TOWN OF ATKINSON, NH
HAZARD MITIGATION PLAN UPDATE 2013

Approved by the

ATKINSON, NH BOARD OF SELECTMEN

And adopted as an official appendix to the
Atkinson, NH Emergency Operations Plan

_____, 2013

ROCKINGHAM
PLANNING
COMMISSION

This project was partially funded by

NEW HAMPSHIRE HOMELAND SECURITY AND EMERGENCY MANAGEMENT

CERTIFICATE OF ADOPTION

Town of Atkinson, New Hampshire
Board of Selectmen
A Resolution Adopting the Atkinson Hazard Mitigation Plan Update
_____, 2013

WHEREAS, the Town of Atkinson received funding from the NH Office of Homeland Security and Emergency Management under a Pre-Disaster Mitigation Grant and assistance from Rockingham Planning Commission in the preparation of the Atkinson Hazard Mitigation Plan; and

WHEREAS, several public planning meetings were held between March, 2013 and June, 2013 regarding the development and review of the Atkinson Hazard Mitigation Plan Update; and

WHEREAS, the Atkinson Hazard Mitigation Plan Update contains several potential future projects to mitigate hazard damage in the Town of Atkinson; and

WHEREAS, a duly-noticed public hearing was held by the Atkinson Board of Selectmen on _____, 2013 to formally approve and adopt the Atkinson Hazard Mitigation Plan Update.

NOW, THEREFORE BE IT RESOLVED that the Atkinson Board of Selectmen adopts the Atkinson Hazard Mitigation Plan Update.

ADOPTED AND SIGNED this ____ day of _____, 2013.

_____

Atkinson Board of Selectmen Chair

_____

ATTEST

_____ _____

Public Notary

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EXECUTIVE SUMMARY

The Atkinson Hazard Mitigation Plan (herein after, the *Plan*) was compiled to assist the Town of Atkinson in reducing and mitigating future losses from natural hazard events. The *Plan* was developed by the Rockingham Planning Commission and participants from the Town of Atkinson and contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.

The following hazards are addressed:

- Flooding
- Hurricane
- Tornado
- Severe Winter Weather
- Wildfire
- Earthquake

The Critical Facilities include but are not limited to:

- Fire Station
- Town Hall
- Police Station
- Community Center
- Atkinson Academy

The *Plan* is considered a work in progress and should be revisited frequently to assess whether the existing and suggested mitigation strategies are successful. Copies have been distributed to the Town of Atkinson, and a copy will remain on file at the Rockingham Planning Commission. A copy of this Plan will be on file at New Hampshire Homeland Security and Emergency Management (NHHSEM) and the Federal Emergency Management Agency (FEMA). Upon approval by both agencies the town shall adopt the plan update.

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CHAPTER 1 – INTRODUCTION

BACKGROUND

The New Hampshire Homeland Security Emergency Management (NHHSEM) has a goal for all communities within the State of New Hampshire to establish local hazard mitigation plans as a means to reduce and mitigate future losses from natural hazard events. The NHHSEM outlined a process whereby communities throughout the State may be eligible for grants and other assistance upon completion of a local hazard mitigation plan. A handbook entitled *Hazard Mitigation Planning for New Hampshire Communities* was created by NH HSEM to assist communities in developing local plans. The State's Regional Planning Commissions are charged with providing assistance to selected communities to develop local plans.

The *Atkinson Hazard Mitigation Plan* was prepared by participants from the Town of Atkinson Hazard Mitigation Team with the assistance and professional services of the Rockingham Planning Commission (RPC) under contract with the New Hampshire Homeland Security and Emergency Management (NHHSEM) operating under the guidance of Section 206.405 of 44 *CFR* Chapter 1 (10-1-97 Edition). The *Atkinson Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Atkinson in its efforts to identify and mitigate the future impacts of natural and/or man-made hazard events. Upon adoption of the *Plan* by the Atkinson Board of Selectmen and approval by the Atkinson Planning Board, it will become an official appendix to the Atkinson Master Plan.

METHODOLOGY

On September 26, 2012, the Rockingham Planning Commission (RPC) organized the first meeting with emergency management officials from the Town of Atkinson to begin the initial planning stages of the *Plan.* RPC and participants from the Town developed the content of the *Plan* using the ten-step process set forth in the *Hazard Mitigation Planning for New Hampshire Communities* during the initial meeting and subsequent meetings held on 3/14/13, 4/9/13, 5/21/13, and 6/20/13. The following is a summary of the ten-step process conducted to compile the *Plan.*

Step 1 – Form Committee

As stated above, prior to the first meeting, RPC contacted and met with the EMD of Atkinson on September 26, 2012, to review the hazard mitigation planning process. Members of the community were invited to join the Atkinson Hazard Mitigation Committee including a representative from the Police Department, the Fire Chief, a Planning Board member, the Highway Department, the local school district, neighboring towns and others. A formal invite letter was sent to personnel as designated by the towns EMD and per NH RSA 91-A public notices were posted on the Town website and two other public viewing sites including the Town Offices to inform residents about the planning process, to participate, and allow the possibility to be a member of the planning process. The initial meeting was held on March 14, 2013, to introduce the Mitigation Planning Process with possible committee members and to set up future meeting times. Although participation was sought from other agencies, neighboring towns and the public (no public comment was provided), only the participating members mentioned on page 6 participated in this plan update.

Step 2 – Map the Hazards

Participants in the *Committee* identified areas where damage from historic natural disasters have occurred and areas where critical man-made facilities and other features may be at risk in the future for loss of life, property damage, environmental pollution and other risk factors. RPC generated a set of base maps with GIS (Geographic Information Systems) that were used in the process of identifying past and future hazards.

Step 3 – Identify Critical Facilities and Areas of Concern

Participants in the Committee then identified facilities and areas that were considered to be important to the Town for emergency management purposes, for provision of utilities and community services, evacuation routes, and for recreational and social value. Using aerial photography, RPC plotted the exact location of these sites on a map. Digital images were collected for each Critical Facility using Pictometry™ software and images of the Town of Atkinson.

Step 4 – Identify Existing Mitigation Strategies

After collecting detailed information on each critical facility in Atkinson, the Committee and RPC staff identified existing town mitigation strategies relative to flooding, wind, fire, ice and snow events and earthquakes. This process involved reviewing the 2006 Hazard Mitigation Plan, the Town's Master Plan, Capital Improvements Program (CIP), Zoning Ordinance, Subdivision Regulations, Site Plan Review Regulations, and participation in the National Flood Insurance Program (NFIP). This allowed the committee to identify portions of the Town's existing mitigation strategies. The Committee could review how natural hazards were examined in other town documents, which allowed the committee to review how prepared the town was for Natural Disasters.

