

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, NH



Adopted 2004
Updated 2011/2016/2022

Submitted to the New Hampshire Homeland Security & Emergency Management

By the

Town of New Durham, NH
with Strafford Regional Planning Commission

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

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The 2004, 2010, 2016 and 2022 New Durham Hazard Mitigation Committees
New Hampshire Homeland Security Emergency Management (HSEM)
Town of New Durham

The 2022 Town of New Durham Multi-Hazard Mitigation Planning Team

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Cover: Spring Flooding over Merrymeeting Road along the marsh area. 1984. (Credit: New Durham Historical Collections 2010)

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Executive Summary

This Plan was revised and updated to meet statutory requirements and to assist the Town of New Durham in reducing and mitigating future losses from natural and man-made hazardous events. An initial edition of this Plan was developed and presented to FEMA in 2004. The plan was updated in 2011, 2016, and then 2021 to reflect the most recent information obtained through the evolution of the hazard mitigation program at the State. This update was developed by Strafford Regional Planning Commission (SRPC) and participants from the Multi-Hazard Mitigation Planning Committee (hereafter referred to as the Planning Committee), which was made up by the Emergency Management Director, Fire Chief, Supervisor of DPW, Town Administrator, Police Sargent/Officer in Command, Land Use Secretary, Finance Administrator, Building Inspector, Park and Recreation Director, and two town clerks. The Plan references historical events, as well as identifies specific vulnerabilities that are most likely to impact the Town.

This plan addresses the following hazards that affect the Town:

- Flooding
- Dam Failure
- Severe Thunderstorms
- Wildfire
- Severe Winter Weather
- Earthquake
- Landslide
- Drought
- Hurricane & Tropical Storms
- Hazardous Material
- Tornado & Downburst
- Extreme Temperatures
- Public Health
- Radon

This plan also provides an updated list of Critical Infrastructure and Key Resources (CI/KR) categorized as follows: Emergency Response Services (ERS), Non-Emergency Response Facilities (NERS), Facilities and Populations to Protect (FPP) and Potential Resources (PR). In addition, this plan addresses the Town's involvement in The National Flood Insurance Program (NFIP).

The revision process included a review of other Town Hazard Plans, technical manuals, federal and state laws, the State Hazard Mitigation Plan, research data, and other available mitigation documents from multiple sources. Combining elements from these sources, the Team was able to produce this integrated all-hazards plan. The Team recognizes that this plan must be considered a work in progress and reviewed periodically. The Plan will be reviewed by the Town:

- *Annually, to assess whether the existing and suggested mitigation strategies have been successful and remain current in light of any changes in federal state and local regulations and statutes. This review will address the Plan's effectiveness, accuracy and completeness in regard to the implementation strategy. The review will address any recommended improvements to the Plan, and address any weaknesses identified that the Plan did not adequately address. This report will be filed with the Board of Selectmen.*

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- *Every Five Years the Plan will be thoroughly reviewed, revised and updated using the same criteria outlined above. At that time it is expected to be thoroughly reviewed and updated as necessary. The public will be allowed and encouraged to participate in that five year revision process.*
- *After any declared emergency event, by the EMD using the same criteria outlined above.*
- *If the Town adopts any major modifications to its land use planning documents, the jurisdiction will conduct a Plan review and make changes as applicable.*

Monitoring, evaluating, and updating the plan within a 5-year cycle helps to:

- Ensure that the mitigation strategy is implemented according to the plan.
- Provide the foundation for an ongoing mitigation program in your community.
- Standardize long-term monitoring of hazard-related activities.
- Integrate mitigation principles into community officials' daily job responsibilities and department roles.
- Maintain momentum through continued engagement and accountability in the plan's progress.

(FEMA Local Mitigation Handbook)

Public involvement was encouraged throughout the review process and will continue to be stressed in future revisions. The Town of New Durham received conditional approval on March 16, 2022. A public meeting was held and the plan was adopted by the Board of Selectmen on **September 19, 2016**. The Plan received formal approval from FEMA on **September 28, 2016**. The public will have the opportunity for future involvement as the Plan will be periodically reviewed and the public will be invited to participate in all future reviews and updates to this plan. Public notice was and will be given by such means as: press releases in local papers, posting meeting information on the Town website, sending letters to federal, state, and local organizations impacted by the Plan, and posting notices on the town website and on the SRPC website. There will also be a public meeting before each formal review and before any change/update is sent to FEMA.

Once final approval by FEMA has been received, copies of the Plan will be distributed to the relevant Town Departments and personnel, HSEM, and FEMA and other state and local governmental entities; the Plan will then be distributed by these entities per requirements. Copies of the Plan will remain on file at the Strafford Regional Planning Commission (SRPC) in digital format.

Chapter I: Multi-Hazard Planning Process

Authority

New Durham’s All-Hazard Mitigation Plan was prepared pursuant to Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the 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. This revised Multi-Hazards plan will be referred to as the “Plan”. New Durham’s Plan has been prepared by the Multi-Hazard Mitigation Planning Committee with the assistance and professional services of Strafford Regional Planning Commission (SRPC) under contract with New Hampshire Homeland Security Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-2010 Edition). This plan is funded, in part, by HSEM through grants from FEMA (Federal Emergency Management Agency). Funds from town dues and matching funds for team member’s time are also part of the funding formula.

Purpose & History of the FEMA Mitigation Planning Process

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

“establish a national disaster hazard mitigation program –

To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and

To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster.”

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

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

HSEM’s goal is for all New Hampshire communities to complete a local multi-hazards plan as a means to reduce future losses from natural and man-made events before, during, or after they occur. HSEM has outlined a process whereby communities throughout the state may become eligible for grants and other assistance upon completion of this multi-hazard plan. The state’s regional planning commissions are charged with providing assistance to selected communities to help develop local plans.

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New Durham’s Multi-Hazard Mitigation Plan is a planning tool for reducing future losses from natural and man-made disasters as required by the Disaster Mitigation Act of 2000; this plan will be adopted but kept separate from the town’s master plan. The Multi-Hazard Mitigation planning process results in significant cross talk regarding all types of natural and man-made hazards by team members.

The DMA places new emphasis on local mitigation planning. It requires local a local jurisdiction to prepare and adopt a FEMA approved jurisdiction-wide Hazard Mitigation Plan as a condition for receiving all Hazard Mitigation Assistance (HMA) project grants and other grants. Local governments must review the plan yearly and update their plans every five years to continue program eligibility.

Jurisdiction

This plan addresses only one jurisdiction – the Town of New Durham, NH. Once approved by the Planning Committee, the Plan will be forwarded to HSEM and FEMA for Conditional Approval. Upon review and conditional approval by HSEM and FEMA, the Board of Selectmen will hold a public meeting, to consider public comments and must promulgate a signed Resolution to Adopt the Plan.

Scope of Plan

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

Multi-Hazard Planning Process

The planning process consists of ten specific steps. Many factors affect the ultimate sequence of the planning process, including the length of meetings, community preparation and attendance, and other community needs. The ten step of the process are listed below:

1. Establish and Orient a Hazard Mitigation Planning Committee
2. Identify Past and Potential Hazards
3. Identify of Hazards and Critical Facilities
4. Assess Vulnerability – Estimating Potential Losses
5. Analyze Development Trends
6. Identify Existing Mitigation Strategies and Proposed Improvements
7. Develop Specific Mitigation Measures
8. Prioritize Mitigation Measures
9. Prepare Mitigation Action Plan
10. Adopt and Implement the Plan

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Public Involvement in the 2022 Update

The Public, Neighboring Communities, Agencies, Non-profits, and other interested parties.

Public involvement has been and continues to be stressed starting with the initial meeting; community officials were given a list of potential team members before the first review meetings were held. These included the board of selectmen, administrative staff, the conservation commission, school department, the planning board, the zoning board, the police department, the fire department, and the highway department. Local business owners, interested organizations, and residents of New Durham were also invited to participate, however none of these stakeholders attended. Community officials were urged to contact as many people as they could to participate in the planning process. The Planning Committee met three times between August 12, 2021, and October 20, 2021. All feedback from participants of the planning committee was incorporated into the Plan.



Narrative Description of the Process and Methodology

The Plan was developed and updated with substantial local, state and federal coordination; completion of this new multi-hazard plan required significant planning preparation. All meetings were geared to accommodate brainstorming, open discussion, and an increased awareness of potential threats to the Town.

Chapter II: Hazard Identification and Analysis

Hazard Analysis

New Durham has experience limited major disasters. Due to its location in the Lakes Region of New Hampshire, and the presence of streams, rivers, lakes, and dams, New Durham is susceptible to hazards including severe snow and ice storms and impacts associated with dam failures and riverine flooding. While damage from snow and ice storms, flooding, severe wind events, hurricane residuals and downburst/wind shears have caused damage in the town in the past, it has been a relatively safe place to live. New Hampshire lies over an area of “moderate risk” seismic activity. Table 2.1 displays Presidentially Declared Disasters from 1990-2022 that have impacted New Durham and includes remarks of specific local impacts that could be recalled by Planning Committee members from each event.

Table 2.1: Presidentially Declared Disasters (DR) 1990- 2022 impacting the Town of New Durham

Date Declared	Event	Source	Program	Amount (Statewide)	Remarks
September 9, 1991	Hurricane Bob	FEMA 917-DR	PA	\$2,293,449	Committee could not recall specific impacts
October 29, 1996	Severe Storms & Flooding	FEMA 1144-DR	PA	\$2,341,273	Heavy rains, 11 inches
January 15, 1998	Ice Storm	FEMA 1199-DR	PA/IA	\$12,446,202	Major tree damage, electric power interrupted for many days; schools were closed; extensive damage to trees on Ridge, north of the Merrymeeting Lake and Birch Hill areas
May 25, 2006	Severe Storm & Flooding	FEMA 1643-DR	PA/IA	\$17,691,586	Heavy rains, snowmelt
April 27, 2007	Severe Storm & Flooding	FEMA 1695-DR	PA/IA	\$27,000,000	Heavy rains, snowmelt

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Date Declared	Event	Source	Program	Amount (Statewide)	Remarks
August 11, 2008	Severe Storms, Tornado, & Flooding	FEMA 1782-DR	PA	\$1,691,240	Tree and debris removal, shoulder repairs
January 2, 2009	Severe Winter Storm	FEMA 1812-DR	DFA/PA	\$19,789,657	Tree damage, power outages
March 29, 2010	Severe Winter Storm	FEMA 1892-DR	PA	\$9,103,138	Tree and shoulder removal, power outages. Town expenditure for permanent roads and bridgework approximately \$18,000 (\$13,499.51 received as part of the Public Assistance Program – Category C work). Town received additional funds for Category B work (emergency Protective Measures), dollar amount unavailable. Impacts in NH included power outages, high winds, and heavy rain. Debris removal was the primary impact. Strafford County per capita impact: \$6.16).
September 3, 2011	Tropical Storm Irene	FEMA 4026-DR	PA/IA	\$11,101,752	Road closures; Police Department drove students home from school due to road closures and inability of buses to transport students home, buses could not get from Wolfboro to New Durham; trees down; No police runs. Town expenditures for Category B work totaled approximately \$18,162 (Town received \$13,622.07 in federal assistance received). Town expended approximately \$3,279 for Category C work and received \$2,459.24 for this work.
March 19, 2013	Severe Snow and Blizzard	FEMA 4105-DR	PA	\$6,153,471	Needed to purchase and apply extra salt. Town expended approximately \$27,937 for Category B work and received \$20,952.42 in assistance for this work.
March 25, 2015	Severe Snow & Snowstorm	FEMA 4209-DR	PA	\$4,799,125	Heavy snowfall; Roof of school had to be shoveled off. Town expended approximately \$26,103 for Category B work and received \$19,577.62 in assistance for this work.
Jun 8, 2018	Severe Winter Storm and Snowstorm	FEMA 4371-DR	PA	\$2,666,522	This March 13-14 storm brought over 20 inches of snow to New Durham. This resulted in the town deploying several snow removal trucks and drivers working overtime to finish remove all the snow removal and haul it out.

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April 3, 2020	Coronavirus Pandemic	FEMA 4516-DR	PA	\$126,892,512	The pandemic brought closures of non-essential businesses and a transition to remote learning for schools K-12 until the Summer. Public Assistance federal funding were available to the state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency protective measures, including direct federal assistance under Public Assistance, for all areas in the state of New Hampshire affected by COVID-19 at a federal cost share of 75 percent
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11 declarations impacting New Durham. Total statewide amount approximately \$103,458,297.

Program Key: PA: Public Assistance, IA: Individual Assistance, DFA: Direct Federal Assistance

Table 2.2: Emergency Declaration (EM) 1990-December 2022 impacting the Town of New Durham

Date Declared	Event	Source	Program	Amount (Statewide)	Remarks
March 16, 1993	Heavy Snow	FEMA 3101-EM	PA	\$832,396	Snowfall
March 28, 2001	Snow Emergency	FEMA 3166-EM	PA	\$4,500,000	26" snowfall
March 11, 2003	Snow Emergency	FEMA 3177-EM	PA	\$3,000,000	Large amount of snowfall
March 30, 2005	Snow Emergency	FEMA 3207-EM	PA	\$4,654,738	Snow removal
December 13, 2008	Severe Winter Storm	FEMA 3297-EM	DFA/PA	\$900,000	No significant impacts
November 1, 2011	Severe Winter Storm	FEMA 3344-EM	PA	Data not available	Snow removal
October 30, 2012	Hurricane Sandy	FEMA 3360-EM	PA	\$643,660	3 EMS calls and 5 downed power lines on record. No significant impacts. Town expended approximately \$8,656 for Category B work and received \$6,492.15 in assistance for this work.
March 17, 2020	Coronavirus Pandemic	FEMA 3445-EM	PA	Data not available	The World Health Organization declared COVID-19 a pandemic in March 2020. The town followed the Governor's state of emergency that required all non-essential businesses

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to close and required K-12 schools to transition to remote learning. The town of New Durham continued to follow CDC guidelines throughout 2020/2021.

7 emergency declarations impacting New Durham. Total statewide amount approximately \$13,887,134

Program Key: PA: Public Assistance, DFA: Direct Federal Assistance

Public Assistance (PA): Disaster grant assistance available for communities to quickly respond to and recover from major disasters or emergencies declared by the President

Emergency Work (Categories A-B): Work that must be performed to reduce or eliminate an immediate threat to life, protect public health and safety, and to protect improved property that is significantly threatened due to disasters or emergencies declared by the President

Permanent Work (Categories C-G): Work that is required to restore a damaged facility, through repair or restoration, to its pre-disaster design, function, and capacity in accordance with applicable codes and standards

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Rating Probability, Severity, and Overall Risk of Future Disasters

The nature of each hazard type and the quality and availability of corresponding data made the evaluation of hazard potential difficult. The Multi-Hazard Planning Committee considered what data was at hand and used its collective experience to formulate statements of impact or potential. Each hazard type was rated using a hazard vulnerability assessment tool (refer to Table 2.3). This tool estimates the probability of occurrence, severity, and overall risk of an event using scoring and ranking system of: answer High (3), Moderate (2), and Low (1). A zero (0) score meant that there is no likelihood the hazard would impact the Town in the next 25 years. The ranges established for the average to determine severity were:

- High = >3
- Moderate = 2
- Low = 1 or below

The overall risk is a numeric indication developed by multiplying the total numbers of the probability and the severity.

Probability of Occurrence

Probability is based on a limited objective appraisal of a hazard's probability using information provided by relevant sources, observations and trends. The Planning Committee came together and broke down each hazard and the Town's subsequent vulnerability.

- **High:** There is a very strong likelihood (67-100% chance) that New Durham will experience a hazardous event within the next 25 years. Score = 3
- **Moderate:** There is moderate likelihood (34-66% chance) that New Durham will experience a hazardous event within the next 25 years. Score = 2
- **Low:** There is little likelihood (0-33% chance) that New Durham will experience a hazardous event within the next 25 years. Score = 1

Severity

Severity is an estimate generally based on a hazard's impact on humans, property and business. The Planning Committee identified the impact associated with each hazard on each of these three areas. The severity was calculated by the average of human, property, and business impacts

- **High:** The total population, property, commerce, infrastructure and services of the Town are uniformly 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. Score = 3
- **Moderate:** The total population, property, commerce, infrastructure and services of the Town are exposed to the effects of a hazard of moderate influence; or the total population, property, commerce, infrastructure and services of the community is exposed to the effects of a hazard, but not all to the same degree; or an important segment of population, property, commerce, infrastructure or service is exposed to the effects of a hazard. In a worst case

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scenario there could be a disaster of moderate to major, though not catastrophic, proportions.
Score = 2

- **Low:** 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. Score = 1

Overall Risk

The risk number can help the Town weigh the hazards against one another to determine which hazard is most detrimental. This is calculated by multiplying the ***Probability of Occurrence*** score by the average of the ***Severity*** score (human, property, and business impacts). The result was rounded to the nearest whole number.

- **High:** There is a great risk of this hazard in New Durham. Score = 4 or greater
- **Moderate:** There is moderate risk of this hazard in New Durham. Score = 2-3
- **Low:** There is little risk of this hazard in New Durham = 1 or less

Hazard Ratings in New Durham, NH

The Team determined that the hazards are distributed as follows:

- **5** hazards rated as having a **high** overall risk in New Durham:
 - Severe Thunderstorms
 - Severe Winter Weather
 - Hazardous Material
 - Extreme Temperatures
 - Tornado & Downburst
- **7** hazards rated as having a **moderate** overall risk in New Durham:
 - Flooding
 - Dam Failure
 - Earthquake
 - Hurricane & Tropical Storms
 - Public Health Threats (Epidemic and Lyme Disease)
 - Landslides
 - Radon & Arsenic
- **2** hazards rated as having a **low** overall risk in New Durham:
 - Wildfire
 - Drought

Table 2.3 is the Town's vulnerability assessment tool, which provides more information on the multi-hazard threat analysis that was completed during a brainstorming session with the Planning Committee.

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Table 2.3: Hazard Vulnerability Assessment Tool - Town of New Durham

	Human Impact	Property Impact	Business Impact	Severity	Probability	Overall Threat <i>(Severity x probability)</i> <i>(Rounded to the nearest whole number)</i> <i>Low = 0-1</i> <i>Moderate = 2-3</i> <i>High = > 4</i>
0 – N/a 1-Low 2-Moderate 3-High	<i>Probability of death or injury</i>	<i>Physical losses and damages</i>	<i>Interruption of service</i>	<i>Average of human, property, and business impacts</i>	<i>Likelihood this will occur within 25 years</i>	
Hazard Event						
Flooding	2	3	1	2	1	2
Dam Failure	2	3	2	2.3	1	2
Severe Thunderstorms	1	2	1	1.3	3	4
Wildfire	1	1	1	1	1	1
Severe Winter Weather	2	1	1	1.3	3	4
Earthquake	1	2	2	1.6	1	2
Landslide	1	1	1	1	2	2
Drought	1	1	1	1	1	1
Hurricane & Tropical Storms	1	2	1	1.3	2	3
Hazardous Material	2	3	3	2.6	2	5
Tornado & Downburst	2	3	2	2.3	2	3
Extreme Temps.	2	1	1	1.3	3	4
Public Health Threats	3	1	1	1.6	1	2
Radon & Arsenic	1	1	1	1	2	2

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Description of Hazards

This section describes the location and extent of hazards that could impact the Town of New Durham. It presents past hazard events in the Town or elsewhere in New Hampshire and discusses their rank order placement. The Multi-Hazard Planning Team investigated past and potential hazards using a variety of sources and techniques, including interviewing Town historians and other citizens; researching historical records archived at the Town Library; scanning old newspapers; reading published Town histories; consulting various hazard experts; and extracting data from the State of NH Hazard Mitigation Plan and other state and federal databases. With spatial data available, past and potential hazards were mapped.

Flooding

Hazard Type	Flooding
Location/Extent	Along Merrymeeting River and other small brooks
Vulnerability	
Severity	2
Probability	1
Overall Threat	2
Potential Loss	\$5,945,819 to \$29,729,097

Description of the Hazard

Riverine flooding is the most common natural disaster to impact New Hampshire. Floods are a common and costly hazard. They are most likely to occur in the spring due to the increase in rainfall and the melting of snow; however, floods can occur at any time of the year because of heavy rains, hurricane, or a Nor'easter.

New Hampshire usually has a climate of abundant precipitation. Weather ranges from moderate coastal to severe continental, with annual precipitation ranging from about 35 inches in the Connecticut and Merrimack River valleys, to about 90 inches on top of Mount Washington. Localized street flooding occasionally results from severe thundershowers, or over larger areas, from more general rain such as tropical cyclones and coastal "nor'easters." More general and disastrous floods are rare, but some occur in the spring from large rainfall quantities combined with warm, humid winds that rapidly release water from the snowpack.

The "100-year flood" Term:

The "100-year flood" is a term often used to describe a flood that has a 1% chance of occurring in any year. But the phrase is misleading, and often causes people to believe these floods happen every 100 years on average. The truth is, these floods can happen quite close together, or not for long stretches of time, but the risk of such a flood remains constant from year to year. The 100-year-flood term was originated to delineate areas on a map to determine what properties are subject to the National Flood Insurance Program. Properties within the 100-year-floodplain, as defined by the Federal Emergency Management Agency, have special requirements and mortgage holders will require owners to carry flood insurance on these properties.

[Source: The Nurture Nature Center: Focus on Floods]

Extent of the Hazard

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Causes of flooding other than a 100-yr. rainstorm—severe tropical storm (hurricane or tropical storm), rapid snow pack melt, river ice jams, erosion and mudslide, and dam breach or failure—all have some potential to affect New Durham. New Durham has between a 5% and a 12% probability of being impacted by a named tropical storm sometime in any June to November storm season (AOML 2004). These storms often bring torrential rainfall. Some hurricanes have been known to deliver rainfall well in excess of that from a 500-yr. storm. The 100-yr. floodplain data available for this analysis does not well account for the effects of such special weather events. Rapid snow melt in spring is always a significant potential flooding source, given the northern, relatively cold location and climate of New Durham, and has occurred multiple times in the past. Ice jam events, though the possibility of their occurrence definitely exists, seem not to have been a problem in the past. The Army Corps of Engineers Ice Jam Database contains no record of ice jams in New Durham, and the Planning Committee did not encounter any record or reference to ice jamming in the Town. Erosion and mudslide in steep slope areas resulting from heavy rainfall could alter topology enough to cause flooding. Steep slopes are especially prevalent in the northern third of the Town above Merrymeeting Lake.

Based on the extent of the floodplain, New Durham has significant flooding potential along Merrymeeting Brook, Merrymeeting River and along the Ela River. Hayes Brook in the southeast also has a fairly expansive floodplain area. New Durham has approximately 15% (4,172 acres) of its area in 100-yr. floodplain. Although flooding of the full extent of this floodplain by definition would require a 100-yr. storm, smaller storms with a higher annual probability of occurrence could still flood significant portions of that floodplain. Some of the structures that would be impacted by a 100-yr. storm could also be affected by smaller, more frequent flooding.

Past Impacts and Events

New Durham has several areas where development is particularly susceptible to 100-year flooding: the southern shore of Downing's Pond, near the Town center; the southeast and northwest shores of Chalk Pond and the northwest shore of March's Pond, next to each other in central New Durham; and the southeastern shore of Shaw's Pond in northern New Durham. Additionally, although development is less dense there, the floodplain around Merrymeeting River, especially near the Fish Hatchery, is susceptible to flooding. Significant flooding has occurred in the past but not in the last 5 years according to the committee.

Potential Future Impacts on Community

Overall, flooding potential in New Durham is moderate though no major flooding has occurred within recent years. Flood conditions will likely continue to affect the Town of New Durham even as the Town continues to improve the drainage system. Both seasonal flooding and flooding due to extreme weather events, which may increase in frequency and severity with climate change, have the potential to occur during all seasons.

Estimated Loss: \$5,945,819 to \$29,729,097

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Town of New Durham, New Hampshire

Dam Failure

Hazard Type	Dam Failure
Location/Extent	Along the Merrymeeting River, primary at Jones Dam
Vulnerability	
Severity	2
Probability	1
Overall Threat	2
Potential Loss	\$5,945,819 to \$29,729,097

Description of the Hazard

A dam failure is defined as the sudden, rapid, and uncontrolled release of impounded water. This sudden release of water may cause damage to local assets and even loss of life. The potential impact is measured with the dam classification. While no dams have failed within recent years, the potential for catastrophic flooding from dam breach or failure exists in New Durham. Of the 23 dams in New Durham, three are classified as High Hazard and two are classified as Low Hazard. High hazard dams include: Merrymeeting Lake Dam (D170001), Jones Dam (D170020), and Marches Pond Dam (D170004).

