. at the Nelson Town Hall for the second meeting of the hazard mitigation plan update. For more information, please contact [Lisa Murphy](#) of SWRPC staff.

August 22

The **Stoddard Hazard Mitigation Committee** will meet at 6:30 p.m. at the Stoddard Fire Station to begin the hazard mitigation plan update. For more information, please contact [Lisa Murphy](#) of SWRPC staff.

Please register by **August 3rd** by emailing [Lindsay Tafas](#), at the Monadnock Conservancy or by calling (603) 357-0660, ext. 113.

FCC Mobility Fund Phase II

Are there areas of your community that lack mobile voice and high speed internet coverage? The Federal Communications Commission (FCC) Mobility Fund Phase II will make up to \$4.53 billion available over 10 years to expand 4G Long Term Evolution service, primarily in rural areas. As part of this opportunity, the FCC established a Challenge Process to provide feedback on a map of eligible areas. Interested parties, including local governments have an opportunity to challenge an initial determination that an area is ineligible for support. This opportunity closes in late-November of this year. In New Hampshire, the Public Utilities Commission is assisting interested communities to coordinate their efforts to participate. In addition, SWRPC has created a [dedicated webpage](#) with information relevant to this process.

Preventing Aquatic Invasive Species in Local Water Bodies

New Hampshire has been fighting exotic aquatic plants since the mid-1960's and these invasive species have spread to infest more than 60 water bodies in the state.

On **Wednesday, August 22nd** from 12:00 - 1:00 p.m. the New Hampshire Municipal Association (NHMA) will host a webinar on preventing aquatic invasive species in our local water bodies. Amy Smagula, Exotic Species Program Coordinator with the New Hampshire Department of Environmental Services along with Kelly Ainslee Buchanan, Advocacy Coordinator with NH LAKES, will discuss what cities and towns can do through

APPENDIX F

PROJECT STATUS SHEETS

The following form can be used to keep track of projects identified in the hazard mitigation plan that are in progress or that have been completed.