Step 5 – Identify the Gaps in Existing Mitigation Strategies

The existing strategies were then reviewed by the RPC and the Committee for coverage and effectiveness, as well as the need for improvement.

Step 6 – Identify Potential Mitigation Strategies

A list was developed of additional hazard mitigation actions and strategies for the Town of Atkinson. The existing Hazard Mitigation Plans of Plaistow, Exeter and Hampstead were utilized to identify new mitigation strategies as well as FEMA recommended hazard mitigation examples. The Master Plan, Emergency Operation Plan, and Capital Improvements Plan were also reviewed to generate ideas.

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Step 7 – Prioritize and Develop the Action Plan

The proposed hazard mitigation actions and strategies were reviewed and each strategy was rated (good, average, or poor) for its effectiveness according to several factors (*e.g.*, technical and administrative applicability, political and social acceptability, legal authority, environmental impact, financial feasibility). Each factor was then scored and all scores were totaled for each strategy. Strategies were ranked by overall score for preliminary prioritization then reviewed again under Step 8.

Step 8 - Determine Priorities

The preliminary prioritization list was reviewed in order to make changes and determine a final prioritization for new hazard mitigation actions and existing protection strategy improvements identified in previous steps. RPC also presented recommendations to be reviewed and prioritized by emergency management officials.

Step 9 - Develop Implementation Strategy

Using the chart provided under Step 9 in the handbook, an implementation strategy was created which included person(s) responsible for implementation (who), a timeline for completion (when), and a funding source and/or technical assistance source (how) for each identified hazard mitigation actions.

Step 10 - Adopt and Monitor the *Plan*

RPC staff compiled the results of Steps 1 to 9 in a draft document. This draft *Plan* was reviewed by members of the Committee and by staff members at the RPC. The draft *Plan* was also placed on the Town and RPC website for review by the public, neighboring communities, agencies, businesses, and other interested parties to review and make comments via email. A duly noticed public meeting was held by the Atkinson Board of Selectmen on _____. The meeting allowed the community and neighboring towns to provide comments and suggestions for the Plan in person, prior to the document being finalized. This review also allowed board and committee members to review other planning documents in town such as the Master Plan and CIP to consider and incorporate pertinent information that may be included within the Hazard Mitigation Plan. After public comment was accepted, the draft was revised to incorporate comments from the Selectmen, Planning Board and general public; then submitted to the NHHSEM and FEMA Region I for their review and comments. Any changes required by NHHSEM and FEMA were made and a revised draft document was then submitted to the Atkinson Board of Selectmen for their final review. A public hearing was then held by the Atkinson Board of Selectmen on _____. At this public hearing the Plan update was approved and adopted by the Board of Selectman.

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HAZARD MITIGATION GOALS AND OBJECTIVES OF THE STATE OF NEW HAMPSHIRE

The *State of New Hampshire Natural Hazards Mitigation Plan*, which was prepared and is maintained by the New Hampshire Bureau of Emergency Management (NH BEM), sets forth the following related to overall hazard mitigation goals and objectives for the State of New Hampshire:

1. To improve upon the protection of Atkinson's general population, the citizens of the State and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on Atkinson, the Region and the State's Critical Support Services.
3. To reduce the potential impact of natural and man-made disasters on Critical Facilities in Atkinson, the Region and the State.
4. To reduce the potential impact of natural and man-made disasters on Atkinson, the Region and the State's infrastructure.
5. To improve Emergency Preparedness.
6. Improve Atkinson, the Region and the States Disaster Response and Recovery Capability.
7. To reduce the potential impact of natural and man-made disasters on private property.
8. To reduce the potential impact of natural and man-made disasters on Atkinson, the Region and the State's economy.
9. To reduce the potential impact of natural and man-made disasters on Atkinson, the Region and the State's natural environment.
10. To reduce Atkinson's, the Regions and the State's liability with respect to natural and man-made hazards generally.
11. To reduce the potential impact of natural and man-made disasters on Atkinson, the Region and the State's specific historic treasures and interests as well as other tangible and intangible characteristics which add to the quality of life of the citizens and guests of the State.
12. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish Atkinson, the Region and the State's Goals and Objectives and to raise the awareness of, and acceptance of, Hazard Mitigation generally.

Through the adoption of this Plan the Town of Atkinson concurs and adopts these goals and objectives.

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ACKNOWLEDGEMENTS

The Town of Atkinson offers thanks to the **New Hampshire Bureau of Emergency Management** (www.nhBEM.state.nh.us), which provided the model and funding for this document.

Name:	Position:
Mike Murphy	Atkinson, EMD and Fire Chief
Pat Caggiano	Atkinson, Police Department
Edward Stewart	Atkinson, Road Agent
Susan Killam	Atkinson, Planning Board Member
Bill Innes	Atkinson, Town Administrator

The Atkinson Board of Selectmen offers thanks to the **NHHSEM** (http://www.nh.gov/safety/divisions/hsem/index.html) which provided the model and funding for this *Plan* update.

In addition, thanks are extended to the staff of the **Rockingham Planning Commission** for professional services, process facilitation and preparation of this document.

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CHAPTER II – COMMUNITY PROFILE

NATURAL FEATURES

Atkinson is a suburban community in southeastern New Hampshire. According to the 2010 census the population in 2010 was 6,751. The town is characterized by rolling hills, winding roads, and a pastoral landscape. Atkinson is approximately 11.2 square miles with 0.2 square miles of surface water. The town has four named ponds that are wholly or partially within the Town boundaries: Island Pond (67 acres of the 498 acre pond are in Atkinson), Hodges Mill Pond (9 acres), Blunts Pond (9 acres), Stewart Farm Pond and Hovey Meadow Pond (18.6 acres).