Extent of the Hazard

The delineated dam inundation area for a 100-yr. storm breach is large and extends generally southward down the valley of Merrymeeting Brook to Route 11, then continues to the north and west up the watershed of Merrymeeting River to the Route 11-Route 28A split in Alton Bay. Inundation waters would affect both Route 11 and the New Durham town center and would largely destroy any structures in their path. Approximately 154 and 562 acres of inundation would occur if the Jones Dam and Merrymeeting Lake Dam

Dam Classification Schedule

Classifications	Definition	Inspection Interval in Years
High	Dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life.	2
Significant	Dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no probable loss of lives but major economic loss to structures or property.	4
Low	Dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no possible loss of life and low economic loss to structures/property.	6
Non-Menace	Dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property.	6

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failed, respectively (see Map 1). The dam, however, has never breached, has been continually inspected, and is in excellent condition.

High water overflow of the Ellis Hatch Dam in Brookfield would result in significant flooding in northwest New Durham and would impact structures and three culverts on Kings Highway within a 0.5 mile stretch (see Map 2, below).

Past Impacts and Events

There has been no instance of dam failure in New Durham in at least the last 20 years.

Potential Future Impacts on Community

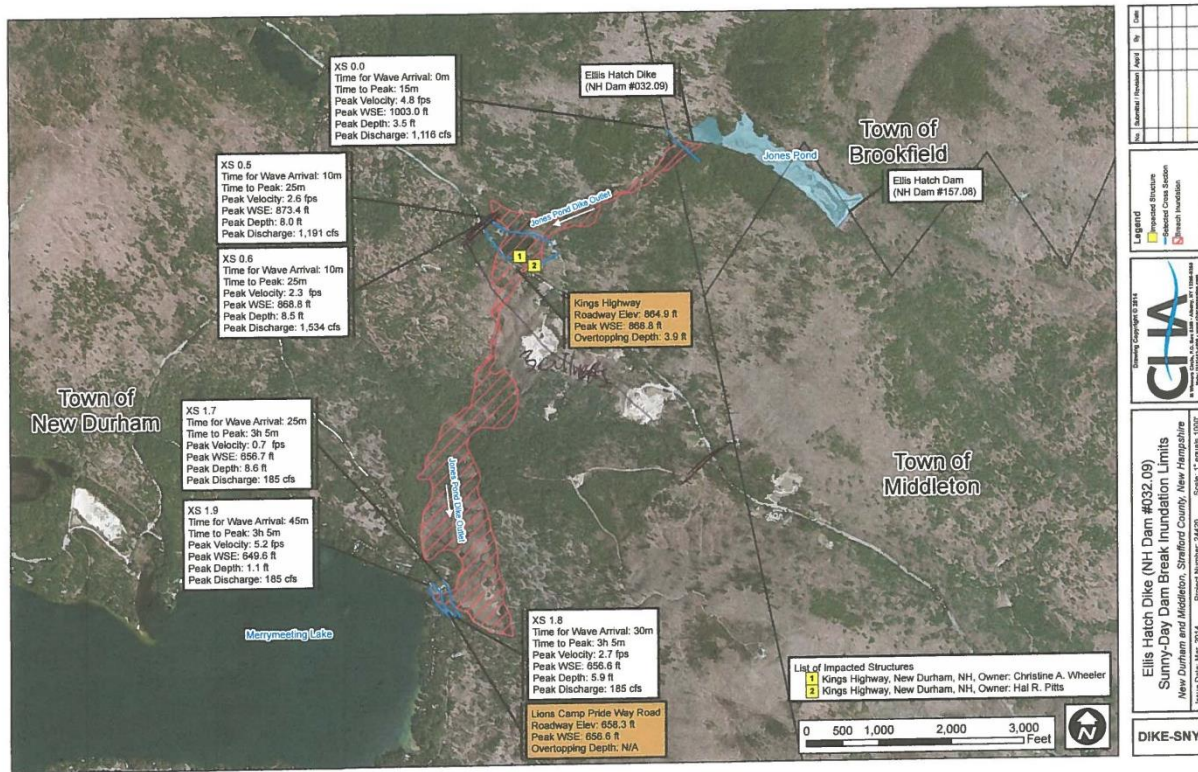
New Durham's dams are generally in good condition: The Jones Dam was repaired in summer of 2015 and the Marches Pond Dam has been rebuilt. The Jones Dam however has been prone to leaks in 2020/2021 and may need more repairs or perhaps a rebuild. Due to the locations of the dams and the inundation zones, dam failure is a moderate hazard in New Durham.



Map 1. High hazard dams and inundation areas in New Durham (Source: SRPC)

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Map 2. Ellis Hatch Dam (Brookfield, NH) Inundation Zone (Provided by the Town of New Durham)

Estimated Loss: \$5,945,819 to \$29,729,097

Severe Thunderstorms

Hazard Type	Severe Thunderstorms
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	3
Overall Threat	3
Potential Loss	\$29,729,097 to \$59,458,194

Description of the Hazard

Thunderstorm-related hazards that could impact New Durham include: high winds and downburst, lightning, hail, and, torrential rainfall. Thunderstorms are common in New Hampshire but can be considered generally less severe than in other areas of the country, such as the Great Plains states. Severe thunderstorms do occur in New Hampshire, though.

Extent of the Hazard

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Lightning can cause significant, sometimes severe, damage. Lightning strikes can cause direct damage to structures and serious injury or death to people and animals. Extensive damage also commonly results from secondary effects of lightning, such as electrical power surges, wildfire, and shockwave. According to lightning fatality data collected by the National Oceanic and Atmospheric Administration (NOAA), there were 418 fatalities in the United States from 2006 to 2019.

There were no reported deaths in NH. The National Climatic Data Center Storm Events database (NCDC 2021) lists 0 reports of lightning events in Strafford County from January 1, 2010 to January 1, 2022. One of these event took place in New Durham on July 15, 2007. It should be noted that there hasn't been a report of a significant event reported in Strafford County since 2008, however lightning can occur throughout the jurisdiction.

Past Impacts and Events

The [National Climatic Data Center Storm Events database](#) (NCDC 2015) lists 50 reported events (over 28 different days) of severe thunderstorm winds in Strafford County from January 1, 2010 to January 1, 2022. During that time period there were four reported events in New Durham on July 21, 2010, October 7, 2013, May 28, 2015, and September 11, 2016.

As stated in the NCDC, on July 21, 2010, Low pressure crossing southern Canada pushed a trailing cold front toward northern New England during the late afternoon and evening. Ahead of the front, thunderstorm activity quickly turned severe with numerous supercells producing damaging winds and large hail. These storms produced several tornadoes later in the evening across the border in southwest Maine. The severe thunderstorm downed trees and wires on Kings Highway.

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On October 7, 2013, the NCDC reports that A warm front lifted north through the region during the morning and early afternoon of October 7th. By mid afternoon much of New Hampshire had broken into the warm sector with temperatures pushing into the mid 70s. A strong cold front approaching from the west set the stage for late afternoon convection in a highly sheared environment. Damage associated with these storms was exclusively due to strong winds as a squall line with bowing segments moved through the region during the evening hours. The severe thunderstorm felled 3 trees across Ham Road.

On May 28, 2015, the NCDC reports that a strong shortwave and associated cold front moved into northwestern New England on the afternoon of May 28th. A warm and humid airmass was in place across the region ahead of the front. Convection began firing during the early afternoon in western New England and quickly moved into New Hampshire. Damaging winds were the main threat associated with these storms. The severe storm downed trees in West New Durham.

On September 11, 2016, the NCDC reports a line of strong to severe thunderstorms formed ahead of a strong and fast-moving cold front on the morning of September 11th. Numerous reports of wind damage were associated with these storms as they raced through New Hampshire during the mid to late morning hours. A severe thunderstorm downed trees and power lines in New Durham.

On May 26, 2021, the committee noted that the fire and police departments both lost shingles on their buildings due to high wind damage. The NCDC identified the storm as a strong jet streak that allowed for strong 0-6sm shear profiles. These ingredients led to organized linear convection by the afternoon hours with numerous reports of straight-line wind damage across the state.

Finally, hail is a fairly common part of thunderstorms in New Hampshire, but damaging hail is apparently not. The damage that can result is mostly to cars and windows. The NCDC Storm Events database lists 18 reported hailstorms in Strafford County from January 1, 2010 to January 1, 2022. One of these events took place in New Durham on June 8, 2012, however other storms have impacted New Durham since, despite not being listed in the NCDC database.

As stated in the NCDC, on June 8, 2012, A shortwave trough and associated strong jet max approached the forecast area on the afternoon of June 8th. Several line segments formed as the flow veered with time and freezing levels dropped. Large hail events occurred with these storms in the afternoon, which transitioned into bowing lines across central and southern New Hampshire. The storm produced 0.75 inch hail in New Durham.

Lightning Activity Scale (NOAA)	
Lightning Activity Level (LAL)	Conditions
LAL1	No thunderstorms activity
LAL2	Isolated thunderstorms
LAL3	Widely scattered thunderstorms
LAL4	Scattered thunderstorms
LAL5	Numerous thunderstorms
LAL6	Widely scattered, scattered, or numerous DRY thunderstorms

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The 2021 New Durham hazard mitigation committee reported no severe thunderstorms since 2016.

Potential Future Impacts on Community

Overall, the recurrence probability for thunderstorms is high. The annual recurrence probability of thunderstorms in general is effectively 100% with damaging ones occurring less often. New Durham will continue to experience thunderstorms and should expect to sustain significant damage periodically. This hazard was ranked as being a high overall threat.

Estimated Loss: \$29,729,097 to \$59,458,194

Wildfire

Hazard Type	Wildfire
Location/Extent	Town-wide, especially in densely wooded rural areas during a drought.
Vulnerability	
Severity	1
Probability	2
Overall Threat	2
Potential Loss	\$5,945,819 to \$29,729,097

Description of the Hazard

Wildfire is defined as an uncontrolled and rapidly spreading fire.

Forest Fires and Grass Fires - 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 grassland areas.

Extent of the Hazard

New Durham is a rural town, and much of the land cover of the Town is unfragmented woodland and grassland. Wildfires can occur anywhere but are more likely to occur in forested areas or fields. Exposure to natural factors, such as lightning, that start wildfires is consequently high and can occur throughout the

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jurisdiction. Wildfires in New Hampshire historically have tended to run in 50-yr cycles, which can be observed starting from the 1800s. This 50-year cycle is partially based upon human activities and, therefore, may not prove to be accurate into the future.¹

The peak in wildfires in the late 1940's and early 1950's is thought to be related to the increased fuel load from trees downed in the 1938 hurricane. Here, 60 years later, New Hampshire officials are again concerned about the high fuel load created by the 1998 and 2008 ice storms that hit New Hampshire.

Past Impacts and Events

The NCDC Storm Events database lists 0 reported wildfires in Strafford County from January 1, 2010 to January 1, 2022. Since 2011, there have been small (<1 acre) wildfires in New Durham but no significant wildfires. The committee however identified a couple wildfires that have occurred in the last 5 years such as the significant fire behind Johnson's Steak and Seafood on Route 11.

The National Wildfire Coordinating Group (NWCG) defines the size of a wildfire as:

- 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.

Potential Future Impacts on Community

The probability of occurrence of wildfires in the future is difficult for the Planning Committee to predict due to the dependence of wildfire on the occurrence of the causal hazards and the variability of numerous factors that affect the severity of a wildland fire. Both the severity of impacts and the probability of a wildfire occurring were ranked low.

Estimated Loss: \$5,945,819 to \$29,729,097

Severe Winter Weather

Hazard Type	Severe Winter Weather
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	3
Overall Threat	4

¹ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

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Potential Loss	\$29,729,097 to \$59,458,194
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Description of the Hazard

Winter snow and ice events are common in New Hampshire.

Extent of the Hazard

The NCDC Storm Events database reports 44 heavy snow events, 2 blizzards, 0 ice storms, and 8 winter storms (nor'easters) among large winter weather events impacting Strafford County from January 1, 2010, to January 1, 2022. Heavy snow typically brings significant snow removal costs along with delays in transportation schedules. Wet snow can result in major infrastructure damage from heavy snow loads and has been the cause of human harm during long periods of shoveling, including back injuries and in some cases heart attacks to older individuals. The most severe damage, though, often comes from ice storms and winter nor'easters.

Past Impacts and Events

Three events of those listed in the NCDC database are of particular note for their severity:

1. **The Ice Storm of 2008** (December 11th – 12th) was a major winter storm that brought a mixture of snow, sleet, and freezing rain. The greatest impact in the state was in southern and central New Hampshire where a significant ice storm occurred. Following the ice storm, recovery and restoration efforts were negatively impacted by additional winter weather events that passed through the state. The freezing rain and sleet ranged from 1 to 3 inches, ice accretion to trees and wires in these areas generally ranged from about a half inch to about an inch. The weight of the ice caused branches to snap, and trees to either snap or uproot, and brought down power lines and poles across the region. About 400 thousand utility customers lost power during the event, with some customers without power for two weeks. Property damage across northern, central and southeastern NH was estimated at over \$5 million.



Ice laden trees, ice storm December 2008, Birch Ridge area of New Durham (Photo credit: Catherine Orlowicz)

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- The Blizzard of 2013 – NEMO** (February 8th-9th) was an area of low pressure developed rapidly off the Carolina coast late on the 7th and early on the 8th. The storm moved very slowly northeast during the 8th and 9th as it continued to intensify. By the morning of the 10th, the storm was located just to the east of Nova Scotia. The storm brought heavy snow, high winds, and blizzard conditions to the southeastern part of the state. Snowfall amounts were generally 18 inches or more in the southeast where blizzard conditions caused considerable blowing and drifting snow. In western and northern sections, snowfall amounts were in the 4 to 18 inch range. Southeastern New Hampshire had blizzard conditions for about 3 to 10 hours.

The NCDC Regional Snowfall Index for stations near New Durham (in Wolfeboro and Rochester) reported between 18 and 24 inches of snow from February 8-February 10, 2013. According to the NH Union Leader, wind gusts of over 30-miles-per hour were expected to occur with the storm; however, the NH Electric Co-op reported only minor power outages.² Local impacts included additional plowing for crews. The Town needed to purchase and apply extra salt.

- The Blizzard of 2015 – JUNO** (January 26th – 28th) was area of low pressure developed off the Delmarva peninsula on Monday, January 26th, and intensified rapidly as it moved slowly northward through the 27th. Snow spread northward across the region Monday night and became heavy on Tuesday, the 27th. Winds became strong during the day Tuesday leading to blizzard conditions at times along and inland from the coast. The snow persisted into Tuesday night in many areas with blowing and drifting snow. Along the coast, large waves combined with a storm surge produced coastal flooding and splash over. In Hampton, the Tuesday morning tide was 1.43 feet above flood levels (see graph below), inundating many streets on the bay side of town. Snowfall amounts ranged from 10 to more than 30 inches across much of the southeastern part of the state.

The Regional Snowfall Index for stations near New Durham (in Strafford and Rochester) reported between 18 and 24 inches and 6 to 12 inches of snow from January 25-January 28th, 2015. Local impacts included heavy snowfall. The school roof needed to be shoveled off to prevent roof collapse.

The 2021 Hazard Mitigation committee identified from March 8, 2018 to March 14, 2018, in two separate storms, receiving upwards of 3 feet of snow. Over 12 inches of snow on March 8th and the March 14th storm brought over 20 inches of snow. Parts of the town lost power causing daycare to close along with several parts of the town losing power for over the 2 days. The second storm caused more closings than the first but they both inundated road conditions for two days each.

Another storm brought around 8 inches of snow to New Durham on March 23, 2020. A couple trees fell that caused the town to be without power for another two days. This storm took them over budget for 2020 where overtime was needed to help clear the roads of not only snow, but trees as well.

² New Hampshire Union Leader. February 9, 2013.

<http://www.unionleader.com/apps/pbcs.dll/article?AID=/20130209/NEWS1101/130209041/0/OPINION02>

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The Sperry–Piltz Ice Accumulation Index, or SPIA Index, is a forward-looking, ice accumulation and ice damage prediction index that uses an algorithm of researched parameters that, when combined with National Weather Service forecast data, predicts the projected footprint, total ice accumulation, and resulting potential damage from approaching ice storms. It is a tool to be used for risk management and/or winter weather preparedness.

Potential Future Impacts on Community

New Durham will continue regularly to receive impacts from severe, regional winter weather events. Due to its heavily forested nature, the Town is most highly exposed in terms of damage to forest resources and the secondary impacts of those damages. This hazard impacts the entire jurisdiction.

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.)

Estimated Loss: \$29,729,097 to \$59,458,194

Earthquake

Hazard Type	Earthquake
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	1
Overall Threat	1
Potential Loss	\$0 to \$5,945,819

Description of the Hazard

The USGS defines an earthquake as a term used to describe both sudden slip on a fault, and the resulting ground shaking and radiated seismic energy caused by the slip, or by volcanic or magmatic activity, or other sudden stress changes in the earth. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, avalanches, and tsunamis. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and

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are followed by vibrations of gradually diminishing force called aftershocks.³ The magnitude and intensity of an earthquake is measured by the Richter scale and the Modified Mercalli Intensity (MMI) scale, respectively.

The Richter magnitude scale was developed in 1935 by Charles F. Richter of the California Institute of Technology as a mathematical device to compare the size of earthquakes. The magnitude of an earthquake is determined from the logarithm of the amplitude of waves recorded by seismographs. Adjustments are included for the variation in the distance between the various seismographs and the epicenter of the earthquakes.⁴

The Modified Mercalli Intensity (MMI) scale was developed in 1931 by the American seismologists Harry Wood and Frank Neumann. This scale, composed of 12 increasing levels of intensity that range from imperceptible shaking to catastrophic destruction, is designated by Roman numerals. It does not have a mathematical basis; instead it is an arbitrary ranking based on observed effects actually experienced at a given place and therefore has a more meaningful measure of severity.⁵

MODIFIED MERCALLI SCALE		RICHTER SCALE	
I.	Felt by almost no one.	2.5	Generally not felt, but recorded on seismometers.
II.	Felt by very few people.	3.5	Felt by many people.
III.	Tremor noticed by many, but they often do not realize it is an earthquake.		
IV.	Felt indoors by many. Feels like a truck has struck the building.		
V.	Felt by nearly everyone; many people awakened. Swaying trees and poles may be observed.		
VI.	Felt by all; many people run outdoors. Furniture moved, slight damage occurs.	4.5	Some local damage may occur.
VII.	Everyone runs outdoors. Poorly built structures considerably damaged; slight damage elsewhere.		
VIII.	Specially designed structures damaged slightly, others collapse.	6.0	A destructive earthquake.
IX.	All buildings considerably damaged, many shift off foundations. Noticeable cracks in ground.		
X.	Many structures destroyed. Ground is badly cracked.	7.0	A major earthquake.
XI.	Almost all structures fall. Very wide cracks in ground.	8.0 and up	Great earthquakes.
XII.	Total destruction. Waves seen on ground surfaces, objects are tumbled and tossed.		

Extent of the Hazard

Due to the state's location in an area of moderate seismic activity earthquakes are a common event in New Hampshire, but significantly damaging earthquakes are not. The Northeast States Emergency Consortium (NESEC, 2021) website presents a history of earthquake in the Northeast and documents that New Hampshire is an area of high earthquake probability. Three hundred and twenty earthquakes occurred in New Hampshire from 1638 to 2022. However, New Hampshire has only experienced nine earthquakes of significant magnitude (Richter Magnitude 4.0 or greater) in that time period.

Past Impacts and Events

³ The Northeast States Emergency Consortium Earthquake Hazards. <http://nesec.org/earthquakes-hazards/>. Viewed on 8/10/155

⁴ USGS. Earthquake Hazard Program. <http://earthquake.usgs.gov/learn/glossary/?term=Richter%20scale>. Viewed on 8/10/15

⁵ USGS. Earthquake Hazard Program. <http://pubs.usgs.gov/gip/earthq4/severitygip.html>. Viewed on 8/10/15

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This data would suggest, then, that earthquakes are on average an annual occurrence but that significant quakes have an annual probability of occurrence (based on the 1638 to 2022 period) of about 2.4%. An earthquake can impact all areas of the jurisdiction.

Table 2.4: Notable Historic Earthquakes in NH 1638-2022 (Magnitude 4.0 or Greater)

Location	Date	Intensity MMI Scale	Magnitude Richter Scale
Central New Hampshire	June 11, 1638	-	6.5
Portsmouth	November 10, 1810	V	4.0
Near Hampton	July 23, 1823	IV	4.1
Ossipee	October 9, 1925	VI	4.0
Ossipee	December 20, 1940	VII	5.5
Ossipee	December 24, 1940	VII	5.5
West of Laconia	January 19, 1982	-	4.7
Northeast of Berlin	October 20, 1988	-	4.0
Southeast of Berlin	April 6, 1989	-	4.1

Potential Future Impacts on Community

The Planning Committee noted no significant, recent earthquakes which is backed up by the USGS data. It's almost impossible to predict future earthquakes, but only small <5.0 magnitude earthquakes are expected that could possibly cause small damage to local structures.

Estimated Loss: \$0 to \$5,945,819

Landslide

Hazard Type	Landslide
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	1
Overall Threat	1
Potential Loss	\$0 to \$5,945,819

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Description of the Hazard

Landslides could occur in New Durham in areas with steep slopes, where soils and loose bedrock formations would tend to slough off and move en masse downhill under gravity. Earthquakes could readily cause landslides, as could ground saturation from extended heavy precipitation events. Given seismic or precipitation events that could initiate landslide, landslide hazard is likely quite high in steep slope areas.

Extent of the Hazard

In New Durham, steep slopes cover approximately 7.2% (2,011 acres) of the Town. The Planning Committee did not have the expertise available to analyze the actual probability of landslide in New Durham. However, the USGS (1997) classifies landslide incidence regionally as very low (less than 1.5% of land area involved).

Past Impacts and Events

The local probability in New Durham will depend on specific soil/rock types and upon the probability of initiating events. Camp Maranatha is at risk from landslides due to the boulders and steep slopes located adjacent to the building. Owl's head on Shore Road is also a vulnerable location. North Shore Road is not reliable and not accessible in all seasons. For example, in the past landslides and rocks have needed to be blasted because they were too large to remove with town equipment from North Shore Road. McCoy Pit at the bottom of the road and summer traffic, in particular, would be impacted by a road closure on North Shore Road. The Planning Committee noted no significant, recent landslides.

Potential Future Impacts on Community

The Planning Committee noted no significant, recent landslides. There is a possibility that the Copple Crown Village District may be cut off from a landslide. However, this district does their own maintenance and landscaping.

Estimated Loss: \$0 to \$5,945,819

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Drought

Hazard Type	Drought
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	2
Overall Threat	3
Potential Loss	\$5,945,819 to \$29,729,097

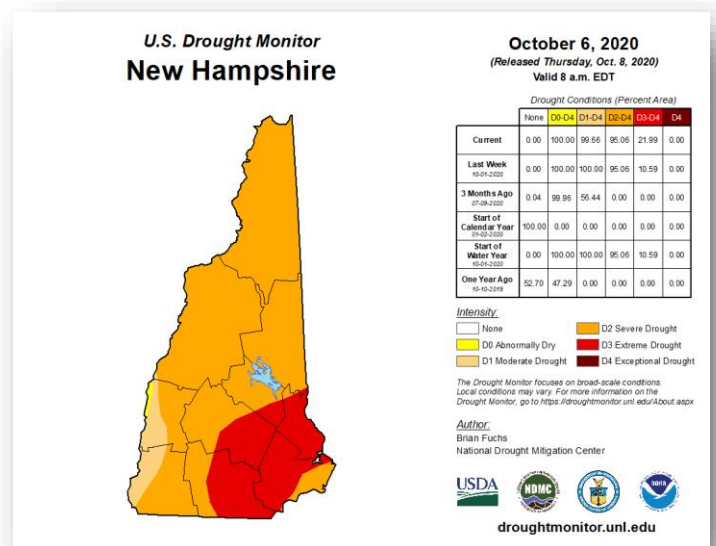
Description & Extent of the Hazard

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

Past Impacts and Events

Droughts have been recurring through the past centuries. Normal precipitation for the state averages 40 inches per year. During the summer of 2015, most of central and southern New Hampshire experienced a drought, the first since 2001–2002 (which was the 3rd worst on record, exceeded only by the national droughts of 1956-1966 and 1941-1942). While many communities experienced record snowfall totals that past winter (2014-2015), the lack of rainfall and higher-than-average temperatures resulted in river and groundwater levels to be lower than average. This resulted in the implementation of local water conservation plans throughout the region.