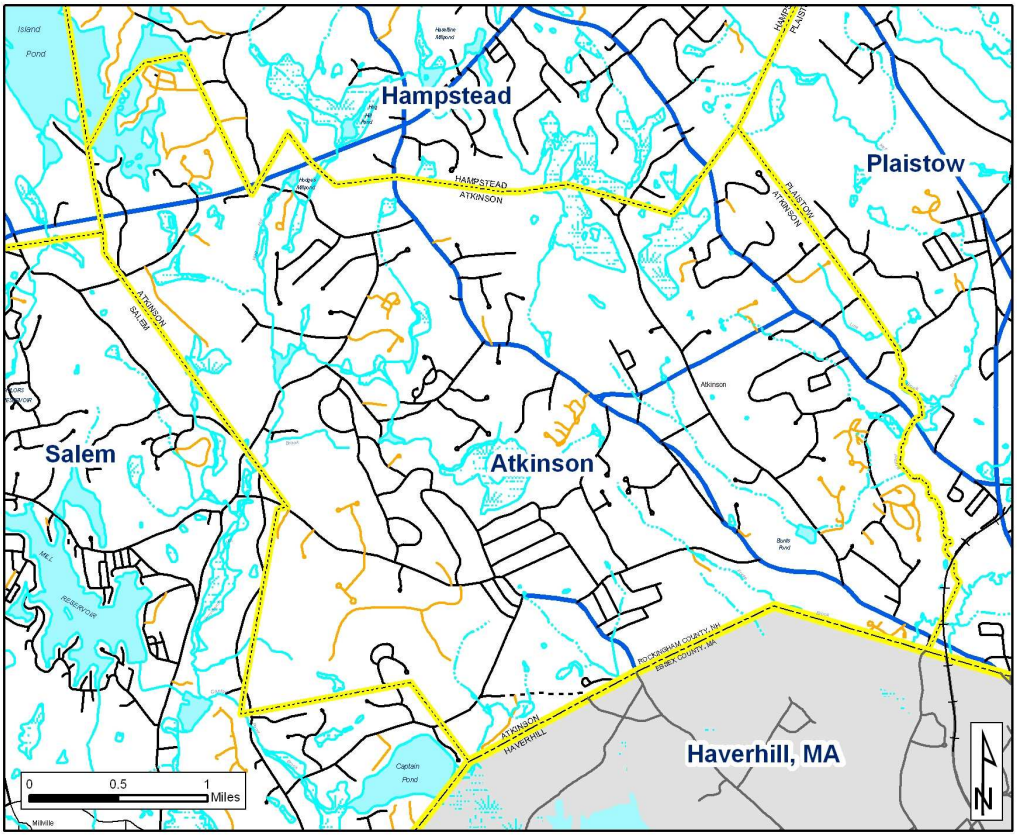


Figure 1: Location Map of Atkinson, New Hampshire

Atkinson is part of two watersheds (HUC, Hydrologic Unit Code 10). These are the Lower Merrimack River and the Spickett River. These watersheds are divided into four sub-watersheds (HUC 12). The Lower Merrimack River watershed contains the Little River and the Lower Merrimack River sub-watersheds (yes it is named the same as the HUC 10 watershed). The Spickett River Watershed is divided into the Lower Spickett River and the Arlington Mill sub-watersheds (see figure 2). Atkinson Wetland soils and Floodplains are shown in figure 3 and 4.