During Summer of 2020, Dry conditions developed rapidly across New Hampshire starting in the middle of May. The period May 16 to June 25 was exceedingly dry. There was some relief in late June



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and July but by the middle of August, dry conditions set in again with September being exceedingly dry with some locations reporting their driest September on record. The National Centers for Environmental Information reported that September was the 7th driest on record for New Hampshire. The D2 severe drought rapidly expanded through the entire state by the end of September. An area of D3 extreme drought area developing towards the end of September in Southeast New Hampshire with Strafford County being the hardest hit, along with regions of surrounding counties. The drought peaked in intensity during the first week of October before beneficial widespread rains impacted the state towards the middle of October. The town of New Durham reported that they needed to fill residential wells by hiring a swimming pool company.

Hydrological drought is evidenced by extended periods of negative departures. Six droughts of significant extent and duration were evident in the 20th century as noted below in Table 2.5. The most severe drought recorded in New Hampshire occurred from 1960 to 1969. This drought encompassed most of the northeastern United States (1956-1966). The drought of 1929-1936 was the second worst and coincided with severe drought conditions in large areas of the central and eastern United States. The drought of 2001-2002 was the third worst on record.⁶

The National Drought Monitor classifies the duration and severity of the drought using precipitation, stream flow, and soil moisture data coupled with information provided on a weekly basis from local officials. There are five magnitudes of drought outlined in the New Hampshire State Drought Management Plan, including Exceptional, followed by Extreme, Severe, Moderate and Abnormally Dry.

Table 2.5: New Hampshire Drought History & Conditions

Dates	Area Affected	Magnitude	Remarks
1929 – 1936	Statewide	-	Regional; recurrence interval 10 to > 25 years
1939 – 1944	Statewide	Severe Moderate	Severe in southeast NH and moderate elsewhere in the State. Recurrence interval 10 to > 25 years.
1947 – 1950	Statewide	Moderate	Recurrence interval 10 to >25 years
1960 – 1969	Statewide	Extreme	Longest recorded continuous spell of less than normal precipitation. Encompassed most of the northeast US. Recurrence interval >25 years.
2001 – 2002	Statewide	Severe	Recurrence interval 10 to >25 years
2015	Central & Southern NH	Moderate	Recurrence interval cannot yet be determined
2020	Statewide	Severe	Recurrence interval cannot yet be determined

Historically, droughts in New Hampshire have had limited effect because of the plentiful water resources and sparse population. Since 1960, the population has more than doubled, which has increased demand for

⁶ NHDES. Drought Management Program. Publications. *NH Drought Historical Events*. Viewed on 8/10/15. <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>

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the State’s water resources. Further droughts may have considerable effect on the State’s densely populated areas along the seacoast and in the south-central area.

Potential Future Impacts on Community

With extreme variation in environmental conditions due to climate change possibly on the rise, drought probability may grow in the future. Currently, drought possibility seems moderate. The large amount of water resources and relatively sparse population in New Hampshire have tended to minimize the impacts of drought events in the region, but this regional protection may be endangered in the future with increases in drought frequency or severity.

Drought is a regional hazard and can impact the entire jurisdiction. Some residents or areas of the town may be more vulnerable to the effects of a drought. The Birch Hill Ponds in New Durham, for example, experienced low water levels in the summer of 2015. However, because most people have drilled wells (as opposed to shallower, dug wells) residents’ drinking water supply was not impacted by minor drought conditions over the summer of 2015 and 2020.

Estimated Loss: \$5,945,819 to \$29,729,097

Hurricane & Tropical Storms

Hazard Type	Hurricane and Tropical Storms
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	2
Overall Threat	3
Potential Loss	\$5,945,819 to \$29,729,097

Description of the Hazard

According to the State Hazard Mitigation Plan (2018) tropical cyclones with maximum sustained winds of less than 39 mph are called tropical depressions. Once the tropical cyclone reaches winds of at least 39 mph, they are typically called a tropical storm and assigned a name. If the winds reach 74 mph or greater, they are upgraded and called a hurricane. 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. Hurricanes may impact all areas of the jurisdiction.

Extent of the Hazard

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These severe tropical storms may occur anytime from early spring to late fall, and in general are less common than other storms, e.g. nor'easters. As wind events, hurricanes have caused damage in New Durham, most notably in 1938 and 1954 (Hurricane Carol). Quite a few other hurricanes have impacted the Town, including Hurricane Donna, Gloria, and Bob, with high winds but relatively little damage.

Past Impacts and Events

The NOAA National Climatic Data Center's Storm Events database (NCDC 2015) reports one tropical storm event affecting Strafford County from January 1, 2010 to December 31, 2021, which is detailed as follows:

Tropical Storm Irene (August 28, 2011) - brought a prolonged period of strong and gusty winds and heavy rain to the state. The high winds snapped or uprooted numerous trees throughout the state causing more than 160,000 customers to lose electrical and/or communication services. The heavy rains caused rivers and streams throughout the state to flood causing damage to bridges, roads, and property. The strongest winds across the state began Sunday morning in southern areas and spread northward during the day. Winds continued to be gusty overnight as the storm moved away from the area. Observed maximum wind gusts included 63 mph at Portsmouth, 52 mph at Concord, and 51 mph at Manchester. On the top of Mt. Washington, winds gusted to 104 mph as the storm approached and 120 mph as it moved away. The combination of wet soil and the prolonged period of strong and gusty winds brought down numerous trees throughout the state. One person was killed and three people were injured across the state due to falling trees or branches. Rainfall amounts across the state ranged from 1.5 to 3 inches across southeastern New Hampshire.

Tropical Storm Isaias (August 4, 2020) – was the first tropical storm to impact New Hampshire since 2011. The center of the storm tracked west of the state, keeping the flooding rain associated with the storm across New York. The primary impacts the storm brought to New Hampshire were gusty winds with widespread reports of wind gusts in the mid to upper 40s. Numerous trees and branches were brought down with scattered power outages across the state. An area of enhanced damage was concentrated in Carroll County as a squall line pushed through the region. Concentrated tree damage toppled 100s of trees with one fatality being reported as a large tree crashed into the home. Overall storm impacts were brief with a period of gusty winds from the south to southeast on the evening of August 4th causing most of the damage. There was no coastal flooding reported as the relatively minor storm surge of around a foot coincided at the time of low tide on the New Hampshire coast. There was no reported flooding in Strafford County.

The last hurricane to hit the region was Hurricane Sandy during the period of October 26 to November 8, 2012. New Durham experienced minimal damage due to heavy rain and sustained wind speeds. Presidential Declaration DR-4095 requested funds for debris removal and emergency protective measures; although Strafford County was not included in the in this disaster declaration. Strafford County did; however, receive Emergency Declaration funds for Emergency Protective Measures through EM-3360. New Durham expended approximately \$8,656 of which 75% was reimbursed through the federal public assistance program from EM-3360.

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Potential Future Impacts on Community

Based on historical data and statistical predictors, the Atlantic Basin averages approximately 12 total named storms per year. Six of those storms will become hurricanes with three becoming a category three or higher. With variability in sea-level pressure and sea-surface temperatures in the Atlantic Ocean, it is difficult to predict with certainty the number of storms in any given year. It is even more difficult to determine which of those storms will make landfall. Because New Durham is considerably inland from the New Hampshire coast, wind speeds may be diminished from their coastal strength, and significant impact on the Town would be dependent on the exact track of these concentrated storms.

Scale Number (Category)	Sustained Winds (MPH)	Damage	Storm Surge
1	74-95	Minimal: Unanchored mobile homes, vegetation and signs.	4-5 feet
2	96-110	Moderate: All mobile homes, roofs, small crafts, flooding.	6-8 feet
3	111-130	Extensive: Small buildings, low-lying roads cut off.	9-12 feet
4	131-155	Extreme: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded.	13-18 feet
5	More than 155	Catastrophic: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.	Greater than 18 feet

Hurricanes and tropical storms will continue to affect New Durham and recurrence potential of hurricane and tropical storm hazards is, therefore, moderate. From 1938-2020 there have been thirteen significant hurricanes or tropical storms that have impacted the county. It is likely that the region may be impacted by a significant storm of tropical origin within the foreseeable future.

Estimated Loss: \$5,945,819 to \$29,729,097

Hazardous Material

Hazard Type	Hazardous Material
Location/Extent	Town-wide, specifically around the Route 11 corridor
Vulnerability	
Severity	3
Probability	2
Overall Threat	4
Potential Loss	\$29,729,097 to \$59,458,194

Description of the Hazard

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines. Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Hazardous materials continue to evolve as new chemical formulas are created.

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Extent of the Hazard

In New Durham, large trucks carrying fuel (oil, gas, propane) are a concern as accidents along the Route 11 corridor could contaminate waterbodies including tributaries in the Upper Cochecho River and Alton Bay watersheds.

Past Impacts and Events

In the late 1990's there was a major spill on Route 11 in Alton, NH. The Planning Committee recalled a truck carrying 35,000 gallons of gasoline was involved in an accident and two state highways were closed for 36 hours, one of which was an evacuation route (Route 11). In 2009/2010, flooding caused a residential tank to spill heating fuel on Merrymeeting River.

Potential Future Impacts on Community

The Planning Committee also addressed the potential for other hazardous spills containing medical supply waste from lab work and harmful contaminants. There is also the potential for a hazardous threat coming through the mail at the post office.

Estimated Loss: \$29,729,097 to \$59,458,194

Tornado & Downburst

Hazard Type	Tornado and Downburst
Location/Extent	Town-wide
Vulnerability	
Severity	2
Probability	2
Overall Threat	4
Potential Loss	\$29,729,097 to \$59,458,194

Description of the Hazard

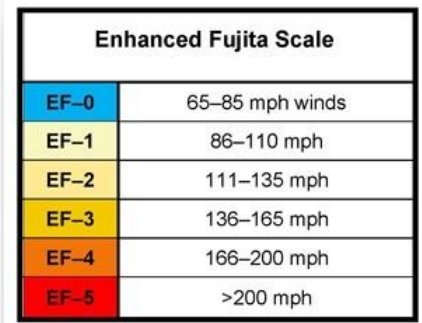
A *tornado* is a violent windstorm characterized by a twisting, funnel shaped cloud with winds in excess of 200 mph, often accompanied by violent lightening, peripheral high winds, severe hail, and severe rain. Tornadoes develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The

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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.

A **downburst** is a severe localized wind blasting down from a thunderstorm. These "straight line" winds are distinguishable from tornadic activity by the pattern of destruction and debris. Downbursts fall into two categories: microburst, which covers an area less than 2.5 miles in diameter and macroburst, which covers an area at least 2.5 miles in diameter.



Enhanced Fujita Scale	
EF-0	65–85 mph winds
EF-1	86–110 mph
EF-2	111–135 mph
EF-3	136–165 mph
EF-4	166–200 mph
EF-5	>200 mph

Extent of the Hazard

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage. The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

Past Impacts and Events

Between 1991 and 2010, the average annual number of tornadoes in New Hampshire was one.⁷ The severity and overall risk of tornado/downburst activities in the state is ranked as moderate. Though the frequency of tornado events in New Hampshire is not great, the state has experienced large tornados throughout its history. An early example is the tornado that struck the state in September 1821. This tornado was reported to have tracked from the Connecticut River, near Cornish, and terminating near Boscawen. When the skies cleared, 6 people were dead, hundreds injured and thousands homeless.

In 1998 an F2 tornado in Antrim, N.H. blew down a 45-foot by 12-foot section of the Great Brook Middle School. Witnesses reported seeing a funnel cloud, and the weather service, after an inspection, confirmed it was a tornado. According to the June 2, 1998 edition of the Eagle Tribune, John Jensenius from the National Weather Service in Gray, Maine estimated that the twister cut a path half a mile long, up to 100 yards wide, and was on the ground for several minutes.

In July 2008, an F2 tornado and high winds created a path of destruction through five New Hampshire counties that destroyed homes, displaced families, downed trees and forest lands and closed major state roadways. The impact to residents was extensive, with over 100 homes rendered uninhabitable. Phone and

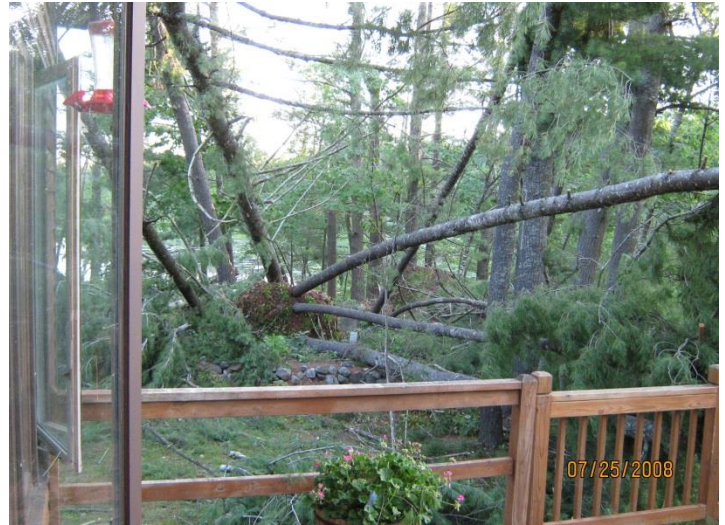
⁷ NOAA. U.S. Tornado Climatology (<https://www.ncdc.noaa.gov/climate-information/extreme-events/us-tornado-climatology>)

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electric service was cut off to over 12,500 customers. One fatality is attributed to a building collapse, and local hospitals reported numerous physical injuries associated with this severe storm.⁸ New Durham was one of the 11 towns hit by this tornado.

An E-F1 tornado, moving north northeast out of Belknap County entered Strafford County approximately 2.2 mile north northwest of New Durham and skipped along for more than eight miles before exiting into Carroll County. The intensity of the tornado varied between F0 and F2 and numerous trees were blow down along the path of the storm.⁹ Sustained winds of 86 to 110 mph were recorded. The tornado's path was centrally located over undeveloped land and forested areas, however at least 20 buildings were damaged in the town. Property damage in New Durham totaled \$126,000.



First house hit by Tornado in New Durham July 25, 2008 No damage to house , lost all trees on property, Merrymeeting Road (Source: Catherine Orlowicz).

Since the July 2008 tornado (through December 2021), 13 tornados have hit New Hampshire, however none have hit Strafford County. Several however have occurred between Alton and Wolfeboro within 10 miles of New Durham.

Downburst activity is very prevalent throughout the State. However, the majority downburst activity is mostly unrecognized unless a large amount of damage has occurred. Several of the more significant and recent events are highlighted below:

- Central, NH – July 6, 1999 – Damages: Two roofs blown off structures, downed trees, widespread power outages, and damaged utility poles and wires; two fatalities.
- Stratham, NH – August 18, 1991 – Damages: \$2,498,974 worth of damages; five fatalities.
- Moultonborough, NH – July 26, 1994 – Damages: Downed trees, utility poles and wires. Approximately 1,800 homes without power and 50-60 homes damages.
- Bow, NH – September, 6, 2011 – Damages: City Auto in Bow had 15 campers damaged and estimated \$200,000 in damage.

Between 2011 and 2022, New Durham experienced small brief road closures associated with microbursts but no devastating damage. However, the committee noted that the town hall's bell flipped over due to high winds in 2019. That is the only known wind-related damage to city assets in the last 5 years.

Potential Future Impacts on Community

⁸ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

⁹ NOAA National Climatic Data Center. Storm Events Database. (<https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=123355>)

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Considering the great dependence of impact upon the actual track of any tornado, the likelihood of a large tornado hitting New Durham is fairly low; however, the impacts of a tornado in New Durham would be moderate to significant. The probability of reoccurrence of a downburst may be higher. A tornado or downburst can impact the entire jurisdiction and may cause greater damage in the community center.

Estimated Loss: \$29,729,097 to \$59,458,194

Extreme Temperatures

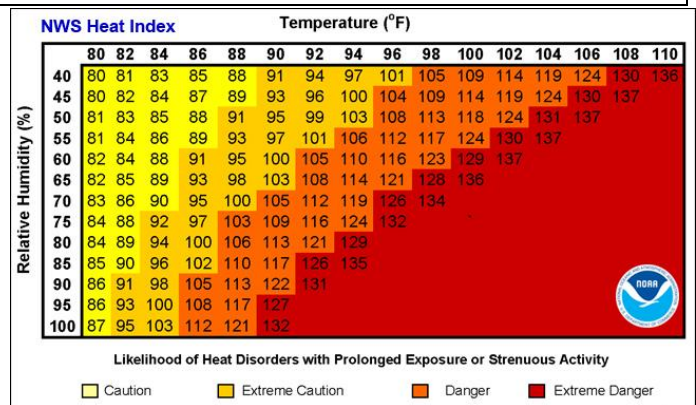
Hazard Type	Extreme Temperatures
Location/Extent	Town-wide
Vulnerability	
Severity	1
Probability	3
Overall Threat	4
Potential Loss	\$29,729,097 to \$59,458,194

Extreme Heat

Extreme heat events can be described as periods with high temperatures of 90°F or above. Elderly and very young populations are particularly susceptible to these events, even those of only single-day duration. Also, roads, railroads and other infrastructure can suffer significant damage during extended events. All area of town are susceptible to extreme heat.

According to a 2014 study of climate change by Climate Solutions New England, [Climate Change in Southern New Hampshire](#), from 1970 to 1999, southern New Hampshire experienced an average of seven days per year above 90°F each year. This is projected to increase to 22 days per year under a low emissions scenario to nearly 50 days per year under a high emissions scenario. Between 1980 and 2009, an average of one day per year reached 95°F in southern New Hampshire. By the end of the century, the number of days per year over 95°F is expected to increase as much as six to 22 days per year. Additionally, the average daytime maximum temperature on the hottest day is expected to increase to as much as 98°F to 102°F (depending on the emissions scenario), compared to the historical average of 93°F.¹⁰

Between 1960 and 2012, there was an average of 8.3 days per year (or 0.8 days/decade) greater than 90°F recorded in Durham (the closest of four stations to New Durham included in the study). During this time



The NWS Heat index calculates the dangers from relative humidity and high temperatures (Source: NWS)

¹⁰ Wake, C. et al. "Climate Change in Southern New Hampshire; Past, Present, and Future." Climate Solutions of New England. 2014

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the hottest day of the year averaged 95.0°F. Annual average temperatures may increase on average by 3-5°F by 2050 and 4-8°F by 2100.¹¹

No records of death due to extreme heat were found for New Durham during the preparation of this plan.

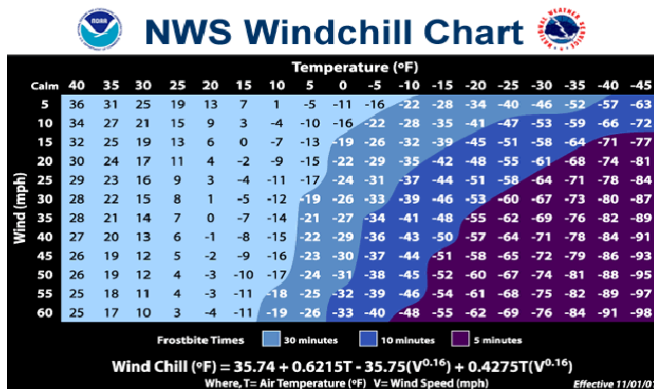
Extreme Cold

What constitutes extreme cold varies by region. Characteristics of an extreme cold event in northern states include temperatures at or below zero for an extended period of time. According to the National Weather Service (NWS), extreme cold is a daily concern during the winter months for northern states.

Between 1960 and 2012, the average temperature of the coldest day of the year was -14.5°F in Durham (the closest of four stations to New Durham included in the study).¹² Between 1980 and 2009, there were an average of 164 days per year under 32°F and 16 days per year under 0°F in southern New Hampshire. By the end of the century, southern New Hampshire is expected to see 20 fewer days below 32°F and only about 2 to 5 days per year under 0°F. All areas of the town are susceptible to extreme cold.

The town of New Durham allows their fire station, community room, or library to be used as de-facto warming and cooling centers. However, only the fire station and library have heating and cooling. These resources are not used typically due to the rural aspect of the town and a large percentage of the town having generators. The community room was used as a warming shelter for citizens without power during 2017 and 2018.

No records of death due to extreme cold were found for New Durham during the preparation of this plan.



Winter Storm in 2008 (Source: Catherine Orowicz)

The NWS Wildchill Temperature index calculates the dangers from winter winds and freezing temperatures (Source: NWS)

Estimated Loss: \$29,729,097 to \$59,458,194

¹¹ Wake, C. et al. "Climate Change in Southern New Hampshire; Past, Present, and Future." Climate Solutions of New England. 2014

¹² Wake, C. et al. "Climate Change in Southern New Hampshire; Past, Present, and Future." Climate Solutions of New England. 2014

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Public Health Threats

Hazard Type	Public Health Threats
Location/Extent	Town-wide
Vulnerability	
Severity	2
Probability	2
Overall Threat	4
Potential Loss	Structure loss value cannot be estimated

Description of the Hazard

Public health threats are events or disasters that can affect an entire community. The Planning Committee discussed the threat of specific hazards including epidemics, Lyme disease, and arsenic and radon individually. When completing the Hazard Vulnerability Assessment, epidemic and Lyme disease were considered together under the heading of *public health threat*, and radon and arsenic were considered together.

Epidemic

As defined by the CDC, an epidemic is "the occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time."¹³ In addition to being categorized by the type of transmission (point-source or propagated), epidemics may occur as outbreaks or pandemics. As defined in the State Hazard Mitigation Plan, an outbreak is a sudden increase of disease that is a type of epidemic focused to a specific area or group of individuals. A pandemic is an epidemic that spreads worldwide, or throughout a large geographic area. A recent example of this would be COVID-19.

New Durham is an active member of the Strafford County Public Health Network (SCPHN): a collaborative of local governments and health and human service agencies preparing for and responding to public health emergencies on a regional level.

Epidemics may be caused by infectious diseases, which can be transmitted through food, water, the environment or person-to-person or animal-to-person (zoonoses), and noninfectious diseases, such as a chemical exposure that causes increased rates of illness. Infectious disease that may cause an epidemic can be broadly categorized into the following groups.¹⁴:

- Foodborne (Salmonellosis, Ecoli)
- Water and Foodborne (Cholera, Giardiasis)
- Vaccine Preventable (Measles, Mumps)
- Sexually Transmitted (HIV, Syphilis)
- Person-to-Person (TB, Aseptic meningitis, COVID-19)

¹³ Slate; <http://www.slate.com/id/2092969/>

¹⁴ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

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- Arthropodborne (Lyme, West Nile Virus)
- Zoonotic (Rabies, Psittacosis)
- Opportunistic fungal and fungal infections (Candidiasis).

An epidemic may also result from a bioterrorist event in which an infectious agent is released into a susceptible population, often through an enhanced mode of transmission, such as aerosolization (inhalation of small infectious disease particles).¹⁵

New Durham is a vacation destination. Due to the influx of residents from neighboring towns or even states, there is a threat of enabling infection and viruses to be transmitted from outside the town borders. In addition, while children attend K-6 in New Durham, most travel to Wolfeboro to attend middle school and high school. There are also a number of students who attend private schools in Rochester and Somersworth. Students, tourists, and residents who commute outside the town to get to and from work, among other travelers, increase the threat of enabling infection and viruses to be transmitted from other parts of the state.

During 2020, the town purchased glass barriers for front town clerks at the Town hall. The town also installed a walkup window from the outside to slow the spread of COVID-19 within municipal buildings. The town continued to follow CDC guidelines such as 6-foot distancing, mask wearing indoors and temperature checks using

As of December 2021, New Durham has had about 500 cumulative cases of COVID-19 throughout the 2020/2021 pandemic. As of writing this plan, New Durham has the second highest cumulative cases per 100k population in Strafford County behind Durham. The town's sprawled out student population may be a large cause for these higher number of cases.¹⁹

Because of these factors, an epidemic or pandemic could present a possible threat to New Durham. With the occurrence of worldwide pandemics such as SARS, H1N1, Avian Flu, and COVID-19, New Durham could be susceptible to an epidemic and subsequent quarantine. While all individuals are potentially vulnerable to the hazard of an epidemic, epidemics often occur among a specific age group or a group of individuals with similar risk factors and exposure.¹⁶

Lyme Disease

Lyme disease, which is spread to humans by the bite of an infected tick, is a growing threat in New Hampshire. New Hampshire has one of the highest rates of Lyme disease in the U.S. The number of New Hampshire residents diagnosed with Lyme disease has increased over the past 10 years, with significant increases occurring since 2005.¹⁷ In 2009, the rate of cases of Lyme disease reported in New Hampshire

¹⁵ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

¹⁶ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

¹⁷ 2011 New Hampshire State Health Profile; Improving Health, Preventing Disease, Reducing Costs for All. NH Division of Public Health Services Department of Health and Human Services.
<http://www.dhhs.nh.gov/dphs/documents/2011statehealthprofile.pdf>

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residents was 108 cases per 100,000 persons, which is significantly higher than the Healthy People 2010 science-based 10-year national objective for improving the health of all Americans objective of 9.7 cases per 100,000 persons.¹⁸ From 2009 to 2013, reported cases of Lyme disease in New Hampshire increased by approximately 20% from 1416 cases per year to 1691 cases per year.¹⁹ Rockingham, Strafford, and Hillsborough counties had the highest rates of disease in 2008-2009. In 2012, there were 172 reported cases of Lyme disease in Strafford County.²⁰

Radon

Radon is a radioactive gas which is naturally occurring as a result of the typical decay of uranium commonly found in soil and rock (especially granite). Radon has carcinogenic properties and is a common problem in many states; New Hampshire has some isolated areas that are among the highest levels of radon in the United States according to the US Environmental Protection Agency (EPA). Whether or not a particular type of granite emanates radon is dependent on the geochemistry of that particular granite, some types are a problem and some are not. In other parts of the country, radon is associated with certain black shales, sandstones, and even limestones. The EPA has estimated that radon in indoor air is responsible for about 13,600 lung cancer deaths in this country each year (EPA document, EPA 811-R-94-001, 1994).²¹

Radon & Arsenic Vulnerability	
Severity	1
Probability	2
Overall Threat	2

Exposure is a significant hazard in New Hampshire. According to a NH Bureau of Environmental & Occupational Health (BEOH) study looking at >15,000 indoor radon test results in single-family dwellings, households in northern, eastern, and southeastern regions of New Hampshire especially tend to have nominally high concentrations of radon in air or water (BEOH 2004); however, values in excess of the US Environmental Protection Agency’s 4.0 picocurie per liter (pCi/L) action guideline have been found in nearly every community in New Hampshire. Values exceeding 100 pCi/L have been recorded in at least eight of New Hampshire’s ten counties. The highest indoor radon reading in New Hampshire known to NHDDES is greater than 1200 pCi/L; higher values probably exist. The probability of significant radon exposure is apparently quite high. In the BEOH study, 44.0% of tests in Strafford Co. exceeded the 4.0 pCi/L action level and 13.0% even exceeded 12.0 pCi/L. Similarly, in New Durham between 40% and 50% of tests exceeded the 4.0 pCi/L action level. The probability of significant radon exposure is apparently quite high.

Table 2.6: Summary Data for Strafford County (radon values in picocuries per liter)

County	# Test Results	% of tests > 4.0 pCi/L	% of tests > 12.0 pCi/L
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¹⁸ HealthyPeople.gov. About Healthy People. Accessed April 2014. Available at: <http://healthypeople.gov/2020/about/default.aspx>

¹⁹ New Hampshire COVID-19 Response Dashboard. Available at <https://www.covid19.nh.gov/dashboard/map>

¹⁹ NHDHHS. State of New Hampshire Tickborne Disease Prevention Plan. March 31, 2015.

<http://www.dhhs.state.nh.us/dphs/cdcs/lyme/documents/tbdpreventionplan.pdf>

²⁰ 2011 New Hampshire State Health Profile; Improving Health, Preventing Disease, Reducing Costs for All. NH Division of Public Health Services Department of Health and Human Services.

<http://www.dhhs.nh.gov/dphs/documents/2011statehealthprofile.pdf>

²¹ New Hampshire Department of Safety. State of NH Natural Hazard Mitigation Plan 2013. Homeland Security and Emergency Management.

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Strafford	1,645	44.0%	13.0%
Statewide	15,860	32.4%	8.6%

Arsenic

Arsenic is a semi-metal element that is odorless and tasteless. Arsenic is a hazard because it can enter drinking water supplies, either from natural deposits in the earth or from agricultural and industrial practices.²²

Wells drilled into New Hampshire’s bedrock fractures have about a 1 in 5 probability of containing naturally occurring arsenic above 10 parts per billion. In addition, wells within short distances (~50 feet) can present very different water quality because of our highly fractured bedrock. Arsenic in water has no color or odor, even when present at elevated levels. Therefore, the only way to determine the arsenic level in your well water is by testing.

From 1975 until 2001, the federal maximum contaminant limit (MCL) for arsenic in water supplied by public water systems was 50 parts per billion, because the health effects of exposure to lower concentrations was not recognized. Based on an exhaustive review of the new information about arsenic’s health effects, in January 2001 EPA established a goal of zero arsenic in drinking water. At the same time, EPA adopted an enforceable MCL of 10 parts per billion (ppb) based on balancing treatment costs and public health benefits. Studies have shown that chronic or repeated ingestion of water with arsenic over a person’s lifetime is associated with increased risk of cancer (of the skin, bladder, lung, kidney, nasal passages, liver or prostate) and non-cancerous effects (diabetes, cardiovascular, immunological and neurological disorders). The same studies found that dermal absorption (skin exposure) of arsenic is not a significant exposure path; therefore, washing and bathing do not pose a known risk to human health.²³

Other Hazards not Included in Plan

The 2021 New Durham Hazard Mitigation Committee acknowledged the hazards of solar/space weather, civil unrest, and urban conflagration but found them to have little to no immediate impact to the town in the next 5 years. The committee will reassess in the next plan to identify if these hazards are applicable to New Durham’s resilience.

National Flood Insurance Program (NFIP)

The Office of Energy & Planning (OEP) administers and coordinates the State’s role in the National Flood Insurance Program (NFIP). The NFIP is a Federal program administered by the Federal Emergency

²² EPA. Arsenic in Drinking Water. (<http://water.epa.gov/lawsregs/rulesregs/sdwa/arsenic/index.cfm>)

²³ New Hampshire Environmental Services. Drinking Water and Groundwater Bureau. Arsenic in Drinking Water Fact Sheet.

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Management Agency (FEMA) that allows property owners in participating communities to purchase insurance protection against losses from flooding. Communities can voluntarily participate in the NFIP by making an agreement with FEMA and adopting and enforcing floodplain regulations to reduce the flood risks of new construction in FEMA’s designated special flood hazard areas.

Currently 217 communities (92 percent) that participate in the NFIP have adopted at least the minimum standards of the NFIP, which regulate development in the 100-year floodplain. The regulations mitigate flood damage by requiring new and substantially improved structures to be built or flood proofed to, or above the 100-year base flood elevation (BFE).

New Durham Flood Insurance Program (NFIP) Status

New Durham has been a member of the National Flood Insurance Program (NFIP) since June 27, 1977. The Town does have significant portions of land in the 100-year floodplain along Merrymeeting Lake, Merrymeeting River and the Ela River. There are limited structures within this floodplain according to available GIS Flood Insurance Rate Map (FIRM – dated May 17, 2005) data and aerial imagery. Most structures are residential and are located along Merrymeeting Lake and part of Merrymeeting River. According the NH State Floodplain Program Assistant Coordinator (October 14, 2021 email), New Durham has had no repetitive loss claims. According to FEMA’s Community Information System, New Durham is listed as having 10 single family home policies (see Table 2.7) as of 1/2/2022.

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	\$ of Closed Paid Losses	Adjustment Expense
By Occupancy						
Single Family	9	\$12,664	\$1,877,700	2	\$22,690	\$1,600
Non-Residential	1	\$728	\$20,000	0	\$0	\$0
Total	10	\$13,392	\$1,897,700	2	\$22,690	\$1,600
By Zones						
A Zones	7	\$11,962	\$847,700	2	\$22,690	\$1,600
B, C & X Zone - Preferred	3	\$1,430	\$1,050,000	0	\$0	\$0
Total	10	\$13,392	\$1,897,700	2	\$256,601.38	\$1,600

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The Flood Insurance Study for the Town of New Durham was prepared May 2, 2001. The initial Countywide Flood Insurance Study (FIS) effective date for Strafford County is May 17, 2005. The revised date for this study is September 30, 2015, however New Durham's FIRM has not changed since 2005.²⁴

As noted in the Special Flood Hazard Area Variances and Appeals²⁵ the Zoning Board of Adjustment shall notify the applicant in writing that:

- 1. The issuance of a variance to construct below flood level will result in increased premium rates for flood insurance up to amounts as high as \$25 for \$100 of insurance coverage, and*
- 2. Such a construction below the base flood level increases risk to life and property. Such notification shall be maintained with a record of all variance actions.*

Additionally, the Town shall:

- 1. Maintain a record of all variance actions, including the justification for their issuance, and*
- 2. Report such variances issued in its annual or biennial report submitted to FEMA's Federal Insurance Administrator.*

This ordinance may be amended by majority vote of any legal town meeting when such an amendment is noticed in the warrant calling for the meeting.

The Town has worked with elected officials and FEMA to correct existing compliance issues. New Durham has continued communication with FEMA to discuss NFIP compliance issues, especially with the designated flood areas around Merrymeeting Lake.

The Town of New Durham Floodplain Development Ordinance meets the requirements of Section 60.3(c) of the National Flood Insurance Program Regulations. The ordinance is based off of the FEMA Flood Insurance Rate Map dated May 17, 2005. This ordinance directs current and future development away from areas that are vulnerable to flooding. All proposed development in any special flood hazard area requires a permit that is reviewed by the building inspector to determine whether proposed building sites will be reasonably safe from flooding. Development that does occur in a special flood hazard area is to be designed and constructed to minimize damage. In special flood hazard areas, the Building Inspector shall determine the 100-year flood elevation: In zone AE, the elevation data from the FIRM is used and in unnumbered A zones, the 100-year flood elevation data available from any federal, state or other sources is reviewed. A variance is required in order to construct below the base flood level. This ordinance is available on the Town's website:

<https://www.newdurhamnh.us/planning/files/flood-plain-ordinance>

New Durham's Zoning Ordinance also limits development in the identified Flood Hazard Area, defined as areas subject to flooding on the FIRM. Land within this area cannot be counted toward meeting minimum

²⁴ Flood Insurance Study, Strafford County, New Hampshire. <http://www.granit.unh.edu/dfirms/d-FISpdfs/FIS33017CV000B.pdf>

²⁵ Town of New Durham Building Regulations. Revised March 27, 2006.

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lot area requirements, and the Planning Board shall require that these areas are designated as not suitable for building except water-related structures. Land lying entirely within this area cannot be subdivided.

To continue to comply with NFIP requirements, the Town will continue to adopt and enforce floodplain management regulations that meet minimum NFIP criteria. Upon revision of the FIRM, New Durham will adopt a flood hazards map; revise its Floodplain Ordinance, as necessary, to mitigate the effects of flooding on new and improved structures; track any future repetitive loss claims; and continue to provide education to residents about flood hazards and insurance. In the future, the community may participate in the Community Rating System.

Chapter III: History and Demographics

Introduction

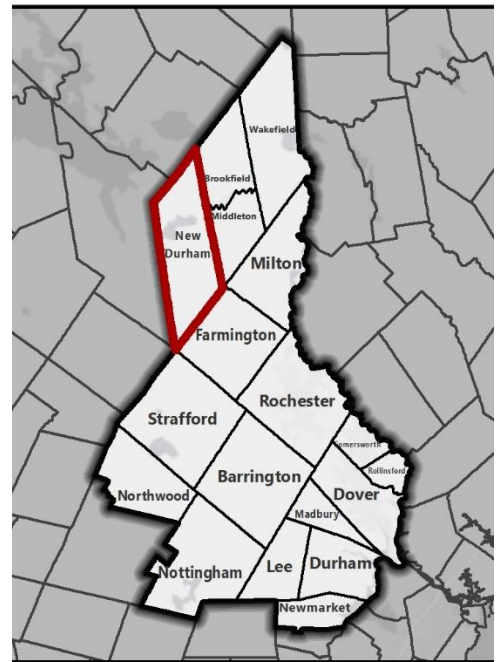
The Town of New Durham is located in northern Strafford County, New Hampshire. It sits on the eastern border of Belknap County and southern border of Carroll County, New Hampshire. New Durham is bounded easterly by the Towns of Brookfield, Middleton, and Farmington, westerly by the Town of Alton, and northerly by the Town of Wolfeboro.

The Town of New Durham covers an area of 43.8 square miles, with land area of 41.4 square miles and water area of 2.4 square miles. New Durham has a parallelogram shape with east and west sides measuring about 10.5 – 11 miles in length and north and south sides measuring 5-6 miles in length. Most of the town is rural with developed areas consisting primarily of residential land use with scattered commercial and industrial uses.

Topographically, the elevation of New Durham ranges from 400 feet above sea level in the southern part of the town to 1680 feet along the Brookfield border. The town is hilly with several small mountains with peaks over 1,000 feet above sea level.

New Durham home to several water bodies, including Shaws Ponds, Merrymeeting Lake, Marsh Pond, Chalk Pond, Marchs Pond, Downing Pond, Coldrain Pond, and Club Pond. Streams in the southern part of the town include the headwaters of the Cocheco River, Hayes Brook, and the Ela River. Numerous small and intermittent streams flow across New Durham's rural landscape.

New Durham contains many wetland areas. Major wetlands in New Durham include: Beaver Brook Marsh, Ela River Marsh, Marsh along the Cocheco River, Marsh along Goodwin Brook, Marsh along Hayes Brook, and Merrymeeting River Marsh. Many of the wetlands in New Durham are also floodplains. The total area covers less than five percent of New Durham. Major floodplains are located along: Beaver Brook; the Cocheco River; the Ela River, particularly west of Davis Cross Road; Goodwin Brook; Hayes Brook; Merrymeeting River; brooks flowing to Sunrise Lake; and around March's Pond, west of March's Pond, and northwest of Shaw's Pond. Natural areas exhibit unique native plant or animal populations or other features of unusual scientific, educational, geological, ecological or scenic value. Such areas in New Durham include: Beaver Brook Marsh, which is a significant wildlife habitat; Cooper Cedar Woods, containing 55 acres of Virgin Atlantic white cedar; Devils Den Mountain, a natural cave with woodland; Ela River Falls and other marshlands, containing natural falls and wildlife; and the Merrymeeting River Marsh, also a significant wildlife habitat.



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History

In 1750, the area that would become the Town of New Durham was settled by a group of homesteaders after the settlers petitioned the Masonian proprietors for a 45 square mile grant of land in 1748. The Town was incorporated in 1762.

Early settlements were established in numerous areas of this community. In the northerly section, known as the second division, many fieldstone foundations can still be found, a testament to a thriving community. Today this area is accessible by four-wheel drive vehicles, snow machine or by foot. In the southerly section of town, known as the first division, settlers built along the range roads used to travel to Concord, Farmington or Rochester.

The town was primarily agricultural oriented with a few saw and grist mills taking advantage of the many waterways that were harnessed for power. During the mid-1800's a limited amount of industry began to appear. Some of the larger businesses were the gun powder mill at Merrymeeting Lake, the Coburn and later the Hayes Knife factories and two wood turning industries a brush factory which remained in business until 1995.

After the 1860 the population began to decline due to a combination of circumstances; the Civil War and the gold rush, the land rush and the migration of the younger generation to the cities to find work in the factories and the huge textile mills that were an early part of the Industrial Revolution. Most of the farm land here was marginal and wresting a living from the rock stew, isolated farms made it hard for younger generations to resist the tales of a better living elsewhere.

Another change in town was brought by the railroad coming through in 1856. This shifted the focus of business and town life to the present location from the original town center, at the "Four Corner" on the (Old) Bay Road and Davis Crossing Road and the Ham Road. The railroad also made possible commuting to other localities to work and farming became, for most, a part time supplement to their other job. It also opened up an easy access to the world for those who had been dependent on their horse and buggy transportation.

The early years of 1900 saw the advent of city folks spending their vacations at several farm boarding houses throughout town and on the Ridge. Arriving by train, they came for the fresh air and country surroundings; enjoying picnics and trips by horse and buggy. Much of their time was spent visiting local natural sites of interest.

In time, many old farms and ruined farmhouses were purchased by these folks from afar, with hopes of vacation homes or somewhere to retire later in their life, thus the beginnings of the gradual growth of our community.

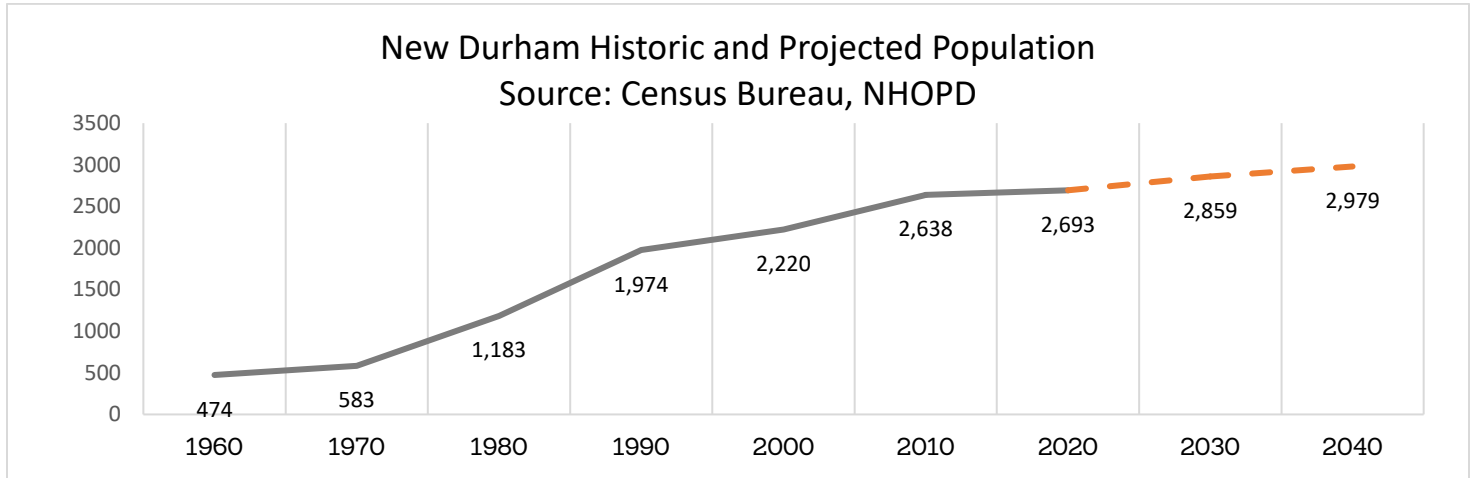
Historical Population Growth

Since its settlement the population of New Durham has fluctuated dramatically. By 1860, the Town's population had grown to 1,173 people. However, by 1940 it had dropped to 463. The Town's population

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began to increase again in the 1960s, growing 23% from 474 to 538 people. Between 1970 and 1980 the population more than doubled to 1,183 people. This growth has slowed over the last two decades, however the Town's population has continued to rise, increasing by 19% between 2000 and 2010. However, between 2010 and 2020, New Durham saw its slowest growth in over 50 years at only 2%.



Projected Population Change

National population projections by the Census Bureau suggest that the United States will reach a population of approximately 380 million by 2040 (an 18% overall population growth). Although the Stafford Planning Region is not expected to grow on pace with the national rate, it is expected to grow by close to 10%, a significantly higher rate than projected for the state of New Hampshire (7.2%). Population projections completed by the New Hampshire Office of Energy and Planning and the state's Regional Planning Commissions, suggest that the town of New Durham can expect an overall growth in population of 10% (an average of 3% per year in the 2020s and 2030s) in the 20-year period between 2020 and 2040.

Migration

Data suggest that fewer New Hampshire residents are leaving the State of New Hampshire. Since 2005, the peak year of outmigration between 2000 and 2010, there has been a 17% decrease in residents exiting the state. Unfortunately, New Hampshire is also experiencing a declining rate of in-migration, meaning that fewer individuals are coming into the state. Along with the effects of COVID-19, travel may be more restrictive for foreign individuals in the short-term.

Aging

New Durham, like so many communities in the region, experienced a significant increase in its 65 and older population between 2000 and 2020. This trend, dubbed the 'silver tsunami' by many demographers, is occurring across both the state and much of the New England and is a product of aging Baby-Boom and Generation X populations.

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In the whitepaper series *The Two New Hampshires: What does it mean?* Ross Gittell addresses the aging population, and how concentrations of older age cohorts vary across the state. In the report Gittell defines two New Hampshires, rural and metro. Rural NH includes Cheshire, Sullivan, Belknap, Carroll, Grafton, and Coos Counties, while Metro NH includes Rockingham, Hillsborough, Strafford and Merrimack Counties. As Gittell notes, Rural NH has a far older population (median age) than Metro NH, and if this was its own state it would be the second oldest in the nation. Even Metro NH, if considered by itself, would be older than Massachusetts, Connecticut, Rhode Island, and Vermont.

Population and Age

While data show the region growing at a faster rate than the state over the next 25 years, the slowed growth rate beginning in 1990 has, and will continue to have, an effect on the region. As the regional population ages, and in-migration continues to decrease, the percentage of school age children is declining. Out of the 161 districts in the state, 130 experienced a decline in enrollment between 2000 and 2010.

The aging population, combined with a decrease in population ages 18 to 55, may result in a labor force shortage in coming years. Additionally, a trend known as ‘brain drain’, the emigration of highly skilled or trained individuals to other states, could have potentially negative impacts on local, regional and state economic systems.

With the expected increase in demand for health care, assisted living facilities, and nursing home capacity, and the potential for a smaller labor force, a care-provider shortage may emerge. Local governments will likely need to create programs and strategies in order to provide adequate health and social services for increased numbers of aging seniors. New Durham has already experienced a decline in school enrollment, with a decrease from a population of approximately 215 students in 2010 (excluding preschool) to 166 students in 2015 (including preschool).

Housing

In the period between 2010 and 2020, New Durham experienced an increase of nearly 58 total housing units, a steep decline from 214 between 2000 and 2010 likely due to the 2008 recession. Occupancy-type data shows that in the same 10-year period, total renter-occupied unit count increased by 10%, while owner-occupied housing units increased by 53%. During this time period, the vacant housing units decline by 6% and occupied housing units increased by only slightly.

As of 2020, New Durham’s occupied housing units are roughly 91% owner-occupied and 9% renter occupied. The town exhibits a 33% vacancy rate. With moderate population growth projected over the coming 3 decades, limited new housing unit development is expected.

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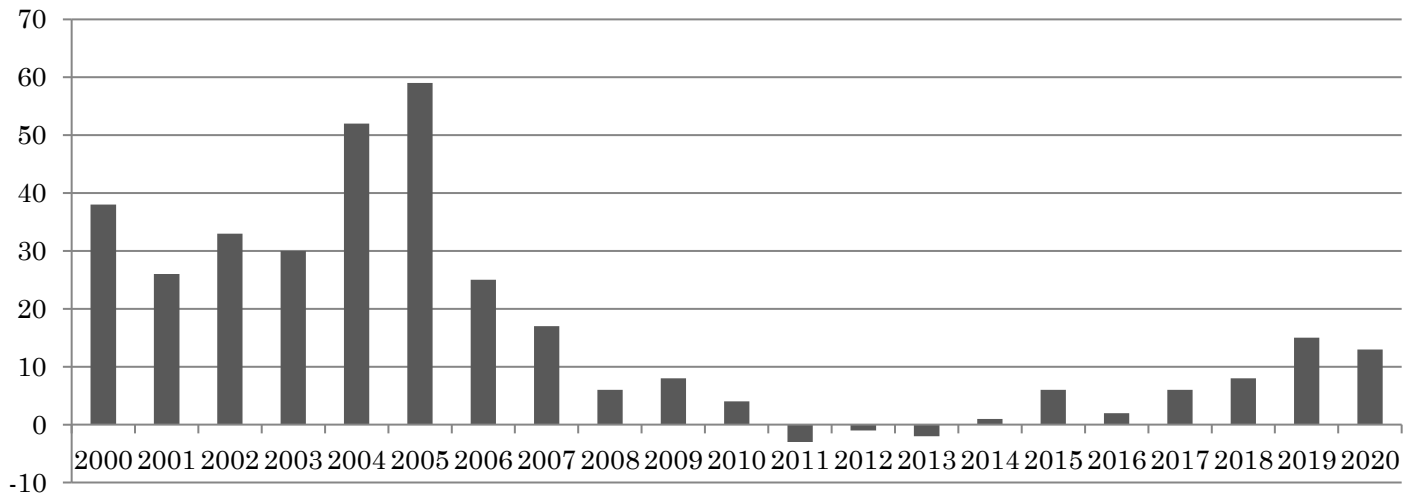
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Table 3.1: New Durham Housing Trends

	Total Housing Units	Occupied Housing Units	Owner-Occupied Housing Units	Renter-Occupied Housing Units	Vacant Housing Units
1990	1,231	688	603	85	543
2000	1,309	819	740	79	490
2010	1,523	1,014	923	91	509
2020	1,581	1,097	~953	~100	484

Building trend data suggest that in the period between 2000 and 2020, the net number of building permits issued declined significantly from a high of 59 in 2005 to none in 2011-2014 with only about 10 permits each year. This is representative of not only stagnating population growth, but also of the impacts of the economic recession of the mid-late 2000's. This data represents the best available data at the time the Plan was updated.