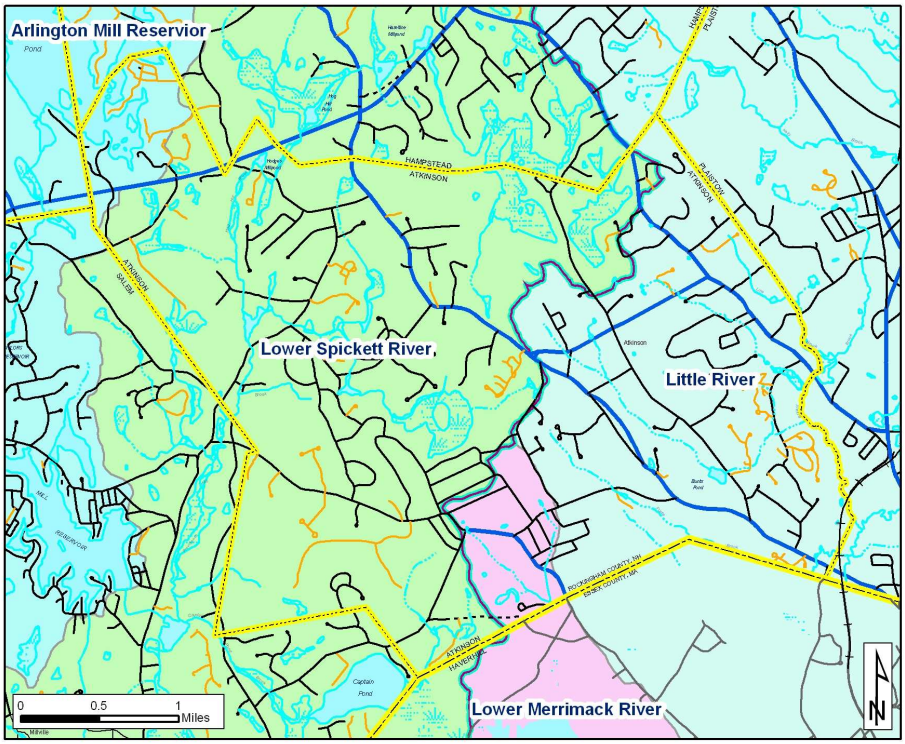


Figure 2: Watershed Map of Atkinson, New Hampshire

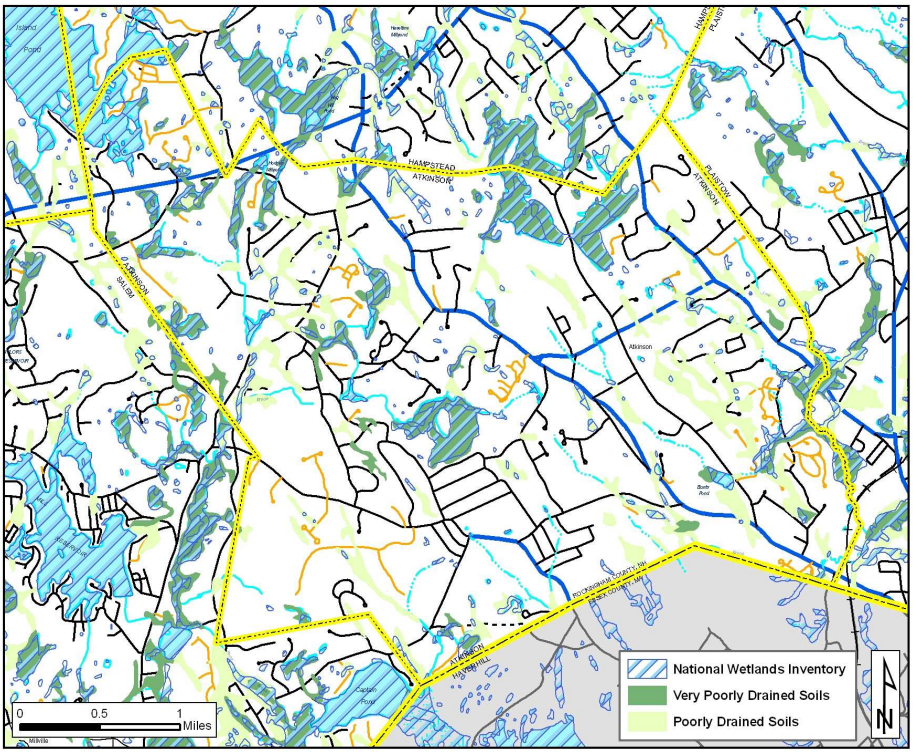


Figure 3: Wetland Map of Atkinson, New Hampshire

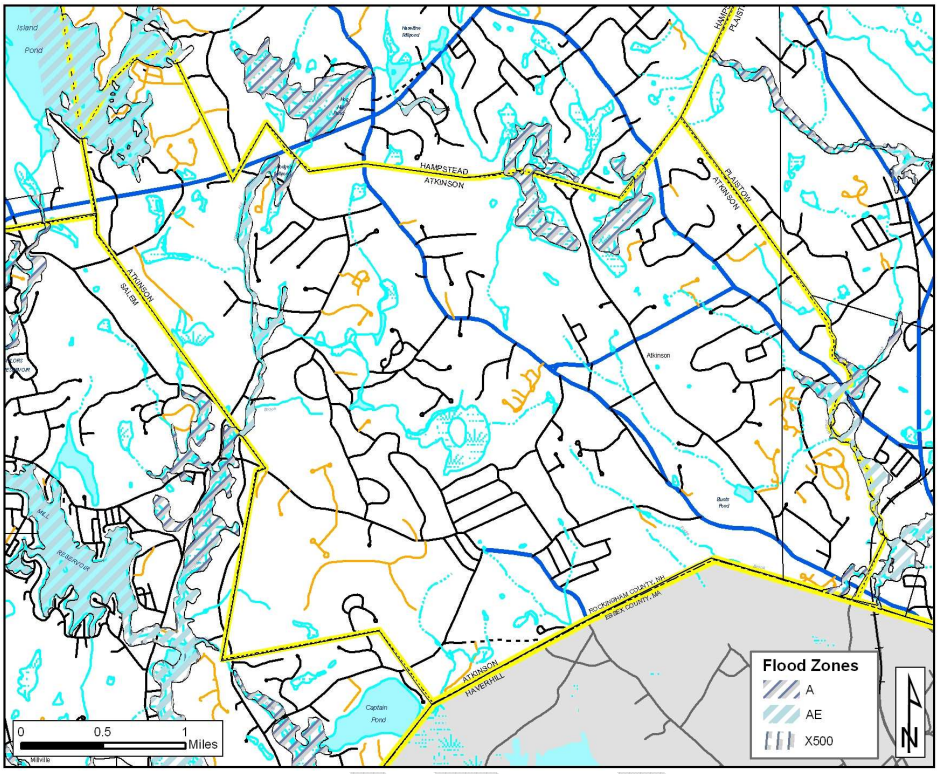


Figure 4: Floodplain Map of Atkinson, New Hampshire

LAND USE AND DEVELOPMENT

A land use map was prepared for this *Plan* using data from GRANIT (The New Hampshire Geographically Referenced Analysis and Information Transfer System). The land use data was created for Rockingham County in 1998 and since was amended in 2010 using 2010 aerial imagery. The data was developed through interpretation of 1:12,000 scale black and white digital orthophoto quadangles from the United States Geologic Survey. For more information on this data layer please visit http://www.granit.unh.edu/ . This data is presented in Map 1: Atkinson Land Use.

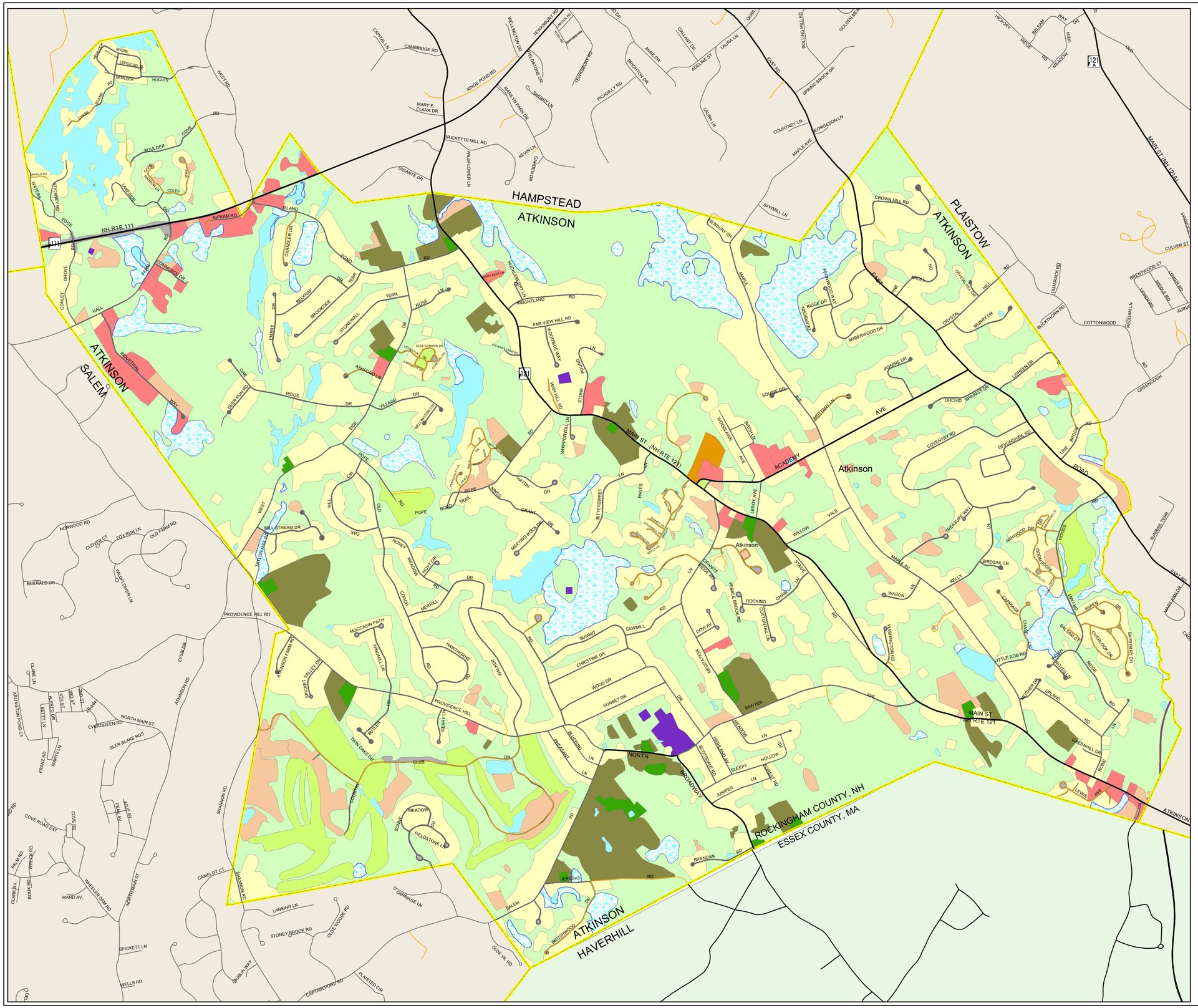
Future development in Atkinson will be primarily small, scattered residential developments and limited commercial and industrial development in areas zoned for such use. However, according to town assessor records over the past 5 years the town has granted 38 residential building permits for new residential dwellings and 3 commercial building permits.