New Durham Net Building Permits 2000-2020
Source: NHOPD, RLS, RPC's



Little development has occurred since the last update of the Plan and little development is anticipated in the new future. New Durham directs development away from the floodplain through its Floodplain Ordinance and a 75 foot setback from all water bodies. Future development includes new neighborhood-style (1/4 mi. diameter) development will extend areas that already have significant development. These areas include:

- Ham Rd. and Davis Crossing Rd.
- From Birch Hill Rd. south to Route 11
- Brackett Rd., from Jones Pond south to Birch Hill Rd.
- Area around Chalk and March's Ponds
- Pine Point Rd. and King's Highway

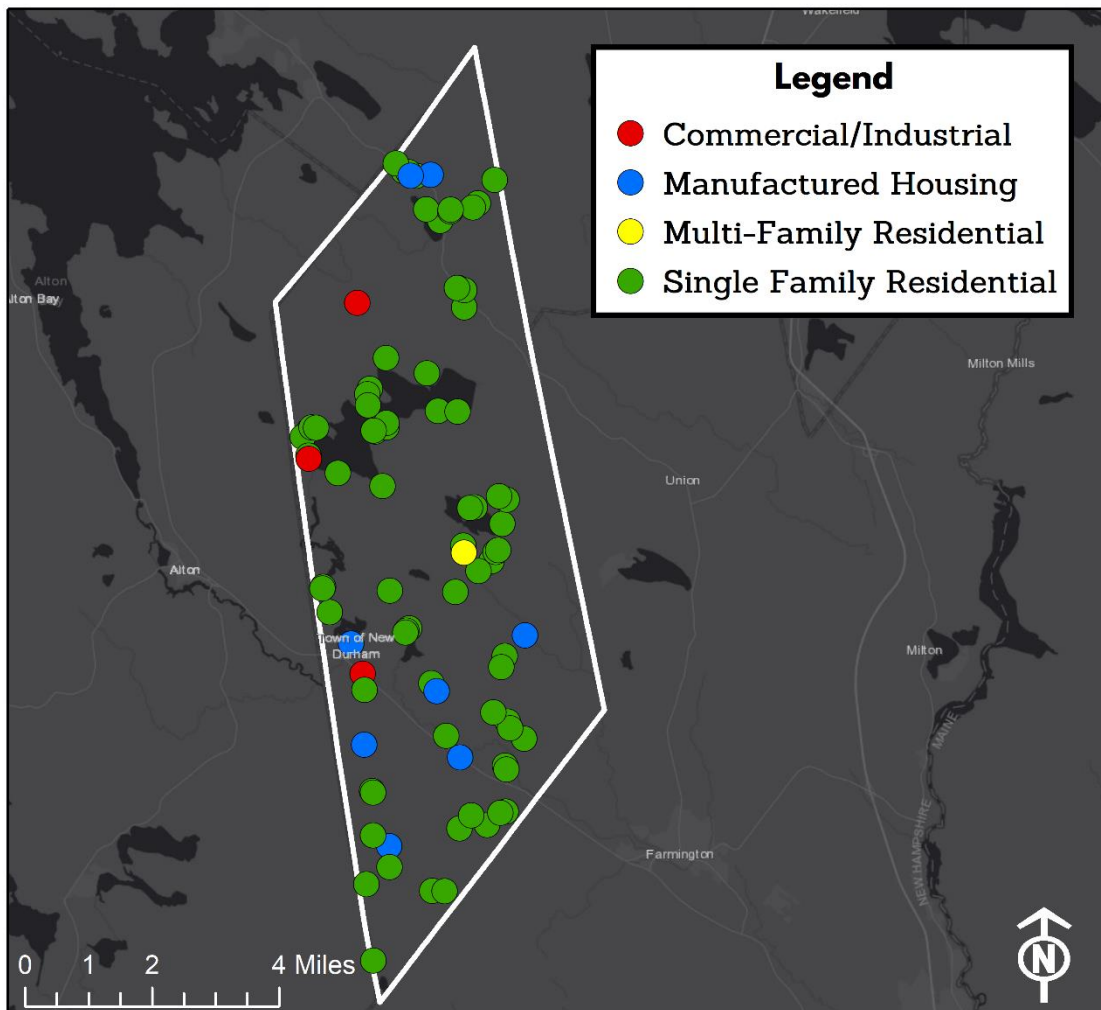
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- From Merrymeeting Lake north to Mountain Dr.
- The general area around Shaw's Pond, Copplecrown Rd., and Mountain Dr.

The area between Merrymeeting River, Main St, Old Bay Rd, Tash Rd and Rt. 11 is considered to be the Town village area. The King's Highway, Shaw's Pond, and Merrymeeting Lake Dam development areas are also in the northern half of New Durham. Roughly speaking, this area is being considered generally as a rural-forestry-conservation area where development would only occur in the relatively distant future. The southern half of New Durham is being considered as the more near-term, rural-agricultural area for development after the existing development areas are expanded appropriately. The significance here, in terms of hazards, is that the northern area where development is generally not being encouraged is also the area of Town that has the most unfragmented woodlands and, therefore, risk of wildfire. Little development has occurred in New Durham since the 2011 plan update, but the Town continues to utilize its ordinances and land use regulations to reduce potential impacts associate with flooding. To the best of the Planning Committee's knowledge, development has not resulted in increased vulnerability to the identified hazards. Development however is trending upwards since 2015.

Map: New Durham Building Permits 2008-2020



Chapter IV: Critical Infrastructure & Key Resources (CI/KR)

With team discussion and brainstorming, Critical Facilities and Key Resources (CI/KR) within New Durham were identified and mapped for the multi-hazard plan. Facilities located in adjacent towns were not mapped. CI/KR are displayed in the table below.

Table 4.1. Emergency Response Facilities (ERF)

ERF's are primary facilities and resources that may be needed during an emergency response

Facility	Type of Facility	Address	Phone Number
Town Hall	Emergency Operations Center	4 Main St.	859-2091
Fire Station	Emergency Operations Center	6 Main St.	859-3473
Police Station	Emergency Operations Center	4 Main St.	859-2721 859-2752
Highway Department	Emergency Operations Center	56 Tash Rd.	859-0237
Merrymeeting Lake Marina	Emergency Fuel	318 Merrymeeting Lake Rd.	859-2000
Prospect Mt. High School	Emergency Shelter (Day-time)	242 Suncook Valley Rd., Alton	875-3800
Farmington High School	Emergency Shelter	40 Thayer Dr., Farmington	755-2811

Evacuation Routes (localized only)

Route 11	Evacuation Route	Route 11	n/a
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Telephone Facilities

Cell Tower	Communication Function	129A Ridge Rd.	n/a
Switching Station	Communication Function	407 Birch Hill Rd.	n/a
Switching Station	Communication Function	44 Main St.	n/a
Switching Station	Communication Function	317 South Shore Rd.	n/a

Bridges

Bridge (State #199/054)	Transportation	Main St. over Merrymeeting River	n/a
Bridge (State #169/049)	Transportation	Merrymeeting Rd. over Marsh Pond Outlet	n/a
Bridge (State #204/056)	Transportation	Route 11 over Merrymeeting River	n/a
Bridge (Town #228/091)	Transportation	Davis Crossing Rd. over Ela River	n/a
Coldrain Crossing (Pond)(culvert)	Transportation	Birch Hill Road Pond, access from Bracket Rd.	n/a
Old Bay West	Transportation	Old Bay Rd. West over Ela River	n/a

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Old Bay East	Transportation	Old Bay Rd. East	n/a
Tash North	Transportation	Tash Rd. North	n/a
Tash South		Tash Rd. South near Route 11	

Table 4.2: Non-Emergency Response Facilities (NERF)

NERF's are facilities that although critical, not necessary for the immediate emergency response effort; some hazardous material facilities are also included

Facility	Type of Facility	Address	Phone Number
Power Substation	Power Station – NH Electric Coop Eversource	31 Depot Rd.	1-800-867-6369 1-800-386-4086
Solid Waste Facility	Solid Waste	74 Hurd Hill Rd., Alton	875-5801

Table 4.3: Facilities and Populations to Protect (FPP)

FPP's are facilities that need to be protected because of their importance to the Town and to residents who may need help during a hazardous event

Facility	Type of Facility	Address	Phone Number
Schools, Churches, and Daycare Facilities			
First Freewill Baptist Church	Religious Facility	20 Depot Rd.	397-7002
Celeste Chasse' Child Care	Day Care (Home)	33 Ham St.	859-3666
Being Cool After School	After School Care		303-0487
New Durham Elementary School	School	7 Old Bay Rd.	859-2061
Prospect Mt. High School	School	242 Suncook Valley Rd., Alton	875-3800
Historic Facilities			
Meetinghouse (dated 1772)	Historic	207 Old Bay Rd.	859-2091
Colmey Graveyard (Town #49)	Historic	Merrymeeting Rd.	n/a
Downing Graveyard (Town#31A)	Historic	Main St.	n/a
Town Hall (built 1908)	Historic	4 Main St.	859-2091
Freewill Baptist Church Ridge	Historic	56 Ridge Road Top	n/a
Commercial and Manufactured Housing Facilities			
Manitoos Shores	Manufactured Housing Park	Downing Drive	
Commercial/Economic Impact Area			
Powder Mill Fish Hatchery	Commercial/Economic Area	288 Merrymeeting Rd.	859-2041

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Table 4.4: Potential Resources (PR)

PR's are potential resources that could be helpful for emergency response in case of a hazardous event

Facility	Type of Facility	Address	Phone Number
Food/Water/Retail			
Food Pantry	Food, Services	5 Main St.	817-0372
General Store	Services	3 Old Bay Rd.	859-5400
Johnsons Steak & Seafood	Restaurant	69 Route 11	859-7500
Airport/Helipad			
Helipad at Lions Camp Pride	Airport	180 Lions Camp Pride Way	701-2015
Helipad at Ballfields	Airport	Smitty's Way	n/a
Helipad at Berry Road	Airport	44 Ridge Dr.	n/a
Helipad at Birch Hill	Airport	413 Birch Hill Rd.	859-4525
Helipad at Lake Winnepesaukee Golf Course	Airport	1 Lake Winnepesaukee Dr.	569-3055
Helipad at Johnson's Seafood	Airport	69 Route 11	859-7500
Equipment/Hazardous Waste Facilities			
Powerspan Corp	Hazardous Material	100 International Dr.	570-3000
Transfer Station	Hazardous Material	56 Tash Rd.	859-8080
Lake Winnepesaukee Golf Club	Hazardous Material	1 Lake Winnepesaukee Dr.	569-3055
Recreational Facilities (Indoor and Outdoor)			
Community Center (School)	Recreation – Indoor	7 Old Bay Rd.	859-2061
Ballfield	Recreation – Outdoor	47-87 Route 11	n/a
Lake Winnepesaukee Golf Club	Recreation – Outdoor	250 Lake Winnepesaukee Rd.	569-3055
Beach	Recreation – Outdoor	South Shore Rd.	n/a
Marina	Recreation – Outdoor	318 Merrymeeting Rd.	859-2000
Fish and Game Club/Shooting Range	Recreation – Outdoor	64 Old Bay Rd.	859-3474
Lions Camp Pride	Recreation – Outdoor	180 Lions Camp Pride Way	701-2015
Camp Maranatha	Recreation – Outdoor	140 Merrymeeting Rd.	859-6100
Birch Hill Camp	Recreation – Outdoor	333C Birch Hill Rd.	859-4525
Merrymeeting River (Route 11)	Recreation - Outdoor	Route 11.	n/a
Merrymeeting River (Marsh Pond)	Recreation - Outdoor	Merrymeeting Rd.	n/a
Merrymeeting Lake (Public Access)	Recreation - Outdoor	318 Merrymeeting Rd.	859-2000
Shaws Pond (Public Access)	Recreation - Outdoor	Kings Hwy.	n/a

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Medical Facilities			
Frisbie Memorial Hospital	Medical	11 Whitehall Rd. Rochester	332-5211
Huggins Hospital	Medical	240 S. Main St. Wolfeboro	569-7500

Table 4.5: Water Resources (WR) WR's are additional resources that could be helpful for emergency response in case of a hazardous event.

Facility	Type of Facility	Address	Phone Number
Auxiliary Fire			
Dry Hydrant	Fire Aid	Near 57 Main Street	n/a
Dry Hydrant	Fire Aid	153 Middleton Rd.	n/a
Dry Hydrant	Fire Aid	near 398 Berry Rd.	n/a
Dry Hydrant	Fire Aid	5 Maggie Lane	n/a
Dry Hydrant	Fire Aid	Tash Rd. at Route 11	n/a
Dry Hydrant	Fire Aid	near 299 Merrymeeting Rd.	n/a
Dry Hydrant	Fire Aid	near 360 Birch Hill Rd.	n/a
Dry Hydrant	Fire Aid	near 191 Old Bay Rd.	n/a
Dry Hydrant	Fire Aid	Ella Mill Rd. at David Crossing	n/a
Fire Pond/Cistern - 15,000 gal.	Fire Aid	near 32 Chamberlin Way	n/a
Fire Pond/Cistern - 5,000 gal.	Fire Aid	near 140 Ham Rd.	n/a

Active Dams and Hazard Class – As identified by NHDES, Water Division

Dam	Hazard Class
Merrymeeting Lake Dam	High
Jones Dam	High
Downing Dam	Low
Marchs Pond Dam	High
Club Pond Dam	Low
Libbys Pond Dam	Non-menacing
Farm Pond Dam	Non-menacing
TR Beaver Brook Dam	Non-menacing
Shaws Pond Dam	Non-menacing
Fire Pond Dam	Non-menacing
Farm Pond Dam	Non-menacing
Meyer Pond Dam	Non-menacing
Kender Dam	Non-menacing

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Meyer Wildlife Pond	Non-menacing
Lower Fish Pond Dam	Non-menacing
Recreation Pond Dam	Exempt
Upper Fish Pond Dam	Exempt
Taussig Wildlife Pond Dam	Exempt
Lake Winnepesaukee Golf Club Site 1	Exempt
Lake Winnepesaukee Golf Club Site 3	Exempt
Lake Winnepesaukee Golf Club Site 4	Exempt
Lake Winnepesaukee Golf Club Site 5	Exempt

* A **Non-Menace Structure** means a dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property.

* A **Low Hazard Structure** means a dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no possible loss of life and low economic loss to structures/property.

* A **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 misoperation of the dam would result in no probable loss of lives but major economic loss to structures or property.

* A **High Hazard Structure** means a dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life.

Chapter V. Multi-Hazard Effects in New Durham

Identifying Vulnerable Structures

It is important to identify the critical facilities and other structures that are most likely to be damaged by hazards. In New Durham, there were 23 CI/KR within potential and past flood areas (PPFA) and other vulnerable areas that were identified in the risk assessment for a potential loss value estimate of \$5,849,930.00 at 100%.

Table 5.1: Critical Infrastructure & Key Resources within Vulnerable Areas

Facility	Type of Hazard	100% of Structure Value
<u>Bridges</u> ²⁶		
Main Street Over Merrymeeting River	Flood	\$744,000.00
Merrymeeting Road over Marsh Pond (31ft x 14ft)	Flood	\$434,000.00
Route 11 over Merrymeeting River (44ft x 15ft)	Flood	\$660,000.00
Davis Crossing Road over Ela River (29.7ft x 25ft)	Flood	\$742,500.00
Cold Rain Crossing	Flood	\$40,000.00
Old Bay West	Flood	\$60,000.00
Old Bay East	Flood	\$30,000.00
Tash North	Flood	\$30,000.00
Tash South	Flood	\$30,000.00
<u>Potential Emergency Resources</u>		
Helipad at Smitty's Way / Ballfield	Flood	\$102,800
<u>Commercial/Economic Impact Area</u>		
Fish Hatchery	Flood	\$459,900
<u>Infrastructure</u>		
Switching Station at Main St.	Flood	Not available
<u>Water Resources/Auxiliary Fire Aid</u>		
Dry Hydrant near 57 Main St.	Flood	Not available
<u>Recreational Facilities</u>		
Lake Winnepesaukee Golf Course (Includes 600+ acres and a 3 story club house)	Flood	\$459,900

²⁶ The approximate assessed value for the bridges was calculated by multiplying \$1,000.00 per square foot of bridge. This estimate was provided by the Bridge Design Bureau at NHDOT and includes all cost (engineering, consulting and in-house design, construction, etc.) to build a new bridge.

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Beach	Flood	\$333,800
Merrymeeting River Public Access (Route 11, Marsh Pond, Merrymeeting Road)	Flood	\$0.00
Shaw's Pond Public Access	Flood	\$0.00
Fish and Game Club	Flood	\$174,530
Camp Maranatha (Includes 4 lots)	Landslide	\$1,542,500
<u>Manufactured Housing</u>		
Manitoos Shores	Flood	\$1,700,000
<u>Dams</u>		
Marchs Pond Dam (aka Chalk Pond) (High Hazard)	Flood; Dam Breach	The Dam Bureau at NHDES has looked into assessing values for state-owned dams with marginal success. They considered bond ratings, market value, and construction costs. They also developed a formula that calculated the cubic feet of water impounded as a monetary value. Because dams serve different purposes (recreational, hydro-power), assessed values are hard to estimate and cannot be determined.
Merrymeeting Lake Dam (High Hazard)	Flood; Dam Breach	
Jones Dam (High Hazard)	Flood; Dam Breach	
Total		\$5,843,930.00

Note: The assessed value for each structure was provided by the town's assessment department

Calculating Potential Loss

It is difficult to ascertain the amount of damage that could be caused by a natural or man-made hazard because the damage will depend on the hazard's extent and severity, making each hazard event somewhat unique. Therefore, we have used the assumption that hazards that impact structures could result in damage 0-1%, 1-5%, or 5-10% of New Durham's structures, depending on the nature of the hazard, whether or not the hazard is localized, and its economic impact.

Table 5.2: Assessed Value of All Property In New Durham

	Total Assessed Value 2021	<i>Economic Loss</i>		
		Low 1% damage	Medium 5% damage	High 10% damage
Residential	\$568,779,050	\$5,687,790	\$28,438,952	\$56,877,905
Manufactured	\$5,151,100	\$51,511	\$257,555	\$515,110
Commercial	\$15,662,950	\$156,629	\$783,147	\$1,566,295
Tax Exempt	\$1,240,200	\$12,402	\$62,010	\$124,020
Total	\$594,581,948	\$5,945,819	\$29,729,097	\$59,458,194

Source: Department of Revenue Administration; 2021 Property Tax

*Total assessed value for residential and commercial takes into account land and building value.

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Based on this assumption, the potential loss from any of the identified hazards under a low, medium, and high damage scenario would range from **\$0 to \$5,945,819 (low)** or **\$5,945,819 to \$29,729,097 (medium)** or **\$29,729,097 to \$59,458,194 (high)** based on the 2021 New Durham Town valuation, which lists the assessed value of all structures in New Durham to be \$594,581,948 (see Table 5.2, above).

In order to stay consistent, the planning committee made the decision to use the results derived from the hazard vulnerability assessment tool (Table 2.3). There was consensus that the overall threat rankings (severity x probability) associated with each hazard were an equal indicator to the percentage of damage and were therefore used to determine the potential loss.

Human loss of life was not included in the potential loss estimates, but could be expected to occur, depending on the severity and type of the hazard.

Flood (Heavy Rains and Riverine Flooding).....\$5,945,819 to \$29,729,097

Flooding is 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 year. Flooding in New Durham often results from the overflow of the Ela River, Hayes Brook and a few areas along Merrymeeting River. The estimate above represents potential damage to roads, culverts, and nearby structures.

Dam Failure.....\$5,945,819 to \$29,729,097

Most dams in New Durham have a low or non-menacing hazard classification, which means they have a relatively low hazard potential because of the size and location. Failure or misoperation of any number of these dams would result in a possible economic loss to structures and property but no probable loss of lives. Three dams are classified as high hazard dams: Merrymeeting Lake, Jones, and Marchs Pond. The Team identified the Merrymeeting Lake and Jones Dam, as their biggest concern if the dam were to fail. These dams have a high hazard potential that would result in probable loss of human life due to water levels and velocity. The Team discussed if an event were ever to take place where either dam failed or was breached it would have a catastrophic effect on the Town.

Severe Thunderstorms & Lightning.....\$29,729,097 to \$59,458,194

Severe lightning as a result of summer storms or as a residual effect from hurricanes and tornadoes has occurred in New Durham. Due to the possibility of trees being toppled by lightning onto power lines and creating sparks, lightning is a significant disaster threat. Lightning could do damage to specific structures, injure or kill an individual but the direct damage would not be widespread. Although lightning is a potential problem, the Town reports few occurrences (none of which were severe) and the impact of lightning strikes is localized.

Wildfires.....\$5,945,819 to \$29,729,097

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Wildfire is defined as an uncontrolled and rapidly spreading fire. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. In recent years, there have not been severe windstorms and as a result the debris that has accumulated on the forest floor at the time of the update is normal and risk of wildfires was determined to be relatively low.

Severe Winter Weather (Ice Storms & Nor'easters).....\$29,729,097 to \$59,458,194

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snowstorms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in New Durham in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly, and increased traffic accidents. Damage caused as a result of this type of hazard varies according to wind velocity, snow accumulation, duration and moisture content. Seasonal accumulation can also be as significant as an individual snowstorm.

The December 2008 ice storm knocked out power for as many as 400,000 customers throughout the State (five times larger than those who lost power in the ice storm of 1998, which was previously the most devastating storm on record). Ice storms in New Durham could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

Earthquakes\$0 to \$5,945,819

Earthquakes could cause structural damage throughout the Town. Minor earthquakes in this area of the country are common, however significant earthquakes are less likely to occur. Earthquakes could readily cause landslides.

Landslide.....\$0 to \$5,945,819

Landslides may be caused by earthquakes or ground saturation from extended heavy precipitation events. Given seismic or precipitation events that could initiate landslides, landslide hazard is likely quite high in steep slope areas. Landslides would occur in New Durham in areas with steep slopes, where soils and loose bedrock formations would tend to slough off and move en masse downhill under gravity. In New Durham steep slopes are especially prevalent in the northern third of Town above Merrymeeting Lake, though they are present elsewhere. The Planning Committee identified three areas of concern: Merrymeeting Road just west of Merrymeeting Lake, Owl's Head, and Merrymeeting Road near the Christian camp.

Drought.....\$5,945,819 to \$29,729,097

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects growing or living conditions. They generally are not as damaging and disruptive as floods and are more difficult to define. An extended period without precipitation could elevate the risk for wildfire and with an extreme drought, the water supply and aquifer levels could be threatened. The cost of drought is difficult to calculate, as any cost would primarily result from an associated fire risk and diminished water supply.

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Hurricanes and Tropical Storms.....\$5,945,819 to \$29,729,097

The Hurricane of 1938 and Hurricane Carol both caused considerable damage to New Durham. These storms caused major power outages, significant damage due to high winds, and heavy rain. Although hurricanes could fit into several different categories (wind and flooding), the Team considered hurricanes to be separate events. Hurricanes are rare in New Hampshire, but they should not be ruled out as a potential hazard. The potential loss value due to hurricanes represents the potential damage to roads, culverts, and stream banks.

Hazardous Material Threat.....\$29,729,097 to \$59,458,194

The possibility of vehicular accidents involving hazardous materials is identified as a serious hazard in New Durham. Route 11 is a major thoroughfare and is very heavily traveled, both by large and small vehicles. Small delivery vehicles, often traveling at fast speeds, and carrying materials to residents use this highway; the contents of these vehicles are rarely known. Tractor-trailers hauling fuel, propane and other hazardous materials (medical waste/solid waste/harmful chemicals) also travel through New Durham on a constant basis. A hazardous material vehicular accident could occur but it would be localized by nature.

Tornados.....\$29,729,097 to \$59,458,194

Tornadoes are relatively uncommon natural hazards in New Hampshire; on average, about six touch down each year. Damage largely depends on where the tornado strikes. If it were to strike an inhabited area, the impact could be severe. In the State of New Hampshire, the total cost of tornadoes between 1950 and 1995 was \$9,071,389.²⁷

In 2008, there was a tornado that occurred in New Durham. Because the path of the tornado avoided the downtown area and most residential buildings, the damage was minimal. But the Team discussed the possibility that if the tornado took a different path and came into the center of town, it could have caused massive amounts of damage. If a tornado or downburst were to occur, the affects would be localized yet very high in damage.

Extreme Temperatures.....\$29,729,097 to \$59,458,194

During extreme heat conditions there is inadequate air conditioning in some of the Town's critical facilities. Both town officials and the community as a whole should be concerned and should look after its citizens, especially its elderly and special needs populations, to ensure that extreme temperatures do not create a life or property threatening disaster.

The potential for extended power outages during extreme cold is also a threat. Extended power outages have occurred in New Durham, both as a result of local line damage from high winds and severe storms. If

²⁷ The Disaster Center (NH); <http://www.disastercenter.com/newhamp/tornado.html>

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a major and/or extended power outage occurs and lasts for more than a week, a significant hardship on individual residents could result, particularly those citizens who are elderly or handicapped.

Radon.....Structure Loss Value Cannot Be Estimated

A naturally occurring radioactive gas with carcinogenic properties, radon is a common problem in many states. New Hampshire is one of them, specifically areas with shallow depth to granite bedrock. New Hampshire tends to have a particular problem with radon in drinking water, but airborne radon is also a significant hazard. There have been reports by the EPA that lung cancer deaths nationwide can be attributed to radon exposure, but nothing conclusive has been determined at this point.

Public Health Threat/Epidemic.....Structure Loss Value Cannot Be Estimated

New Durham’s unique geography provides its citizens and tourists alike the opportunity for summer and winter recreation activities, which often brings outdoor enthusiasts into the Town. During the summer months New Durham often sees its population double. Because of the influx of residents from neighboring towns or even states, there is a threat of enabling infection and viruses to be transmitted from outside the town borders. Children attend K-6 in New Durham, but must travel to Wolfeboro to attend middle school and high school. There are also a number of students who attend private schools in Rochester and Somersworth. Because of these factors, an epidemic or pandemic could present a possible threat to New Durham. With the occurrence of worldwide pandemics such as SARS, H1N1 and Avian Flu, New Durham could be susceptible to an epidemic and subsequent quarantine. Lyme disease is also a threat in this region of New Hampshire.

Chapter VI: Multi-Hazard Goals and Existing Mitigation Strategies

Multi-Hazard Mitigation Goals

Before identifying new mitigation actions to be implemented, the Planning Committee reviewed and adopted the following multi-hazard goals. These goals were based on the State of New Hampshire Multi-Hazard Mitigation Plan (2013) that was prepared and is maintained by HSEM.

Before identifying new mitigation actions to be implemented, the Team established and adopted the following multi-hazard goals:

- *Ensure the protection of the general population, citizens and guests of New Durham, New Hampshire, before during and after a hazard.*
- *Protect existing properties and structures through mitigation activities.*
- *Provide resources to residents of New Durham, when needed, to become more resilient to hazards that impact the town's critical support services, critical facilities, infrastructure, economy, environment, historical & cultural treasures and private property.*
- *Support the Presidential Policy Directive (PPD-8) through prevention, mitigation, preparedness, response and recovery actions*
- *Work regionally to identify, introduce and implement cost effective hazard mitigation measures in order to accomplish the town's goals.*
- *Develop and implement programs to promote hazard mitigation to protect infrastructure throughout the town to reduce liability with respect to natural and human-caused hazards generally.*
- *To address the challenges posed by climate change as they pertain to increasing risks in the town's infrastructure and natural environment.*

Mitigation Strategies Currently Underway in New Durham

The Hazard Mitigation Planning Committee established an initial list of mitigation actions by conducting a brainstorming session. The Committee reviewed these objectives and concluded that, with some modification, the objectives would constitute a usable framework for identifying and categorizing potential mitigation actions.

Gaps in Existing Measures

Gaps in the existing mitigation measures relate to general preparedness for natural hazards. The Town awaits new FEMA maps. The drainage system in Town is an ongoing maintenance issue that the Town is actively addressing. A primary gap in existing mitigation measure is the lack of an EOC and the inability of emergency personnel to communicate with each other at all times from all locations of the Town. Further, cell phone, television, and radio services should be improved, especially related to the Town radio station

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for which citizens can tune for information during a natural disaster. Lastly, certain critical facilities that are used as shelters need to have generators installed.

Existing Protection Matrix

The New Durham Hazard Mitigation Planning Committee has developed the summary matrix of existing hazard mitigation strategies presented on the following pages. This matrix, a summary of the preceding information, includes the type of existing protection (Column 1), a description of the existing protection (Column 2), the type of hazard (Column 3), the type of activity (Column 4), the area of town impacted (Column 5), enforcement (Column 6), effectiveness of the strategy (Column 7), changes in priority (Column 8), and a status update in 2022 (Column 9).

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Table 6.1: Existing Mitigation Strategies Matrix and Proposed Improvements

Existing Program	Description	Type of Hazard	Type of Activity	Area of Town impacted	Enforcement	Effectiveness	Changes in Priority	2021 Update
Building Code/ Permits	Requires builder to obtain all permits prior to action.	Multi-Hazard	Prevention	Town-wide	Code Enforcement Officer	Good	Completed Action	No improvements necessary
Elevation Certificates	An administrative tool of the NFIP, used by communities to verify and document building compliance with the community's floodplain management regulations	Flooding	Prevention	Potential Flood Areas	In order to be rated properly for flood insurance, a State-licensed professional is required to certify the elevation information	Good	Deferred Action	Some areas around Merrymeeting have been remapped; Waiting for new floodplain maps, only have from 2005
Emergency Action Plan (EAP)	Describes the actions employees should take in case of an emergency situation.	Multi-Hazard	Emergency Preparedness	Town-wide	Emergency Mgt. Officer	Good	Deferred Action	Plan still needs to be update; Tested on table-top only
EAP and FEMA materials	Update EAP and provide schools/town office with copies of EAP and other FEMA educational materials	Multi-Hazard	Emergency Preparedness	Town-wide	Emergency Mgt. Officer	Good	Completed Action	This is done on a quarterly basis.
Storm Drain Maintenance	Open channel/ culvert year round maintenance.	Flooding	Town Planning	Town-wide	Building Inspector, Road Agent, Planning and Zoning Board. Zoning to permit driveway variances granted, exiting of drainage wetland.	Excellent	Deferred	Most of the drainage system has been upgraded; Town continues to maintain drainage

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Road Design Standards	Above State minimum regulations. Adopted Stormwater Management and Erosion Control Regulations in 2012 and Roadway Related Subdivision Regulations in 2006 that require drainage facilities to remove stormwater and prevent flooding of the pavement and erosion of adjacent surfaces.	Multi-Hazard	Prevention	Town-wide	Planning Board or Road Agent; Board of Selectmen for existing roads	Good	Completed	Town has new standards; Replacing pipes all the time
State Dam Classification Program; State Dam Inspection Program	Emergency Action Plan for all Dams classified as Significant or High Hazard	Dam Failure and Flooding	Prevention	Town-wide; Significant or High Hazard Dams	State Dam Bureau	Excellent	Completed	No improvements
Tree Maintenance	Eversource, NH Coop, Highway Dept	Multi-Hazard	Prevention, Maintenance	Town-wide	Eversource, Highway Department, and NHCOOP after event	Excellent	Completed	No improvements
Evacuation and Notification	Radio station notification	Multi-Hazard	Emergency Preparedness	Town-wide	Emergency Mgt. Director	Average	Improve cell phone service, community TV notification.	Better program needed, not currently used.
Emergency Back-up Power	Highway Department has emergency fuel; Fire Department has generator	Multi-Hazard	Emergency Preparedness	Currently located in Fire Station	Fire Department	Average	Deferred	Need back up power for School, Town Hall

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Shoreland Protection Act	<p>Establishes minimum standards for the subdivision, use, and development along the State's larger water bodies (Cocheco River, Chalk Pond, Club Pond, Coldrain Pond, Downing Pond, Jones Dam, March's Pond Marsh Pond, Merrymeeting lake, Shawy's Pond, Unnamed Dam). Referenced in the Town's ordinances. The Town's Shorefront Conservation Overlay District extends 300 feet inland from the normal high water level.</p>	Flooding	Town Planning	Along shorefront	Planning Board, Selectboard, CEO, Conservation Commission	Excellent	Completed	None needed
Hazardous Materials Response Team	Mutual response system with Capital Area and Seacoast for action.	Hazardous Threats	Emergency Preparedness	Town-wide	Fire Dept. and Emergency Mgt.	Good	Completed	No improvements
Mutual Aid	Mutual Aid System with Police as authorized by RSA 48:11-A and 105:13.	Multi-Hazard	Emergency Preparedness	Most of Strafford County	Police Departments	Good	Completed	No improvements
Mutual Aid	Mutual Aid System with Fire as authorized by RSA 154:30.	Multi-Hazard	Emergency Preparedness	Belknap County, part of Strafford, Merrimack, Carroll & Grafton Counties	Fire Departments	Excellent	Completed	No improvements
Mutual Aid	Mutual Aid System with Highway Dept.	Multi-Hazard	Emergency Preparedness	State-wide	Highway Departments	Good	Completed	No improvements

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BMPs	Stormwater management. Required by State	Flooding	Town Planning	Town-wide	Town Officials	Good	Completed	No improvements identified
Drive-up Voting	Town hall have drive-up window to conduct town elections safely without packing people into a small room specifically for COVID-19	Public Health Threats	Emergency Preparedness	Town-wide	Town Officials	Good	Completed	This was constructed in 2020 for the election. Unclear if it will be used again, depending on future public health threats.

Effectiveness:

- Excellent – The existing program works as intended and is exceeding its goals
- Good – The existing program works as intended and meets its goals
- Average – The existing program does not work as intended and/or does not meet its goals
- Poor – this existing program is negatively impacting the community

Changes in Priority:

- Completed Action – This program continues to be an implemented mitigation action item since the last updated plan was developed
- Deferred Action – At the time of developing this plan, more time is required for completion
- Deleted Action – This existing program is no longer a priority to the Town
- Ongoing Action – This program will occur throughout the life of the plan.

2021 Update:

- Recommendations for improvement

Chapter VII: Prior Mitigation Plan(s)

New Durham participated in two prior mitigation plans that were developed by the New Durham Hazard Mitigation Planning Committee and adopted by the Board of Selectmen in 2004 and 2011. This Plan, the “Multi-Hazard Mitigation Plan, New Durham, NH 2022” is the most recent version.

Many strategies identified in the 2004, 2011, 2016 plans had not been completed as of the preparation of the 2022 plan update. Many strategies identified in the 2011 STAPLEE have also not been completed. In order to avoid redundancy in the plan, the Planning Committee determined that prior mitigation strategies would be consolidated in one table, Table 7.1, and an update reflecting the current status of each strategy as of 2022 would be included. Strategies related to communication were consolidated. The Planning Committee discussed and clarified these strategies and included them in Table 8.1 as new mitigation strategies as necessary.

The Planning Committee members decided to rank mitigation actions included in prior plans as high, medium, and low priority, rather than rank by number. The group felt that the ranking scheme does not consider the practicality, relative cost, immediacy of need, or potential mitigation gain associated with each of the actions particularly well. Therefore the Planning Committee determined that, a general low-medium-high, rather than a numerical rank, would be sufficient for the purpose of reviewing previously identified mitigation actions.

Table 7.1 Accomplishments since Prior Plan Approval

Rank	Proposed Mitigation Action	2021 Update
High	Construct EOC.	The Town does not have an EOC. Needs to build building first along with implementing procedures for the EOC. Deferred action – more time necessary to implement strategy.
High	Upgrade radio system.	Police have upgraded to digital technology. Fire Department uses analog technology.
	Convert Radio system for Highway Department.	The Highway Department has not converted their radio system, yet. The Team expressed concerns with switching to digital and will wait for better technology. Deferred action – awaiting availability of better technology.
	Construct Communication Tower in second division of Town.	This has not been completed. Deferred action – more time and release of funding necessary to implement strategy. Also awaiting construction of new communication tower that may make a second one obsolete.
High	Reformat Emergency Action Plan	The Town needs to update both the content and format of the EAP. Deferred action – more time is necessary to implement this strategy.

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Rank	Proposed Mitigation Action	2021 Update
High	Establish home list for assistance during emergencies	Completed/Ongoing. The Town has started developing this list (2021) but continues to develop a more comprehensive database. The list will be continuously maintained
High	Improve communication infrastructure to enable reliable communication and interoperability between all departments and other emergency response personnel, at all times, and in all locations in the Town. This includes the radio system, communication towers and repeaters in the school and second division, and EOC.	Deferred. The town still needs radio connectivity across town.
Medium	Add a page to the Town's Emergency Management website that covers emergency procedures and general information on flooding and other safety precautions.	To be completed. Deferred strategy due to lack of staff capacity to develop webpage material.
Medium	Develop home assistance database. Identify specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages and coordinate transportation and other assistance.	Deferred. Will distribute survey to identify gaps in welfare serves. Pending budget.
Medium	Improve communication infrastructure to enable reliable communication and interoperability between all departments and other emergency response personnel, at all times, and in all locations in the Town. This includes the radio system, communication towers and repeaters in the school and second division, and EOC.	Deferred, Current radio abutting issues with Strafford. Currently use Lakes Region Mutual Fire Aid Association Communications.
Medium	Develop a Fact Sheet on safety measures that residents can take to lessen the effect of hazards.	To be completed. Deferred strategy due to lack of staff capacity.
Medium	Develop an evacuation routes plan.	The Town has made progress with developing an evacuation routes plan and the primary evacuation route has been included on the maps in this Plan update, more education for residents is needed. Signage could also be developed. Deferred – additional time is necessary to complete this strategy.
Medium	Install new 15,000-gallon cistern downtown near Fire Department.	Deferred. To be completed once the new fire station is built.
Medium	Update the Highway Department to be used as a backup EOC.	The Highway Department has a generator but it is only for the Highway Department. The priority is establishing a primary EOC. The town is still strategizing.
Medium	Expand multi-hazard mitigation outreach and education. Develop resources about types of hazards and mitigation strategies for residents. Make information available on website, on Facebook page, in school newsletter, and at Town hall.	Deferred. More progress will be made on this now that New Durham has a dedicated EMD director.

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Rank	Proposed Mitigation Action	2021 Update
Low	Continue culvert and drainage improvements. Incorporate inspection and management of hazardous trees into the drainage system maintenance process. SRPC culvert assessment data may be used to prioritize improvements. Data collection may be needed	Completed. Culverts are replaced with each new road. Trees are removed if funding available.
Low	Improve notification of residents. Provide information about resources including Ready NH and reverse 911.	Completed. These materials are now available in Town Hall.
Low	Revise flood maps.	The maps are referring to the FEMA 100-year floodplain. These maps were revised by the town in 2016. All flood maps are now up to date.
Low	New dry hydrants.	Completed/Ongoing. Since the 2016 plan update, one dry hydrant installed the Downing Pond Dam. Additional dry hydrants will be installed when culverts are installed.
Low	Work closely with the Conservation Commission to acquire easements that are located in potential hazard areas and convert them to open space.	To the knowledge of the Planning Committee, the Town had not acquired easements in areas that are located in potential hazard areas to prevent future development. The Planning Committee was not able to obtain confirmation of this from the Conservation Commission. Deferred – this is an ongoing strategy that the community will need additional time and funding to complete.
N/A	Develop a timber management plan.	The Town has managed the forest. Slash remains in the forest but timber has been removed. The Town has a Forest Management Plan that was prepared in 2011. Deferred Action – Town unclear how to proceed but recognize this should be done.
N/A	Prepare and submit an annual hazard mitigation implementation plan and progress report to Board of Selectmen	This will not be completed. The committee decided that they should keep the same 5-year schedule with SRPC.
N/A	Install back-up generator in the School.	This will not be completed. Canceled – Generator was moved to another location

Changes in Priority:

- Completed Action – This program continues to be an implemented mitigation action item since the last updated plan was developed
- Deferred Action – At the time of developing this plan, more time is required for completion
- Deleted Action – This existing program is no longer a priority to the Town
- Ongoing Action – This program will occur throughout the life of the plan.

Chapter VIII: New Mitigation Strategies & STAPLEE

Feasibility and Prioritization

Table 8.1 reflects the newly identified potential multi-hazard mitigation strategies and reprioritized strategies from prior plans, as well as the results of the STAPLEE Evaluation as explained below. It should also be noted that although some areas are identified as “Multi-Hazard,” many of these potential mitigation strategies overlap.

The goal of each proposed mitigation strategy is reduction or prevention of damage from a multi-hazard event. To determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy that was developed by the FEMA. The STAPLEE method analyzes the **S**ocial, **T**echnical, **A**dministrative, **P**olitical, **L**egal, **E**conomic and **E**nvironmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies discussed in Table 8.1.

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

Each proposed mitigation strategy was then evaluated and assigned a score based on the above criteria. Each of the STAPLEE categories were discussed and were awarded the following scores: Good = 3; Average = 2; Poor = 1. An evaluation chart with total scores for each new strategy is shown in Table 8.1.

The ranking of strategies with the scores displayed in the following pages was merely a guideline for further prioritizing. The Planning Committee then prioritized the strategies and prepared the action plan using additional criteria:

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- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures?
- Can the action be implemented quickly?

The prioritization exercise helped the committee seriously evaluate the new hazard mitigation strategies that they had brainstormed throughout the multi-hazard mitigation planning process. While all actions would help improve the Town's multi-hazard and responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation strategies are implemented. Staff capacity and personnel are also a limiting factor.

The Planning Committee's Understanding of Multi-Hazard Mitigation Strategies

The Planning Committee identified the need to determine strategies that are designed to reduce personal injury or damage to property that could be done prior to an actual disaster would be listed as a potential mitigation strategy. This decision was made even though not all projects listed in Tables 8.1 and 9.1 (Implementation Plan) are fundable under FEMA HMA Grant programs. The Planning Committee determined that this Plan was in large part a management document designed to assist the Board of Selectmen and other town officials in all aspects of managing and tracking potential emergency planning strategies. For instance, the team was aware that some of these strategies are more properly identified as readiness issues. The Team did not want to "lose" any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

When brainstorming mitigation strategies for the Town of New Durham, the Multi-Hazard Mitigation Planning Committee reviewed and considered all hazards identified in the Plan. Due to the infrequency and relative low risks of some hazards effecting New Durham, the Planning Committee came up with a comprehensive list of strategies that would address the most relevant needs and vulnerability. While not every hazard has a mitigation strategy, each hazard was considered. Mitigation strategies that addressed multiple hazards and/or strategies that ranked higher with regard to vulnerability were prioritized. In order to remain efficient and mindful of local resources and staff, the strategies and mitigation actions were designed to address the greatest weaknesses and the highest needs in New Durham. Each identified hazard may potentially be a greater threat in the future and should not be removed from the plan.

At the time of the 2022 update, the Planning Committee emphasized the need to address barriers to effective and efficient hazard mitigation and emergency response. While the Planning Committee understood the need to address diverse hazards and recognized the benefits of many mitigation strategies, the Planning Committee ultimately felt very strongly about the need to focus their time and resources on select projects over the next five years. These mitigation strategies are included in Table 8.1

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A summary of additional items discussed during a guided brainstorming of mitigation session follows Table 8.1. Many of these strategies may be added to the Plan and implemented once the priority strategies in Table 8.1 are completed.

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Table 8.1: Potential Mitigation Strategies & STAPLEE

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	Ec	En	Total
Add a second frequency for the Strafford County EMD Response Team Communications for better communication.	Multi-Hazard	Town Wide	Communication, Emergency Response Planning	3	3	3	3	3	3	3	21
Provide copies of quarterly updates EAP and EOP at Fire and Highway Buildings	Multi-Hazard	Town Wide	Communication, Emergency Response Planning	3	3	3	3	3	3	3	21
Apply for Watershed Grant on South Shore Road along Merrymeeting Lake. This is to supplement with culvert replacements where funding for removing hazardous trees from the drainage maintenance process.	Flooding	Town Wide	Construction	3	3	3	3	3	3	3	21

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New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	Ec	En	Total
Conduct an engineering and landslide study for Mountain Road leading to the Copple Crown Village District. The road has been slowly dropping over the last 20 years.	Landslide	Town Wide	Outreach and Education	3	3	3	3	3	3	3	21
Gain remote access to town school's outdoor cameras to reduce hot zones in case of active shooter or other emergency weather events.	Multi-Hazard	Town Wide	Communication	3	3	3	3	3	3	3	21
Advise state to warn New Durham residents within inundation area of dams. Especially ones that could be impacted from high-hazard dams, as they could cause loss of life.	Flooding/Dam Failure	Town Wide	Communication	3	3	3	3	3	3	3	21
Utilize the community room attached to the fire department to be used as an alternative warming shelter.	Severe Cold/Severe Winter Weather	Town Wide	Planning	3	3	3	3	3	3	3	21

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

New Mitigation Project	Type of Hazard	Affected Location	Type of Activity	S	T	A	P	L	Ec	En	Total
Land Acquisition of lot on Main Street to be used as emergency snow storage for days with heavy snowfall. Specially to alleviate stress on the downtown areas/emergency staff parking lots.	Severe Winter Weather	Downtown	Planning	3	3	3	3	3	3	3	21
New Durham fire department purchase of ATV to assist with evacuations and to reach remote locations.	Multi-Hazard	Town-wide	Purchase	3	3	3	3	3	3	3	21
New Durham Fire Department purchase of aerial drone to assist in rescue operations and assess damage.	Multi-Hazard	Town-wide	Purchase	3	3	3	3	3	3	3	21

Multi-Hazard Mitigation Plan Update 2016

Town of New Durham, New Hampshire

Additional Potential Mitigation Strategies

The Planning Committee discussed a range of mitigation strategies during the Planning Committee Meetings. These strategies were not identified as high priority strategies that the Planning Committee wanted to include in Table 8.1 for varying reasons. These strategies and an explanation of why they were not included in Table 8.1 follows. These strategies may be implemented by the Town after the highest priority strategies are implemented.

Drought

- Develop a drought emergency plan.
 - Considered by Planning Committee but not selected for reasons including: most wells are drilled wells; there is no town drinking water infrastructure; and in the past drought has not been a significant hazard; low capacity to prepare and implement this plan.
- Assess vulnerability to drought by compiling data on groundwater resources, climate data, and public water systems.
 - Considered by Planning Committee but determined to be a low priority strategy in 2016 and 2021.

Extreme Temperatures

- Identify cooling centers for residents.
 - Considered by Planning Committee but not selected as a high priority strategy as the Town already reaches out to vulnerable populations to offer assistance when necessary. In addition, the committee noted that the library could currently serve as a cooling center and the Town depends on regional shelters which are already identified.
- Provide citizens with information about the dangers of extreme heat and cold and steps to protect themselves.
 - This strategy is encompassed in the outreach and education strategy.

Severe Winter Weather

- Develop and emergency plan for second division when road is inaccessible; coordinate with Alton and Middleton.
 - Planning Committee discussed this and determined this was not necessary. Heavy snowfall is a regular occurrence and the Town has already identified alternative routes to access this area.
- Conduct public awareness about and seek funding to assist residents with retrofitting buildings to prevent roof collapse.
 - Planning Committee discussed this strategy and determined this was not a high priority strategy due to low capacity to implement.
- Use snow fences or rows of trees and vegetation to limit blowing and drifting of snow over critical roadway segments
 - Planning Committee reviewed the strategy but because the state maintains the primary corridor (NH Route 11) and because drifting is not a major issue, it was not prioritized.
- Distribute information about carbon monoxide hazard associated with use of generators, gas stove, snow-filled tailpipes, etc.
 - This strategy is encompassed in outreach and education strategy.

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Town of New Durham, New Hampshire

Flood

- Establish a multi-jurisdictional response plan with Brookfield and Alton to develop a communication and emergency response plan for flooding of Jones Dam in Farmington and Jones Pond Dike in Brookfield that would impact adjacent communities.
 - The Planning Committee discussed this strategy and determined that this type of plan was not a high priority strategy.