Further, any future development in town should be located away from wetlands and floodplains whenever possible. The filling of wetlands for building construction not only destroys wetlands and their numerous benefits, but may also lead to groundwater contamination. Building within a flood zone may also reduce a floodplain's capacity to absorb and retain water during periods of excessive precipitation and runoff. Moreover, in regard to building within floodplains, contamination may result from flood damage to septic systems.

2010 Land Use Map

Atkinson

New Hampshire



2010 Land Use

- Active Agricultural
- Aux Transportation
- Farmsteads
- Forested
- Industrial/Commercial
- Mixed Urban
- Open Wetlands
- Other/Idle
- Playing fields / Recreation
- Railroad
- Residential
- Transportation
- Utilities
- Water

Roads

- Class I
- Class II
- Class III
- Class IV
- Class V
- Class VI

Political Boundaries

- State Boundary
- Town Boundary
- County Boundary

2010 land use was created from year 2010 1' resolution, natural color aerial photos supplied by NHDOT. This dataset was created through 'heads-up' digitization of the aerial photos at a recommended scale of 1:2,400 (1"=200'). This was an update to the 2005 Land use update completed by the RPC. These datasets along with the 1962, 1974, 1998 land use created by GRANIT use a similar method. The method reflects "NH Land Use Mapping Standard CTAP Land Use Mapping Project" from GRANIT March, 2007. This method closely matches the national standard USGS "Anderson level IV" method. While the digitization is done at Level IV, it is symbolized at the level II, thus giving us consistency across the early GRANIT and later RPC datasets.

0 0.25 0.5 1 Miles

N W E S

GRANIT

ROCKINGHAM PLANNING COMMISSION

CHAPTER III – NATURAL HAZARDS IN THE TOWN OF ATKINSON

WHAT ARE THE HAZARDS?

The first step in planning for natural hazard mitigation is to identify hazards that may affect the Town. Some communities are more susceptible to certain hazards (i.e., flooding near rivers, hurricanes on the seacoast, etc.). The Town of Atkinson is prone to several types of natural hazards. These hazards include: **flooding, hurricanes, tornadoes, severe winter weather, wildfires** and **earthquakes**. Other natural hazards can and do affect the Town of Atkinson, but these were the hazards prioritized by the Committee for mitigation planning. These were the hazards that were considered to occur with regularity and/or were considered to have high damage potential, and are discussed below.

Natural hazards that are included in the State's Hazard Mitigation Plan that are not included in the *Plan* include: drought, extreme heat, landslide, subsidence, radon and avalanche. Subsidence and avalanche are rated by the State as having Low and No risk in Rockingham County, respectively; due to this they were left out of the *Plan*. Atkinson has no record of landslides and little chance of one occurring that could possibly damage property of cause injury; so landslides were not included in this *Plan*. The State's Plan indicates that Rockingham County is at Moderate risk to drought, extreme heat, and radon; these hazards were not included in the *Plan*. When compared natural hazards that could be potentially devastating to the Town (earthquakes or hurricanes) or natural hazards that occur with regularity (flooding or severe winter weather) it was not considered an effective use of the Committee time to include drought, extreme heat, and radon in the *Plan* at this time. Other potential natural Hazards that were considered highly unlikely or only minimally dangerous, and therefore not included in the plan are: Tsunami, Thunder storms, lightning, or hail. When the *Plan* is revised and updated in the future, possible inclusion of these hazards will be reevaluated.

HAZARD DEFINITIONS

Flooding

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

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go. Coastal flooding can be caused by storm surge associated with high wind events hurricanes or from tsunami.

100-year Floodplain Events

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100 year flood does not mean that flood will occur once every 100 years. It is a

statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase "1% annual chance flood". What this means is that there is a 1% chance of a flood of that size happening in any year.

Rapid Snow Pack Melt

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

River Ice Jams

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

Hurricane

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center (see Appendix C). The eye of the storm is usually 20-30 miles wide and may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage. Hurricanes can also include coastal storm surge. Atkinson could be affected by a storm surge from the Great Bay.

Tornadoes

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

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

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

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Severe Winter Weather

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

Heavy Snow Storms

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

Ice Storms

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

Nor'easter

A Nor'easter is a large weather system traveling from South to North passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas form a Northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours (or days) in terms of duration[1].

Wildfire

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

Earthquakes

Geologic events are often associated with California, but New England is considered a moderate risk earthquake zone. An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale[2] and Mercalli scale.

[1] Definition of Nor'easter taken from NH State Natural Hazards Mitigation Plan October 2000 Edition.
[2] A copy of the Richter scale is displayed in Appendix E.

PROFILE OF PAST AND POTENTIAL HAZARDS

As discussed above the natural hazards that were identified for mitigation in this Plan include: flooding, hurricanes-high wind events, severe winter weather, wildfire and earthquakes. Some of the natural hazards could be included under more than one type of hazard. For example a hurricane could be considered a high wind event or a flooding event depending on the storm's consequences.

The hazard profiles below include: a description of the events included as part of the natural hazard, the geographic location of each natural hazard (if applicable), the extent of the natural hazard (e.g. magnitude or severity), probability, past occurrences, and community vulnerability. Past occurrences of natural hazards were mapped if possible (Map 2: Past and Future Hazards). Some of the natural hazards have not occurred within the Town of Atkinson (within written memory), for these hazards the plan refers to a table of hazards that have occurred regionally and statewide (Table 3). Community vulnerability identifies the specific areas, general type of structures, specific structures, or general vulnerability of the Town of Atkinson to each natural hazard.