Landslide

- Utilize soil stabilization measures, such as planting soil-stabilizing vegetation on steep, publically-owned slopes and work with property owners to stabilize soil to prevent roadway damage and traffic disruptions from landslides.
 - The Planning Committee discussed this strategy and determined that due to the low threat of landslide and the few areas of the Town that are vulnerable to a landslide, this was not a high priority given the Town's low staff capacity.

Lightning

- Educate school children and other residents about lightning.
 - This strategy was not considered a high priority strategy. This type of education has occurred in the past.

Severe Wind

- Retrofit public buildings and critical facilities to withstand high winds.
 - This strategy was not identified as a high priority strategy due to the fact that severe wind was not identified as a high ranking hazard and because the Town has a newer public safety building that does not require retrofitting.
- Ensure school officials are aware of the best area of refuge in school buildings.
 - This strategy was not identified as high priority strategy to include in Table 8.1 due to the relatively low threat of severe wind.

Tornado

- Develop a local grant program to assist homeowners who wish to construct a new safe room
 - The Planning Committee determined that this was not feasible from a staff or financial capacity.

Wildfire

- Continue to maintain the Town Forest to reduce risk. Perform maintenance including fuel management techniques such as pruning and clearing dead vegetation, selective loggings, cutting high grass, planting fire-resistant vegetation, and creating fuel/fire breaks.
 - This has already occurred and the Planning Committee did not feel it was necessary to include this as a new mitigation strategy.
- Map and assess vulnerability to wildfire using GIS mapping of wildfire hazard areas to improve planning and wildfire assistance.

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Town of New Durham, New Hampshire

- The Planning Committee did not identify this as a high priority strategy due to the relatively low risk of wildfire.

Multiple Hazards

- Establish a process to coordinate with state and federal agencies and SRPC to maintain up to date hazard data, maps, and assessment.
 - This was considered as a potential strategy but not identified as a high priority strategy.
- Host a disaster preparedness workshop to educate the public on how to prepare for hazards and disasters.
 - This was considered as a potential strategy but not identified as a high priority strategy.

Chapter IX: Implementation Schedule for Prioritized Strategies

After reviewing the finalized STAPLEE numerical ratings, the Team prepared to develop the Implementation Plan (Table 9.1). To do this, team members created four categories into which they would place all the potential mitigation strategies.

- **Category 0** was to include those items, which were “continuous”, that is those that are being done and will continue to be done in the future.
- **Category 1** was to include those items under the direct control of town officials, within the financial capability of the Town using only town funding, those already being done or planned, and those that could generally be completed within one year.
- **Category 2** was to include those items that the Town did not have sole authority to act upon, those for which funding might be beyond the Town’s capability, and those that would generally take between 13—24 months.
- **Category 3** was to include those items that would take a major funding effort, those that the Town had little control over the final decision, and those that would take in excess of 24 months to complete.

Each potential mitigation strategy was placed in one of the three categories and then those strategies were prioritized within each category.

Once this was completed, the Team developed an implementation plan that outlined who is responsible for implementing each strategy, as well as when and how the actions will be implemented. The following questions were asked in order to develop an 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? |

The anticipated cost of each mitigation strategy was categorized as:

- **Low** (\$0-\$5,000)
- **Medium** (\$5,001-\$10,000)
- **High** (>\$10,000)

In addition to the prioritized mitigation projects, Table 9.1 Implementation Plan includes the responsible party (WHO), how the project will be supported (HOW), the timeframe for implementation of the project (WHEN), and the anticipated cost. Strategies that will continue throughout the life of the Plan are labeled ongoing.

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Town of New Durham, New Hampshire

Table 9.1 Implementation Plan

New Mitigation Project	Responsibility or Oversight	Funding and/or Support	Anticipated Cost	Timeframe	STAPLEE Score (Highest score=21)
Add a second frequency for the Strafford County EMD Response Team Communications for better communication.	EMD	Grant Funding. Regional Staff.	Low	1-2 years	21
Provide copies of quarterly updates EAP and EOP at Fire and Highway Buildings	EMD	Minimal funding required.	Low	1-2 Years	21
Apply for Watershed Grant on South Shore Road along Merrymeeting Lake. This is to supplement with culvert replacements where funding for removing hazardous trees from the drainage maintenance process.	Highway	Grant Funding. Highway department Fund.	High	3-5 Years	21
Conduct an engineering and landslide study for Mountain Road leading to the Copple Crown Village District. The road has been slowly dropping over the last 20 years.	Highway	Highway Dept fund, Hazard Mitigation funds, possibly grant funds.	High	3-5 years	21
Gain remote access to town school's outdoor cameras to reduce hot zones in case of active shooter.	EMD/Fire Chief	Minimal funding required. Staff time. School staff time.	Low	1-2 years	21
Advise state to warn New Durham residents within inundation area of dams. Especially ones that could be impacted from high-hazard dams, as they could cause loss of life.	Fire Chief	Minimal funding required. Staff time.	Low	1-2 years	21
Utilize the community room attached to the fire department to be used as an alternative warming shelter.	EMD/Fire Chief	Fire Department Funds. Possibly other towns funds depending on scale.	Medium	1-2 Years	21

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Town of New Durham, New Hampshire

Land Acquisition of lot on Main Street to be used as emergency snow storage for days with heavy snowfall. Specially to alleviate stress on the downtown areas/emergency staff parking lots.	Highway	Highway Department Funds	Medium	1-2 years	21
New Durham fire department purchase of ATV to assist with evacuations and to reach remote locations.	EMD/Fire Chief	Fire Department Funds	Low	1-2 years	21
New Durham Fire Department purchase of aerial drone to assist in rescue operations and assess damage.	EMD/Fire Chief	Fire Department Funds	Low	1-2 years	21

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Town of New Durham, New Hampshire

Chapter X. Monitoring, Evaluation, and Updating the Plan

Introduction

A good mitigation plan must allow for updates where and when necessary, particularly since communities may suffer budget cuts or experience personnel turnover during both the planning and implementation states. A good plan will incorporate periodic monitoring and evaluation mechanisms to allow for review of successes and failures or even just simple updates.

Multi-Hazard Plan Monitoring, Evaluation, and Updates

To track programs and update the mitigation strategies identified through this process, the Town will review the Multi-Hazard Mitigation Plan annually or after a hazard event. Additionally, the Plan will undergo a formal review and update at least every five years and obtain FEMA approval for this update or any other major changes done in the Plan at any time. The Emergency Management Director is responsible for initiating the review and will consult with members of the Multi-Hazard Mitigation Planning Committee identified in this plan. The public will be encouraged to participate in any updates. Public announcements will be made through advertisements in local papers, postings on the town website, and posters disseminated in town. A formal public hearing will be held before reviews and updates are official.

Changes will be made to the Plan to accommodate projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities or funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, will be reviewed as well during the monitoring and update of the plan to determine feasibility of future implementation. In keeping with the process of adopting this multi-hazard mitigation plan, a public hearing to receive public comment on plan maintenance and updating will be held during the annual review period and before the final product is adopted by the Select Board. Chapter XI contains a representation of a draft resolution for New Durham to use once a conditional approval is received from FEMA.

Integration with Other Plans

New Durham will take the necessary steps to incorporate the mitigation strategies and other information contained in this plan with other town activities, and plans and mechanisms, such as comprehensive land use planning, capital improvements planning, site plan regulations, and building codes to guide and control development in the Town of New Durham, when appropriate.

The 2011 update of the Hazard Mitigation Plan was used to inform the development of overlay maps to be incorporated into the Town's Master Plan. This mapset is part of the Zoning Ordinance and identifies areas including floodplains, steep slopes, and waterfront protection areas that establish buffers between bodies of water and areas suitable for development. The mapset also depicts a wetland overlay district, which was established to ensure wetlands – and the flood storage and other valuable services wetlands provide – are well protected.

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

The local government will continue to refer to this Plan and the strategies identified when updating the Town's Master Plan, Capital Improvements Program, Zoning Ordinances and Regulations, and Emergency Action Plan. The Select Board and the Hazard Mitigation Committee will work with town officials to incorporate elements of this Plan into other planning mechanisms, when appropriate. The Emergency Management Director along with other members of the Hazard Mitigation Committee will work with the Planning Board to include references to the Hazard Mitigation Plan in the Town's Master Plan. In addition, the Town will review and make note of instances when this has been done and include it as part of their annual review of the Plan. Finally, an annual report prepared to provide an update to the Board of Selectmen on the status of implementing new mitigation priorities will be incorporated into the Town's quarterly EOP/EAP.

Chapter XI: Signed Community Documents & Approval Letters

Conditional Approval Letter from FEMA

Congratulations!

FEMA Region I has completed its review of the New Durham, NH Hazard Mitigation Plan and found it approvable pending adoption. With this approval, the jurisdiction meets the local mitigation planning requirements under 44 CFR 201 **pending FEMA's receipt of electronic copies of the adoption documentation and the final plan.**

These items should be provided to your State's mitigation planning point of contact who will ensure they are forwarded to FEMA. Acceptable electronic formats include Word or PDF files and must be submitted to us via email at fema-r1-mitigationplans@fema.dhs.gov. Upon FEMA's receipt of these documents, a formal letter of approval will be issued, along with the final FEMA Checklist and Assessment.

The FEMA letter of formal approval will confirm the jurisdiction's eligibility to apply for Mitigation grants administered by FEMA and identify related issues affecting eligibility, if any. If the plan is not adopted within one calendar year of FEMA's Approval Pending Adoption, the jurisdiction must update the entire plan and resubmit it for FEMA review. If you have questions or wish to discuss this determination further, please contact me at Melissa.Surette@fema.dhs.gov or 617-956-7559.

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

Sincerely,

Melissa A. Surette

Senior Planner, Risk Analysis Branch

FEMA Region I
99 High Street
Boston, MA 02110

Email: Melissa.Surette@fema.dhs.gov

Office: 617.956.7559

Cellular: 617.794.0292

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Signed Certificate of Adoption

CERTIFICATE OF ADOPTION

Town of New Durham, New Hampshire
Board of Selectmen

A Resolution Adopting the New Durham, NH Multi-Hazard Mitigation Plan Update 2016

Plan Submitted to FEMA Dated: May 17, 2016
Conditionally Approved: July 18, 2016

WHEREAS, the Town of New Durham authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and received funding from the NH Division of Homeland Security and Emergency Management through the Pre-Disaster Mitigation Grant program and assistance from Strafford Regional Planning Commission in the preparation of the New Durham, NH Multi-Hazard Mitigation Plan Update 2016; and

WHEREAS, several public planning meetings were held between November 9, 2015 and March 28, 2016 regarding the development and review of the New Durham, NH Multi-Hazard Mitigation Plan Update 2016; and

WHEREAS, the New Durham, NH Multi-Hazard Mitigation Plan Update 2016 contains several potential future projects to mitigate hazard damage in the Town of New Durham; and

WHEREAS, the respective officials identified in the mitigation strategy of the Plan are hereby directed to pursue implementation of the recommended actions assigned to them; and


WHEREAS, 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; and

WHEREAS, an annual report on the progress of the implementation elements of the Plan shall be presented to the Board of Selectmen

WHEREAS, a duly-noticed public meeting was held by the New Durham Board of Selectmen on Sept 19, 2016 to formally approve and adopt the New Durham, NH Multi-Hazard Mitigation Plan Update 2016.

NOW, THEREFORE BE IT RESOLVED that the New Durham Board of Selectmen hereby adopts the New Durham, NH Multi-Hazard Mitigation Plan Update 2016 as an official plan of the Town of New Durham.

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of New Durham this 9 (day) of September year. 2016


New Durham Board of Selectmen, Chair

Town Seal or Notary

Date 9/19/16

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Final Approval Letter from FEMA

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



FEMA

OCT 03 2016

Heather Dunkerely
State Hazard Mitigation Officer
Homeland Security & Emergency Management
33 Hazen Drive
Concord, NH 03303

Dear Ms. Dunkerely:

We would like to congratulate the Town of New Durham and the State of New Hampshire for their dedication and commitment to mitigation planning. The Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) Region I Mitigation Planning Team has completed its review of the Multi-Hazard Mitigation Plan Update 2016, Town of New Durham, NH and determined it meets the requirements of 44 C.F.R. Pt. 201.

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

Approved mitigation plans are eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Complete information regarding the CRS can be found at <http://www.fema.gov/national-flood-insurance-program-community-rating-system>, or through your local floodplain administrator.

The Multi-Hazard Mitigation Plan Update 2016, Town of New Durham, NH must be reviewed, revised as appropriate, and resubmitted to FEMA for approval within **five years of the plan approval date of September 28, 2016** in order to maintain eligibility for mitigation grant funding. We encourage the Town to continually update the plan's assessment of vulnerability, adhere to its maintenance schedule, and implement, when possible, the mitigation actions proposed in the plan.

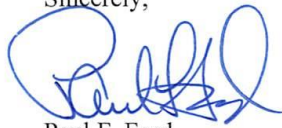
Multi-Hazard Mitigation Plan Update 2022
Town of New Durham, New Hampshire

Heather Dunkerely
Page 2

OCT 03 2016

Once again, thank you for your continued dedication to public service demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please do not hesitate to contact Melissa Surette at (617) 956-7559.

Sincerely,



Paul F. Ford
Regional Administrator

PFF: ms

cc: Leigh Cheney, Chief of Planning, New Hampshire
Whitney Welch, Hazard Mitigation Planner, New Hampshire
Jennifer Gilbert, Asst. New Hampshire State NFIP Coordinator

Enclosure

Appendices

Appendix A: Bibliography

Appendix B: Planning Process Documentation

Appendix C: Summary of Possible Multi-Hazard Mitigation

Appendix D: List of Contacts

Appendix E: Technical and Financial Assistance for Multi-Hazard Mitigation

Hazard Mitigation Grant Program (HMGP)

Pre-Disaster Mitigation (PDM)

Flood Mitigation Assistance (FMA)

Appendix F: Map

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Appendix A: Bibliography

- Local Mitigation Plan Review Guide, FEMA, October 1, 2011
- Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013
- Hazard Mitigation Assistance Guidance, FEMA, February 27, 2015
- Multi-Hazard Mitigation Plans
 - New Durham Hazard Mitigation Plan, 2011
 - Town of Albany, 2010
 - Town of Lee, 2013
 - Town of Madbury, 2014
 - Town of Northwood, 2014
- State of New Hampshire Multi-Hazard Mitigation Plan (2013) - State Hazard Mitigation Goals
- Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2 and Section 322a
<http://www.fema.gov/library/viewRecord.do?id=1935>
- Economic & Labor Market Information Bureau, NH Employment Security, 2014; Census 2000 and Revenue Information
- Population Projections. NH Office of Energy and Planning and Regional Planning Commissions. March 22, 2011
- US Census Bureau. General Housing Characteristics: 2010. American Factfinder 2
- NCDC [National Climatic Data Center, National Oceanic and Atmospheric Administration]. 2015.
Storm Events

Personal Collections

- Town Historian Eloise Bickford, New Durham Material 1750 to 1997
- Town Historian, Catherine Orlowicz, 2010

Multi-Hazard Mitigation Plan Update 2022

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Appendix B: Planning Process Documentation

Agendas

Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #1

August 12, 2021

2:30PM-4:30PM

1. Introductions
2. Discuss the update process and grant requirements, including match documentation
3. Review 2016 plan excerpt – Asset Inventory
4. Review 2016 plan excerpt – Past Mitigation Strategies
5. Review 2016 plan list of hazards and 2018 State Hazard Mitigation Plan hazards

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #2

October 5 2021 (Previously September 16, 2021)

10:00AM-12:00PM

1. Introductions
2. Review National Flood Insurance Program (NFIP) Chapter
3. Review Hazard Descriptions and update past/potential impacts of each hazard
4. Who will I contact about local Development for the community profile?
5. Update Hazard Vulnerability Assessment Tool (Page 10 of Hazard Descriptions)
6. Mark-up map with past hazards
7. Homework for Meeting 3: Brainstorm Potential Mitigation Strategies
8. Adjourn

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #3

October 26 2021

10:00AM-12:00PM

1. Introductions
2. Review Table 8.1 – Discuss potential mitigation strategies. – 1 hour
3. Review table 9.1 – Discuss methods and scoring. – 15 mins
4. Discuss missing items that have not been completed. -15 mins
5. Homework – If you do not want to score the STAPLEE before the meeting or during the meeting, this will be homework. - 30 mins

Multi-Hazard Mitigation Plan Update 2022
Town of New Durham, New Hampshire

Sign-In Sheets

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Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #1

August 12, 2021
3:00-5:00PM

Community Room
New Durham Fire Department
6 Main Street
New Durham, NH 03855

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail	Time spent preparing for meeting (reviewing material, compiling information, etc.)
Nicole Zoltko	Town Admin	ndadmin@newdurhamnh.us	
Shannon Feagy	Tax collector / deputy Town Clerk	ndcollector@newdurhamnh.us	
Robin McClain	Land use admin. assistant	ndlanduse@newdurhamnh.us	
TY TYLER	EMD	tonyatyler@yahoo.com	
Peter Varney	FIRE chief		
Celeste Chasse	Parks & Rec	ndrec@newdurhamnh.us	
Shawn Bernier	Police Chief		

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #2

October 5, 2021
10:00AM-12:00PM

Community Room
New Durham Fire Department
6 Main Street
New Durham, NH 03855

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail	Time spent preparing for meeting (reviewing material, compiling information, etc.)
TY TYLER	E.M.D	fontatylert@yahoo.com	8 HOURS
Rhina McClain	landuse	ndlanduse@newdurhamnh.com	
Amanda Estey	Asst. TA	aestey@newdurhamnh.us	
Alicia Housel	Assessing/FA Assist	alhouse@newdurhamnh.us	
Aimee Sweeney	FA		
Dave Bennett	Highway Supervisor		
Celeste Chasse	Parks & Rec	ndrec@newdurhamnh.us	
Scott Cox	Building Insp.		
Shannon Ferger	Town Clerk		

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

Town of New Durham, New Hampshire

Hazard Mitigation Committee Meeting #3

October 26, 2021
10:00AM-12:00PM

Community Room
New Durham Fire Department
6 Main Street
New Durham, NH 03855

ATTENDANCE SHEET

Name	Position Title/ Department Affiliation	E-mail	Time spent preparing for meeting (reviewing material, compiling information, etc.)
Peter Vanwey	Fire chief	p.vanwey@newdurhamnh.us	5 hours
Robin McClain	land use	rdlanduse@newdurhamnh.us	
Don R. D'Alton	High Way		
Shawn Berube	Chief of police	S.berube@NewDurhamNH.us	
Amanda Estey	Asst. Admin	aestey@newdurhamnh.us	
Anina Sancy	Finance Manager	NDSEL@NewDurhamNH.us	
Nicole Zoltko	TA	ndadmin@newdurhamnh.us	3 hrs.
Celeste Chasse'	Rec director	ndrec@newdurhamnh.us	

Appendix C: Summary of Possible Multi-Hazard Mitigation Strategies

I. RIVERINE MITIGATION

A. Prevention

Prevention measures are intended to keep the problem from occurring in the first place, and/or keep it from getting worse. Future development should not increase flood damage. Building, zoning, planning, and/or code enforcement personnel usually administer preventative measures.

1. **Planning and Zoning**²⁸ - Land use plans are put in place to guide future development, recommending where - and where not - development should occur and where it should not. Sensitive and vulnerable lands can be designated for uses that would not be incompatible with occasional flood events - such as parks or wildlife refuges. A Capital Improvements Program (CIP) can recommend the setting aside of funds for public acquisition of these designated lands. The zoning ordinance can regulate development in these sensitive areas by limiting or preventing some or all development - for example, by designating floodplain overlay, conservation, or agricultural districts.
2. **Open Space Preservation** - Preserving open space is the best way to prevent flooding and flood damage. Open space preservation should not, however, be limited to the floodplain, since other areas within the watershed may contribute to controlling the runoff that exacerbates flooding. Land Use and Capital Improvement Plans should identify areas to be preserved by acquisition and other means, such as purchasing easements. Aside from outright purchase, open space can also be protected through maintenance agreements with the landowners, or by requiring developers to dedicate land for flood flow, drainage and storage.
3. **Floodplain Development Regulations** - Floodplain development regulations typically do not prohibit development in the special flood hazard area, but they do impose construction standards on what is built there. The intent is to protect roads and structures from flood damage and to prevent the development from aggravating the flood potential. Floodplain development regulations are generally incorporated into subdivision regulations, building codes, and floodplain ordinances.
 - a. **Subdivision Regulations:** These regulations govern how land will be divided into separate lots or sites. They should require that any flood hazard areas be shown on the plat, and that every lot has a buildable area that is above the base flood elevation.
 - b. **Building Codes:** Standards can be incorporated into building codes that address flood proofing for all new and improved or repaired buildings.
 - c. **Floodplain Ordinances:** Communities that participate in the National Flood Insurance Program are required to adopt the minimum floodplain management regulations, as developed by FEMA. The regulations set minimum standards for subdivision regulations and building codes. Communities may adopt more stringent standards than those set forth by FEMA.
4. **Stormwater Management** - Development outside of a floodplain can contribute significantly to flooding by covering impervious surfaces, which increases storm water runoff. Storm water management is usually addressed in subdivision regulations. Developers are typically required to build retention or detention basins to minimize any increase in runoff caused by new or expanded

²⁸ All zoning should be carefully reviewed on a consistent basis by municipal officials to make sure guidelines are up-to-date and towns are acting in accordance with best management practices.

Multi-Hazard Mitigation Plan Update 2022

Town of New Durham, New Hampshire

impervious surfaces, or new drainage systems. Generally, there is a prohibition against storm water leaving the site at a rate higher than it did before the development. One technique is to use wet basins as part of the landscaping plan of a development. It might even be possible to site these basins based on a watershed analysis. Since detention only controls the runoff rates and not volumes, other measures must be employed for storm water infiltration - for example, swales, infiltration trenches, vegetative filter strips, and permeable paving blocks.

5. **Drainage System Maintenance** - Ongoing maintenance of channel and detention basins is necessary if these facilities are to function effectively and efficiently over time. A maintenance program should include regulations that prevent dumping in or altering water courses or storage basins; regrading and filling should also be regulated. Any maintenance program should include a public education component, so that the public becomes aware of the reasons for the regulations. Many people do not realize the consequences of filling in a ditch or wetland, or regrading.

B. Property Protection

Property protection measures are used to modify buildings subject to flood damage, rather than to keep floodwaters away. These may be less expensive to implement, as they are often carried out on a cost-sharing basis. In addition, many of these measures do not affect a building's appearance or use, which makes them particularly suitable for historical sites and landmarks.

1. **Relocation** - Moving structures out of the floodplain is the surest and safest way to protect against damage. Relocation is expensive, however, so this approach will probably not be used except in extreme circumstances. Communities that have areas subject to severe storm surges, ice jams, etc. might want to consider establishing a relocation program, incorporating available assistance.
2. **Acquisition** - Acquisition by a governmental entity of land in a floodplain serves two main purposes: 1) it ensures that the problem of structures in the floodplain will be addressed; and 2) it has the potential to convert problem areas into community assets, with accompanying environmental benefits. Acquisition is more cost effective than relocation in those areas that are subject to storm surges, ice jams, or flash flooding. Acquisition, followed by demolition, is the most appropriate strategy for those buildings that are simply too expensive to move, as well as for dilapidated structures that are not worth saving or protecting. Acquisition and subsequent relocation can be expensive, however, there are government grants and loans that can be applied toward such efforts.
3. **Building Elevation** - Elevating a building above the base flood elevation is the best on-site protection strategy. The building could be raised to allow water to run underneath it, or fill could be brought in to elevate the site on which the building sits. This approach is cheaper than relocation, and tends to be less disruptive to a neighborhood. Elevation is required by law for new and substantially improved residences in a floodplain, and is commonly practiced in flood hazard areas nationwide.
4. **Floodproofing** - If a building cannot be relocated or elevated, it may be floodproofed. This approach works well in areas of low flood threat. Floodproofing can be accomplished through barriers to flooding, or by treatment to the structure itself.
 - a. **Barriers:** Levees, floodwalls and berms can keep floodwaters from reaching a building. These are useful, however, only in areas subject to shallow flooding.

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- b. **Dry Floodproofing:** This method seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such as doors, windows, etc. are closed either permanently with removable shields or with sandbags.
 - c. **Wet Floodproofing:** This technique is usually considered a last resort measure, since water is intentionally allowed into the building in order to minimize pressure on the structure. Approaches range from moving valuable items to higher floors to rebuilding the floodable area. An advantage over other approaches is that simply by moving household goods out of the range of floodwaters, thousands of dollars can be saved in damages.
5. **Sewer Backup Protection** - Storm water overloads can cause backup into basements through sanitary sewer lines. Houses that have any kind of connection to a sanitary sewer system - whether it is downspouts, footing drain tile, and/or sump pumps, can be flooded during a heavy rain event. To prevent this, there should be no such connections to the system, and all rain and ground water should be directed onto the ground, away from the building. Other protections include:
- a. Floor drain plugs and floor drain standpipe, which keep water from flowing out of the lowest opening in the house.
 - b. Overhead sewer - keeps water in the sewer line during a backup.
 - c. Backup valve - allows sewage to flow out while preventing backups from flowing into the house.
6. **Insurance** - Above and beyond standard homeowner insurance, there is other coverage a homeowner can purchase to protect against flood hazard. Two of the most common are National Flood Insurance and basement backup insurance.
- a. **National Flood Insurance:** When a community participates in the National Flood Insurance Program, any local insurance agent is able to sell separate flood insurance policies under rules and rates set by FEMA. Rates do not change after claims are paid because they are set on a national basis.
 - b. **Basement Backup Insurance:** National Flood Insurance offers an additional deductible for seepage and sewer backup, provided there is a general condition of flooding in the area that was the proximate cause of the basement getting wet. Most exclude damage from surface flooding that would be covered by the NFIP.

C. Natural Resource Protection

Preserving or restoring natural areas or the natural functions of floodplain and watershed areas provide the benefits of eliminating or minimizing losses from floods, as well as improving water quality and wildlife habitats. Parks, recreation, or conservation agencies usually implement such activities. Protection can also be provided through various zoning measures that are specifically designed to protect natural resources.

1. **Wetlands Protection** - Wetlands are capable of storing large amounts of floodwaters, slowing and reducing downstream flows, and filtering the water. Any development that is proposed in a wetland is regulated by either federal and/or state agencies. Depending on the location, the project might fall under the jurisdiction of the U.S. Army Corps of Engineers, which in turn, calls upon several other agencies to review the proposal. In New Hampshire, the N.H. Wetlands Board must approve any project that impacts a wetland. Many communities in New Hampshire also have local wetland ordinances.

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Generally, the goal is to protect wetlands by preventing development that would adversely affect them. Mitigation techniques are often employed, which might consist of creating a wetland on another site to replace what would be lost through the development. This is not an ideal practice since it takes many years for a new wetland to achieve the same level of quality as an existing one, if it can at all.

2. **Erosion and Sedimentation Control** - Controlling erosion and sediment runoff during construction and on farmland is important, since eroding soil will typically end up in downstream waterways. Because sediment tends to settle where the water flow is slower, it will gradually fill in channels and lakes, reducing their ability to carry or store floodwaters.
3. **Best Management Practices** - Best Management Practices (BMPs) are measures that reduce non-point source pollutants that enter waterways. Non-point source pollutants are carried by storm water to waterways, and include such things as lawn fertilizers, pesticides, farm chemicals, and oils from street surfaces and industrial sites. BMPs can be incorporated into many aspects of new developments and ongoing land use practices. In New Hampshire, the Department of Environmental Services has developed Best Management Practices for a range of activities, from farming to earth excavations.

D. Emergency Services

Emergency services protect people during and after a flood. Many communities in New Hampshire have emergency management programs in place, administered by an emergency management director (very often the local police or fire chief).

1. **Flood Warning** - On large rivers, the National Weather Service handles early recognition. Communities on smaller rivers must develop their own warning systems. Warnings may be disseminated in a variety of ways, such as sirens, radio, television, mobile public address systems, or door-to-door contact. It seems that multiple or redundant systems are the most effective, giving people more than one opportunity to be warned.
2. **Flood Response** - Flood response refers to actions that are designed to prevent or reduce damage or injury, once a flood threat is recognized. Such actions and the appropriate parties include:
 - a. Activating the emergency operations center (emergency director)
 - b. Sandbagging designated areas (Highway Department)
 - c. Closing streets and bridges (police department)
 - d. Shutting off power to threatened areas (public service)
 - e. Releasing children from school (school district)
 - f. Ordering an evacuation (Board of Selectmen/emergency director)
 - g. Opening evacuation shelters (churches, schools, Red Cross, municipal facilities)

These actions should be part of a flood response plan, which should be developed in coordination with the persons and agencies that share the responsibilities. Drills and exercises should be conducted so that the key participants know what they are supposed to do.

3. **Critical Facilities Protection** - Protecting critical facilities is vital, since expending efforts on these facilities can draw workers and resources away from protecting other parts of town. Critical facilities fall into two categories:

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a. **Buildings or locations vital to the flood response effort:**

- i. Emergency operations centers
- ii. Police and fire stations
- iii. Highway garages
- iv. Selected roads and bridges
- v. Evacuation routes

b. **Buildings or locations that, if flooded, would create disasters:**

- i. Hazardous materials facilities
- ii. Schools

All such facilities should have their own flood response plan that is coordinated with the community's plan. Schools will typically be required by the state to have emergency response plans in place.

4. **Health and Safety Maintenance** - The flood response plan should identify appropriate measures to prevent danger to health and safety. Such measures include:

- a. Patrolling evacuated areas to prevent looting
- b. Vaccinating residents for tetanus
- c. Clearing streets
- d. Cleaning up debris

The Plan should also identify which agencies will be responsible for carrying out the identified measures. A public information program can be helpful to educate residents on the benefits of taking health and safety precautions.

E. Structural Projects

Structural projects are used to prevent floodwaters from reaching properties. These are all man-made structures, and can be grouped into the six types discussed below. The shortcomings of structural approaches are that these approaches:

- Can be very expensive
- Disturb the land, disrupt natural water flows, & destroy natural habitats.
- Are built to an anticipated flood event, and may be exceeded by a greater-than expected flood
- Can create a false sense of security.

1. **Diversions** - A diversion is simply a new channel that sends floodwater to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During flood flows, the stream spills over the diversion channel or tunnel, which carries the excess water to the receiving lake or river. Diversions are limited by topography; they won't work everywhere. Unless the receiving water body is relatively close to the flood prone stream and the land in between is low and vacant, the cost of creating a diversion can be prohibitive. Where topography and land use are not favorable, a more expensive tunnel is needed. In either case, care must be taken to ensure that the diversion does not create a flooding problem somewhere else.

2. **Levees/Floodwalls** - Probably the best known structural flood control measure is either a levee (a barrier of earth) or a floodwall made of steel or concrete erected between the watercourse and the land. If space is a consideration, floodwalls are typically used, since levees need more space. Levees

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and floodwalls should be set back out of the floodway, so that they will not divert floodwater onto other properties.

3. **Reservoirs** - Reservoirs control flooding by holding water behind dams or in storage basins. After a flood peaks, water is released or pumped out slowly at a rate the river downstream can handle. Reservoirs are suitable for protecting existing development, and they may be the only flood control measure that can protect development close to a watercourse. They are most efficient in deeper valleys or on smaller rivers where there is less water to store. Reservoirs might consist of man-made holes dug to hold the approximate amount of floodwaters, or even abandoned quarries. As with other structural projects, reservoirs:
 - a. are expensive
 - b. occupy a lot of land
 - c. require periodic maintenance
 - d. may fail to prevent damage from floods that exceed their design levels
 - e. may eliminate the natural and beneficial functions of the floodplain.
4. **Channel Modifications** - Channel modifications include making a channel wider, deeper, smoother, or straighter. These techniques will result in more water being carried away, but, as with other techniques mentioned, it is important to ensure that the modifications do not create or increase a flooding problem downstream.
5. **Dredging:** Dredging is often cost-prohibitive because the dredged material must be disposed of in another location; the stream will usually fill back in with sediment. Dredging is usually undertaken only on larger rivers, and then only to maintain a navigation channel.
6. **Drainage Modifications:** These include man-made ditches and storm sewers that help drain areas where the surface drainage system is inadequate or where underground drainage ways may be safer or more attractive. These approaches are usually designed to carry the runoff from smaller, more frequent storms.
7. **Storm Sewers** - Mitigation techniques for storm sewers include installing new sewers, enlarging small pipes, street improvements, and preventing back flow. Because drainage ditches and storm sewers convey water faster to other locations, improvements are only recommended for small local problems where the receiving body of water can absorb the increased flows without increased flooding. In many developments, streets are used as part of the drainage system, to carry or hold water from larger, less frequent storms. The streets collect runoff and convey it to a receiving sewer, ditch, or stream. Allowing water to stand in the streets and then draining it slowly can be a more effective and less expensive measure than enlarging sewers and ditches.

F. Public Information

Public information activities are intended to advise property owners, potential property owners, and visitors about the particular hazards associated with a property, ways to protect people and property from these hazards, and the natural and beneficial functions of a floodplain.

1. **Map Information** - Flood maps developed by FEMA outline the boundaries of the flood hazard areas. These maps can be used by anyone interested in a particular property to determine if it is flood-prone. These maps are available from FEMA, the NH Homeland Security and Emergency

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Management (HSEM), the NH Office of Energy and Planning (OEP), or your regional planning commission.

2. **Outreach Projects** - Outreach projects are proactive; they give the public information even if they have not asked for it. Outreach projects are designed to encourage people to seek out more information and take steps to protect themselves and their properties. Examples of outreach activities include:
 - a. Presentations at meetings of neighborhood groups
 - b. Mass mailings or newsletters to all residents
 - c. Notices directed to floodplain residents
 - d. Displays in public buildings, malls, etc.
 - e. Newspaper articles and special sections
 - f. Radio and TV news releases and interview shows
 - g. A local flood proofing video for cable TV programs and to loan to organizations
 - h. A detailed property owner handbook tailored for local conditions. Research has shown that outreach programs work, although awareness is not enough. People need to know what they can do about the hazards, so projects should include information on protection measures. Research also shows that locally designed and run programs are much more effective than national advertising.
3. **Real Estate Disclosure** - Disclosure of information regarding flood-prone properties is important if potential buyers are to be in a position to mitigate damage. Federally regulated lending institutions are required to advise applicants that a property is in the floodplain. However, this requirement needs to be met only five days prior to closing, and by that time, the applicant is typically committed to the purchase. State laws and local real estate practice can help by making this information available to prospective buyers early in the process.
4. **Library** - Your local library can serve as a repository for pertinent information on flooding and flood protection. Some libraries also maintain their own public information campaigns, augmenting the activities of the various governmental agencies involved in flood mitigation.
5. **Technical Assistance** - Certain types of technical assistance are available from the NFIP Coordinator, FEMA, and the Natural Resources Conservation District. Community officials can also set up a service delivery program to provide one-on-one sessions with property owners.

An example of technical assistance is the *flood audit*, in which a specialist visits a property. Following the visit, the owner is provided with a written report detailing the past and potential flood depths and recommending alternative protection measures.

6. **Environmental Education** - Education can be a great mitigating tool if people can learn what not to do before damage occurs. The sooner the education begins the better. Environmental education programs for children can be taught in the schools, park and recreation departments, conservation associations, or youth organizations. An activity can be as involved as course curriculum development or as simple as an explanatory sign near a river.

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Education programs do not have to be limited to children. Adults can benefit from knowledge of flooding and mitigation measures; decision makers, armed with this knowledge, can make a difference in their communities.

II. EARTHQUAKES

A. Preventive

1. Planning/zoning to keep critical facilities away from fault lines
2. Planning, zoning and building codes to avoid areas below steep slopes or soils subject to liquefaction
3. Building codes to prohibit loose masonry overhangs, etc.

B. Property Protection

1. Acquire and clear hazard areas
2. Retrofitting to add braces, remove overhangs
3. Apply Mylar to windows and glass surfaces to protect from shattering glass
4. Tie down major appliances, provide flexible utility connections
5. Earthquake insurance riders

C. Emergency Services

1. Earthquake response plans to account for secondary problems, such as fires and hazardous material spills

D. Structural Projects

1. Slope stabilization

III. DAM FAILURE

A. Preventive

1. Dam failure inundation maps
2. Planning/zoning/open space preservation to keep area clear
3. Building codes with flood elevation based on dam failure
4. Dam safety inspections
5. Draining the reservoir when conditions appear unsafe

B. Property Protection

1. Acquisition of buildings in the path of a dam breach flood
2. Flood insurance

C. Emergency Services

1. Dam condition monitoring

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2. Warning and evacuation plans based on dam failure

D. Structural Projects

1. Dam improvements, spillway enlargements
2. Remove unsafe dams

IV. WILDFIRES

A. Preventive

1. Zoning districts to reflect fire risk zones
2. Planning and zoning to restrict development in areas near fire protection and water resources
3. Requiring new subdivisions to space buildings, provide firebreaks, on-site water storage, wide roads, multiple accesses
4. Building code standards for roof materials and spark arrestors
5. Maintenance programs to clear dead and dry brush, trees
6. Regulation on open fires

B. Property Protection

1. Retrofitting of roofs and adding spark arrestors
2. Landscaping to keep bushes and trees away from structures
3. Insurance rates based on distance from fire protection

C. Natural Resource Protection

1. Prohibit development in high-risk areas

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D. Emergency Services

1. Fire Fighting

V. WINTER STORMS

A. Prevention

1. Building code standards for light frame construction, especially for wind-resistant roofs

B. Property Protection

1. Storm shutters and windows
2. Hurricane straps on roofs and overhangs
3. Seal outside and inside of storm windows and check seals in spring and fall
4. Family and/or company severe weather action plan & drills:
 - a. include a NOAA Weather Radio
 - b. designate a shelter area or location
 - c. keep a disaster supply kit, including stored food and water
 - d. keep snow removal equipment in good repair; have extra shovels, sand, rock, salt and gas
 - e. know how to turn off water, gas, and electricity at home or work

C. Natural Resource Protection

1. Maintenance program for trimming trees and shrubs

D. Emergency Services

1. Early warning systems/NOAA Weather Radio
2. Evacuation plans

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Appendix D: List of Contracts

NH Homeland Security & Emergency Management

Hazard Mitigation Section271-2231

Federal Emergency Management Agency (Boston)..... 877-336-2734

NH Regional Planning Commissions:

Central NH Regional Planning Commission226-6020

Lakes Region Planning Commission.....279-8171

Nashua Regional Planning Commission.....424-2240

North Country Council RPC.....444-6303

Rockingham Planning Commission.....778-0885

Southern New Hampshire Planning Commission.....669-4664

Southwest Region Planning Commission.....357-0557

Strafford Regional Planning Commission742-2523

Upper Valley Lake Sunapee RPC448-1680

NH Executive Department:

New Hampshire Office Energy & Planning271-2155

NH Department of Cultural Affairs.....271-2540

Division of Historical Resources271-3483

NH Department of Environmental Services.....271-3503

Air Resources271-1370

Waste Management271-2900

Water Resources.....271-3406

Water Supply and Pollution Control.....271-3434

Rivers Management and Protection Program.....271-8801

Bureau of Dams.....271-3503

NH Fish and Game Department271-3421

NH DRED.....271-2411

Natural Heritage Inventory271-3623

Division of Forests and Lands271-2214

Division of Parks and Recreation271-3556

NH Department of Transportation271-3734

US Department of Commerce:

National Oceanic and Atmospheric Administration:

National Weather Service; Gray, Maine..... 207-688-3216

US Department of Interior:

US Fish and Wildlife Service.....223-2541

US Geological Survey.....225-4681

US Department of Agriculture:

Natural Resource Conservation Service.....868-7581

New Hampshire State Police846-3333

Additional Websites of Interest

Natural Hazards
Research Center, U. of Colorado
<http://www.colorado.edu/hazards/>

National Emergency Management
Association
<http://nemaweb.org>

NASA-Earth Observatory
http://earthobservatory.nasa.gov/NaturalHazards/category.php?cat_id=12

NASA Natural Disaster Reference
Reference of worldwide natural disasters
<http://gcmd.nasa.gov/records/NASA-NDRD.html>

National Weather Service
Weather Warnings, 60 Second Updates
<http://nws.noaa.gov>

FEMA, National Flood Insurance
Program, Community Status Books
<http://fema.gov/business/nfip/>

Florida State & NWS University Atlantic
Hurricane Site
<http://www.met.fsu.edu/orgs/explores/>

National Lightning Safety Institute
List of Lightning Safety Publications
<http://lightningsafety.com>

NASA Optical Transient Detector
Space-based sensor of lightning strikes
<http://www.gr.ssr.upm.es/~jambrina/rayos/thunder.msfc.nasa.gov/otd.html>

LLNL Geologic & Atmospheric Hazards
General Hazard Information
<https://www.llnl.gov/>

The Tornado Project Online
Recent tornado information & details
<http://www.tornadoproject.com/>

National Severe Storms Laboratory
Information & tracking of severe storms
<Http://www.nssl.noaa.gov/>
USDA Forest Service

Forest Fire & Land Management
Information
<http://www.fs.fed.us/fire>

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Appendix E: Technical and Financial Assistance for Multi-Hazard Mitigation

This section discusses the authorization and appropriation of funding for each of the HMA programs. Together, these programs provide significant opportunities to reduce or eliminate potential losses to State, territories, federally-recognized tribes, and local assets through hazard mitigation planning and project grant funding. Each HMA program was authorized by separate legislative action, and as such, each program differs slightly in scope and intent. More information about each of the HMA programs can be found on the FEMA HMA website at <https://www.fema.gov/hazard-mitigation-assistance>.

A. Hazard Mitigation Grant Program (HMGP)

HMGP is authorized by Section 404 of the Stafford Act, 42 U.S.C. 5170c. The key purpose of HMGP is to ensure that the opportunity to take critical mitigation measures to reduce the risk of loss of life and property from future disasters is not lost during the reconstruction process following a disaster.

HMGP funding is available, when authorized under a Presidential major disaster declaration, in the areas of the State requested by the Governor. Federally-recognized tribes may also submit a request for a Presidential major disaster declaration within their impacted areas (see <http://www.fema.gov/media-library/assets/documents/85146>). The amount of HMGP funding available to the Applicant is based on the estimated total Federal assistance, subject to the sliding scale formula outlined in Title 44 of the Code of Federal Regulations (CFR) Section 206.432(b) that FEMA provides for disaster recovery under Presidential major disaster declarations. The formula provides for up to 15 percent of the first \$2 billion of estimated aggregate amounts of disaster assistance, up to 10 percent for amounts between \$2 billion and \$10 billion, and up to 7.5 percent for amounts between \$10 billion and \$35.333 billion. For States with enhanced plans, the eligible assistance is up to 20 percent for estimated aggregate amounts of disaster assistance not to exceed \$35.333 billion.

The Period of Performance (POP) for HMGP begins with the opening of the application period and ends no later than 36 months from the close of the application period.

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

B. Pre-Disaster Mitigation

PDM is authorized by the Stafford Act, 42 U.S.C. 5133. PDM is designed to assist States, territories, federally-recognized tribes, and local communities to implement a sustained predisaster natural hazard mitigation program to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. Congressional appropriations provide the funding for PDM. Part I. The total amount of funds distributed for PDM is determined once the appropriation is provided for a given fiscal year. It can be used for mitigation projects and planning activities.

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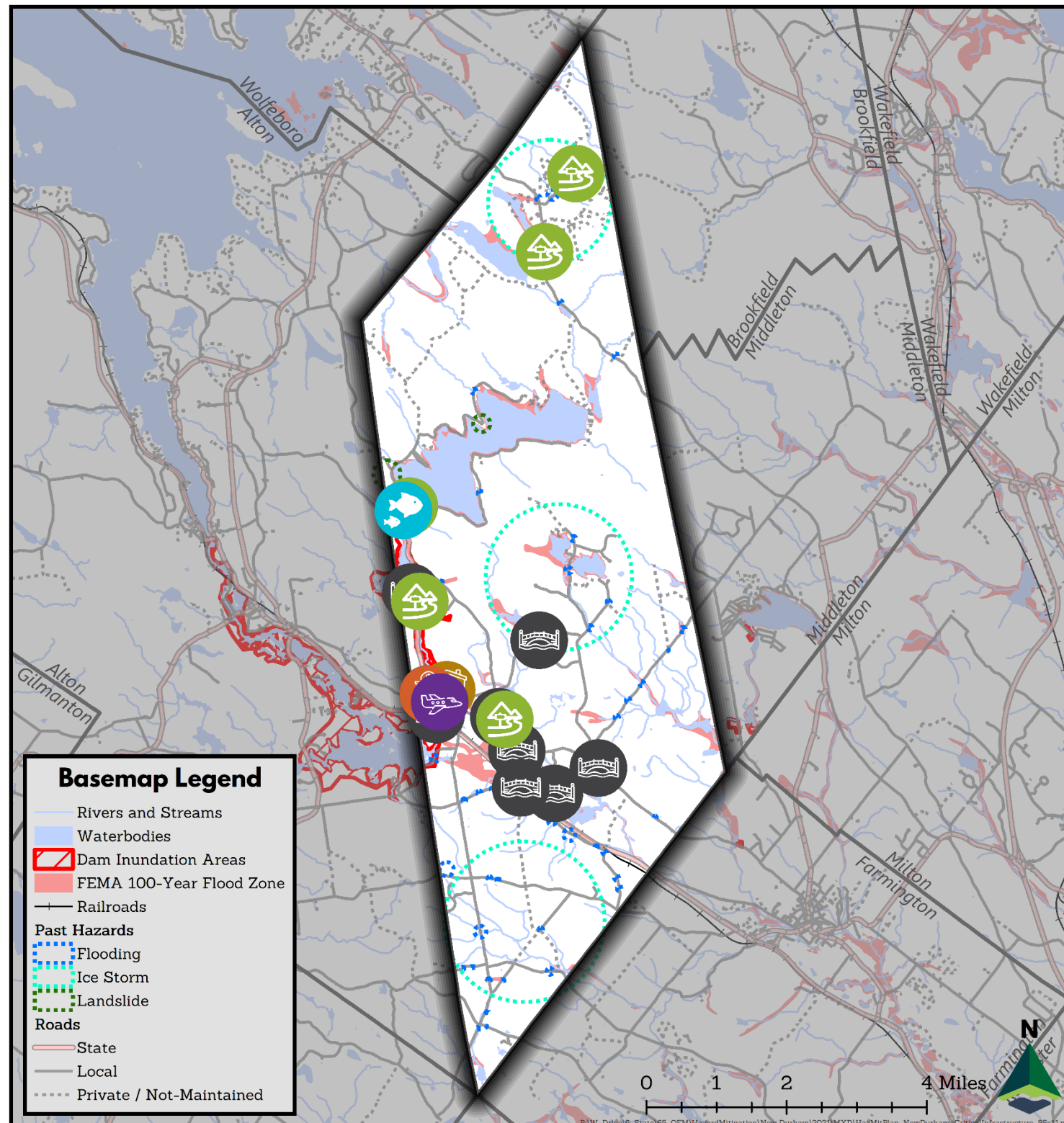
The POP for PDM begins with the opening of the application period and ends no later than 36 months from the date of subapplication selection.

C. Flood Mitigation Assistance

FMA is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended (NFIA), 42 U.S.C. 4104c, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994. The Biggert-Waters Flood Insurance Reform Act of 2012 (Public Law 112-141) consolidated the Repetitive Flood Claims and Severe Repetitive Loss grant programs into FMA. FMA funding is available through the National Flood Insurance Fund (NFIF) for flood hazard mitigation projects as well as plan development and is appropriated by Congress. States, territories, and federally-recognized tribes are eligible to apply for FMA funds. Local governments are considered subapplicants and must apply to their Applicant State, territory, or federally-recognized tribe. The POP for FMA begins with the opening of the application period and ends no later than 36 months from the date of subapplication selection.

For more information on FEMA's Hazard Mitigation Assistance (HMA) grant programs please visit: https://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf

Appendix F: Map



Critical Infrastructure & Past and Potential Hazards
 Hazard Mitigation Plan (2021)
 New Durham, NH

Critical Infrastructure Legend

- Airport
- Auxiliary Fire Aid
- Bridge
- Fish Hatchery
- Manufactured Housing
- Recreation
- Telephone Facility

- Basemap Legend**
- Rivers and Streams
 - Waterbodies
 - Dam Inundation Areas
 - FEMA 100-Year Flood Zone
 - Railroads
 - Past Hazards**
 - Flooding
 - Ice Storm
 - Landslide
 - Roads**
 - State
 - Local
 - Private / Not-Maintained

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Base data layers generally from ESRI, NH GRANIT, NHDOT, MEGIS, USGS, and the Town of New Durham. These agencies and organizations have derived this data using a variety of cited source materials, at different time frames, through different methodologies, with varying levels of accuracy. As such, errors are often inherent in GIS data and should be used for planning purposes only. The presented data is sometimes only a subset of the original data. Please visit the original location of the data, contact the original host source, or contact SRPC for information on the full data set.