The **extent** of a hazard will be described as Minimal, Moderate or Severe if there is no other appropriate scale to use or data on the extent is limited. These terms are defined as follows:

Minimal – local residents can handle the hazard event without help from outside sources.

Moderate - county or regional assistance is needed to survive and/or recover.

Severe – state or federal assistance is necessary to survive and/or recover.

Flooding

Description: Flooding events can include hurricanes, 100-year floods, debris-impacted infrastructure, erosion, mudslides, rapid snow pack melt, river ice jams and dam breach and/or failure.

Location: Atkinson is vulnerable to flooding in several locations. Generally, the Town is at risk within the Flood Zones identified by FEMA on Flood Insurance Rate Maps (FIRM). Atkinson has two major flood zones: A and AE. The AE flood zones are areas that have a 1% annual chance of flooding and have a base flood height determined. A zones also have a 1% annual chance of flooding but have no base flood height determined. There are also several locally-identified areas susceptible to flooding that are not within these flood zones, these areas are described below and displayed on Map 2: Past and Future Hazards.

Extent: Flooding in Atkinson as **Minimal** to **Moderate**. Most of the flooding events can be handled by the town but state or federal assistance may be required to recover from the events (i.e. money for damage to infrastructure).

Probability: **HIGH**

Table 1: Probability of Flooding based on return interval

Flood Return Interval	Chance of Occurrence in Any Given Year
10-year	10%
50-year	2%
100-year	1%
500-year	0.2%

Past Occurrence: Flooding is a common hazard for the Town of Atkinson. Several locations were identified as areas of chronic reoccurring flooding or high potential for future flooding. These areas are listed below. Larger flood events are listed in Table3.

Community Vulnerability:

- Structures located in the flood zone
- Culverts
- Basements
- Homes along Island Pond Road especially parcels that are overlaid by a FEMA flood zone
- Dams (9 class AA, 2 class A and 1 class B, see Map 3, Critical Facilities). Beavers also play a role in impounding water ways in town

National Flood Insurance Program (NFIP)

In 1968, Congress created the National Flood Insurance Program (NFIP) in response to the rising cost of taxpayer funded disaster relief for flood victim and the increasing amount of damage caused by floods. The Federal Insurance and Mitigation Administration (FIMA) a component of the Federal Emergency Management Agency (FEMA) manages the NFIP, and oversees the floodplain management and mapping components of the program.

Communities participate in the NFIP by adopting and enforcing floodplain management ordinances to reduce flood damage. In exchange, the NFIP makes federally subsidized flood insurance available to homeowners, renters, and business owners in these communities. Flood insurance, Federal Grants and loans, Federal disaster assistance and federal mortgage insurance is unavailable for the acquisition or construction of structures located in the floodplain shown on the NFIP maps for those communities that do not participate in the program.

To get secure financing to buy, build or improve structures in the Special Flood Hazard areas, it is legally required by federal law to purchase flood insurance. Lending institutions that are federally regulated or federally insured must determine if the structure is located in the SFHA and must provide written notice requiring flood insurance. Flood insurance is available to any property owner located in a community participating in NFIP.

Flood damage is reduced by nearly $1 billion a year through partnerships with communities, the insurance industry, and the lending industry. Further, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance. Additionally, every $3 paid in flood insurance claims saves $1 in disaster assistance payments.

The NFIP is self-supporting for the average historical loss year, which means that operating expenses and flood insurance claims are not paid for by the taxpayer, but through premiums collected for flood insurance policies. The program has borrowing authority from the U.S. Treasury for times when losses are heavy; however, these loans are paid back with interest.

Repetitive Loss Properties

A specific target group of repetitive loss properties is identified and serviced separately from other NFIP policies by the Special Direct Facility (SDF). The target group includes every NFIP insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced four or more paid losses, two paid flood losses within a 10-year period that equal or exceed the current value of the insured property, or three or more paid losses that equal or exceed the current value of the insured property, regardless of any changes of ownership, since the buildings construction or back to 1978. Target group policies are afforded coverage, whether new or renewal, only through the SDF.

The FEMA Regional Office provides information about repetitive loss properties to State and local floodplain management officials. The FEMA Regional Office may also offer property owners building inspection and financial incentives for undertaking measures to mitigate future flood losses. These measures include elevating buildings from the flood area, and in some cases drainage improvement projects. If the property owners agree to mitigation measures, their property may be removed from the target list and would no longer be serviced by the SDF.

Table 2: Atkinson NFIP Policy and Loss Statistics

Policies in force	Insurance in Force	Number of Paid Losses (since 1978)	Total Losses Paid (Since 1978)
2	$ 610,000	0	$0
Source: FEMA Policy and claims database, as of 6/24/13			

Atkinson NFIP Repetitive Flooding Losses

Atkinson joined the Regular Program of the NFIP on 3/3/09. As of 6/24/13, Atkinson has had no repetitive loss residential or commercial properties according to New Hampshire Office of Energy and Planning (NHOEP) records. This is determined by any repetitive damage claims on those properties that hold flood insurance through the NFIP.

Floodplain Management Goals/Reducing Flood Risks

A major objective to floodplain management is to continue participation in the NFIP. Communities that agree to manage Special Flood hazard Areas shown on NFIP maps participate in the NFIP by adopting minimum standards. The minimum requirements are the adoption of the floodplain Ordinances and Subdivision/Site Plan Review requirements for land designated as Special Flood hazard Areas. Under Federal Law, any structure located in the floodplain is required to have flood insurance. Federally subsidized flood insurance is available to any property owner located in a community participating in the NFIP. Communities that fail to comply with the NFIP will be put on probation and/or suspended. Probation is a first warning where all policy holders receive a letter notifying them of a $50 increase in their insurance. In the event of suspension, the policyholders lose their NFIP insurance and are left to purchase insurance in the private sector, which is of significantly higher cost. If a community is having difficulty complying with NFIP policies, FEMA is available to meet with staff and volunteers to work through the difficulties and clear up any confusion before placing the community on probation or suspension.

Potential Administrative Techniques to Minimize Flood Losses in Atkinson

A potential step in mitigating flood damage is participating in NFIP. Atkinson continues to consistently enforce NFIP compliant policies in order to continue its participation in this program and has effectively worked within the provisions of NFIP. Below is a list of actions Atkinson should consider, or continue to perform, in order to comply with NFIP:

- Participate in NFIP training offered by the State and/or FEMA (or in other training) that addresses flood hazard planning and management;
- Establish Mutual Aid Agreements with neighboring communities to address administering the NFIP following a major storm event;
- Address NFIP monitoring and compliance activities;
- Revise/adopt subdivision regulations, erosion control regulations, board of health regulations to improve floodplain management in the community;
- Prepare, distribute or make available NFIP insurance and building codes explanatory pamphlets or booklets;
- Identify and become knowledgeable of non-compliant structures in the community;
- Inspect foundations at time of completion before framing to determine if lowest floor is at or above Base Flood Elevation (BFE), if they are in the floodplain;
- Require the use of elevation certificates;
- Enhance local officials, builders, developers, local citizens and other stakeholders' knowledge of how to read and interpret the FIRM;
- Work with elected officials, the state and FEMA to correct existing compliance issues and prevent any future NFIP compliance issues through continuous communications, training and education.

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Hurricane

Description: As described on page 10.

Location: Hurricane events are more potentially damaging with increasing proximity to the coast. For this *Plan*, high-wind events were considered to have an equal chance of affecting any part of the Town of Atkinson.

Extent: Atkinson is located within a Zone II hurricane-susceptible region (indicating a design wind speed of 160 mph)[3]. Between 1900 and 1996 2 hurricanes have made landfall in New Hampshire, a category 1 and a category 2. In Maine, 5 hurricanes have made landfall (all category 1). In Massachusetts, 6 hurricanes have made landfall (2 category 1, 2 category 2 and 2 category 3). From this information it can be extrapolated that East Kingston is a high risk to a hurricane event, with variable wind speeds between 74 – 130 mph (category 1-3).

Probability: **HIGH**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of hurricane events.

Past Occurrence: Between 1635 and 1991, 10 hurricanes have impacted the State of New Hampshire. The worst of these occurred on September 21, 1938, with wind speeds of up to 186 mph in MA and 138mph elsewhere. Thirteen of 494 people killed by this storm were residents of New Hampshire. The Storm caused $12,337,643 in damages (1938 dollars), timber not included. The impact of these hurricanes on the Town of East Kingston is unclear. Local knowledge did not indicate that any lives were lost or that property damage was severe.

Community Vulnerability:

- Power lines,
- Shingled roofs,
- Chimneys, and
- Trees
- Mobile homes

Tornadoes

Description: As described on page 10.

Location: For this *Plan*, Tornado events were considered to have an equal chance of affecting any part of the Town of Atkinson.

Extent: From 1950 to 1995 Rockingham County was subject to 9 recorded tornado events, these included 2 type F0 (Gale Tornado, 40-72 mph), 2 type F1 (Moderate Tornado, 73-112 mph), 4 type F2 (Significant Tornado, 113-157 mph) and 1 type F3 (Severe Tornado, 158-206 mph)[4]. Type 3 tornados can cause severe damage including tearing the roofs and walls from well-constructed homes, trees can be uprooted, trains over-turned, and cars lifted off the ground and thrown[5].

[3] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page 3-22
[4] The tornado project .com
[5] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page

Probability: **HIGH**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of tornado events.

Past Occurrence: Rockingham County tornado history is as follows: Category F0 tornados occurred on Oct. 03, 1970 and June 09, 1978. Category F1 tornados occurred on July 31, 1954 and July 26, 1966. Category F2 tornados occurred on Aug. 21, 1951, June 19, 1957, July 02, 1961 and June 09, 1963. The category F3 tornado occurred on June 09, 1953.

Community Vulnerability:

- Power lines,
- Shingled roofs,
- Chimneys, and
- Trees
- Mobile homes

Severe Winter Weather

Description: There are three types of winter events**:** blizzards, ice storms and extreme cold. All of these events are a threat to the community with subzero temperatures from extreme wind chill and storms causing low visibility for commuters. Snow storms have been known to collapse buildings. Ice storms disrupt power and communication services. Extreme cold affects the elderly.

Location: Severe winter weather events have and equal chance of affecting any part of the Town of Atkinson.

Extent: Large snow events in Southeastern New Hampshire can produce 30 inches of snow, or more. Portions of central New Hampshire recorded snowfalls of 98" during one slow moving storm in February of 1969. Ice storms occur with regularity in New England. Seven severe ice storms have been recorded that affected New Hampshire since 1929. These events caused disruption of transportation, loss of power and millions of dollars in damage.

Probability: **HIGH**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of heavy snows and ice storms.

Past Occurrence: A list of past winter storm events is displayed below, in Table 3.

Community Vulnerability:

- Power lines
- Trees (Impacting the ROW)
- Elderly Populations

Wildfire

Description: Wildfires include grass fires and forest fires.

Location: The Committee identified two areas of Town as at-risk to wildfires (see Map 2: Past and Future Hazards). These areas are a large forested track near the industrial park, and the undeveloped land near the railroad tracks in the Southeast corner of Town.

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Extent: The extent of wildfires in Atkinson is **Minimal**. A wildfire in the Town of Atkinson is unlikely, but if a crown fire were to occur it could be very damaging to structures abutting large wooded areas of Town.

Probability: **MODERATE**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with moderate risk to wildfires.

Past Occurrence: A large wildfire in 1947 burned several building in Atkinson. The fire began west of town and burned through Chester and Atkinson.

Community Vulnerability:

- Structures located near large open vegetated areas prone to lightning strike
- Vulnerability increases during drought events
- Abutting Plaistow Town Forest and Hampstead Conservation Area
- Tree debris

Earthquake

Description: Seismic activity including landslides and other geologic hazards.

Location: An earthquake has an equal chance of affecting all areas in the Town of East Kingston.

Extent: New England is particularly vulnerable to the injury of its inhabitants and structural damage because of our built environment. Few New England States currently include seismic design in their building codes. Massachusetts introduced earthquake design requirements into their building code in 1975 and Connecticut very recently did so. However, these specifications are for new buildings, or very significantly modified existing buildings only. Existing buildings, bridges, water supply lines, electrical power lines and facilities, etc. have rarely been designed for earthquake forces (New Hampshire has no such code specifications).

Probability: **MODERATE**. The State of New Hampshire's Natural Hazard Mitigation Plan ranks all of the Counties in the State with at moderate risk to earthquakes. The Town of Atkinson's Peak Ground Acceleration (PGA) values range between 6.1 and 21.0[6]. These numbers are associated with how much an earthquake is felt and how much damage it may cause (Table 2).

Table 3: Peak Ground acceleration (PGA) values for Atkinson (information from State and Local Mitigation Planning, FEMA).

PGA	Chance of being exceeded in the next 50 years	Perceived Shaking	Potential Damage
6.1	10%	Moderate	Very Light
10.6	5%	Strong	Light
21.0	2%	Very Strong	Moderate

[6] http://geohazards.cr.usgs.gov/eq/pubmaps/us.pga.050.map.gif

Past Occurrence: Large earthquakes have not affected the Town of Atkinson within recent memory. A list of earthquakes that have affected the region is displayed in Table 3.

Community Vulnerability:

- Dams,
- Bridges,
- Brick Structures,
- Infrastructure,
- Water and Gas lines, and
- Secondary hazards such as fire, power outages, or hazardous material leak or spill.

Table 4: Past Hazard Events in Atkinson, NH and Rockingham County

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Flood	March 11-21, 1936	Statewide	$133,000,000 in damage throughout New England, 77,000 homeless.	Double Flood; snowmelt/heavy rain.
Flood	September 21, 1938	Statewide	Unknown	Hurricane; stream stage similar to March 1936
Flood	July 1986 – August 10, 1986	Statewide	Unknown	**FEMA DR-771-NH**: Severe storms; heavy rain, tornadoes , flash flood, severe wind
Flood	August 7-11 1990	Statewide	Road Network	**FEMA DR-876-NH**: A series of storms with moderate to heavy rains; widespread flooding.
Flood	August 19, 1991	Statewide, Primarily Rockingham and Strafford Counties	Road Network	**FEMA DR-917-NH:** Hurricane Bob; effects felt statewide; counties to east hardest hit.
Flood	October 28, 1996	Rockingham County	Unknown - Typically structures and infrastructure in the floodplain	North and west regions; severe storms.
Flood	June – July 1998	Rockingham County	Heavy damage to secondary roads occurred	**FEMA DR-1231-NH:** A series of rainfall events
Flood	May 12, 2006	Central and Southern Regions	100 yr – 500 yr	**FEMA-1643-DR:** Severe storms and flooding. Counties Declared: Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham, and Strafford
Flood	April 15 - 23, 2007	Statewide	100 yr – 500 yr	**FEMA-1695-DR:** Severe storms and flooding associated with a Nor'easter. Counties Declared: Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan.

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Flood	July 24 2008	Central and Southern Regions	100 yr – 500 yr	**FEMA-1782-DR** Severe storms, tornado and flooding. Counties Declared: Belknap, Carroll, Merrimack, Rockingham, and Strafford
Flood	March 14 – 31, 2010	Southeastern Region	100 yr – 500 yr	**FEMA-1913-DR** Severe storms and flooding. Counties Declared: Hillsborough and Rockingham County
Hurricane	October 18,19 1778	Portions of State	Unknown	40-75 mph winds
Hurricane	1804	Portions of State	Unknown	
Hurricane	September 8, 1869	Portions of State	Unknown	> 50 mph winds
Great Hurricane Of 1938	September 21, 1938	All of Southern New England	2 billion board feet of timber destroyed; electric and telephone disrupted, structures damaged, flooding; statewide 1,363 families received assistance.	Max. wind speed of 186 mph in MA and 138mph max. elsewhere 13 of 494 dead in NH; $12,337,643 total storm losses (1938 dollars), timber not included.
Hurricane Carol	August 31, 1954	Southern New England	Extensive tree and crop damage in state.	SAFFIR/SIMPSON HURRICANE SCALE[7] - Category 3, winds 111-130 mph
Hurricane Donna	September 12, 1960	Southern and Central NH	Unknown	Category 3 Heavy Flooding
Hurricane Belle	August 10, 1976	Southern New England	Unknown	Category 1, winds 74-95 mph Rain and flooding in NH
Hurricane Gloria	September 27, 1985	Southern New England	Unknown	Category 2, winds 96-110 mph >70 mph winds; minor wind damage and
Tropical Storm Floyd	September 16-18 1999	Statewide	Unknown	
Ice Jam	Feb 29, 2000	Brentwood, NH Atkinson River	Unknown	Discharge 570 cfs
Ice Jam	Mar 29, 1993	Epping, NH Lamprey River	Road flooding	
Tornado	May 21, 1814	Rockingham County	Unknown	F2[8]
Tornado	May 16, 1890	Rockingham County	Unknown	F2
Tornado	August 21, 1951	Rockingham County	Unknown	F2

[7] For a complete description of the Saffir/Simpson Hurricane Scale see Appendix C.
[8] For a complete description of the Fujita Tornado Damage Scale see Appendix D

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Tornado	June 9, 1953	Rockingham County	Unknown	F3
Tornado	June 19, 1957	Rockingham County	Unknown	F2
Tornado	July 2, 1961	Rockingham County	Unknown	F2
Tornado	June 9, 1963	Rockingham County	Unknown	F2
Downburst	July 6, 1999	Stratham, NH	Five fatalities and eleven injuries. Major tree damage, power outages	Microburst $2,498,974 in damages
Tornado	May 21, 2006	Rockingham County	Unknown	F2
Tornado	July 24, 2008	Rockingham, Merrimack, Belknap, Strafford, Carrol	1 fatality, massive power outages, some homes destroyed and major tree damage	F2
Ice Storm	December 17-20 1929	NH	Telephone, telegraph and power disrupted.	
Ice Storm	December 29-30 1942	NH	Unknown- Typically damage to overhead wires and trees.	Glaze storm; severe intensity
Ice Storm	December 22 1969	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 17, 1970	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 8-25 1979	NH	Major disruption of Power and transportation	
Ice Storm	March 3-6 1991	Southern NH	Numerous power outages in southern NH	Numerous in Southern NH
Ice Storm	January 7, 1998	Rockingham County	Power and phone disrupted, communication tower collapsed.	$17,000,000 in damages to PSNH equipment.
Ice Storm	December 12, 2008	New England,	Severe ice storm that caused major damage to private and public utilities.	PSNH states cost of restoration effort Estimated at $75 million for NH alone
Snowstorm	February 4-7 1920	New England	Disrupt transportation for weeks	Boston 37-50cm of sleet , ice and snow
Snowstorm	February 15, 1940	New England	Paralyzed New England	30cm of snow with high wind.
Snowstorm	February 14-17 1958	Southern NH	Unknown	20-33” of snow
Snowstorm	March 18-21 1958	South central NH	Unknown	22-24”of snow
Snowstorm	March 2-5 1950	Southern NH	Unknown	25”of snow

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Snowstorm	January 18-20 1961	Southern NH	Unknown	Blizzard Conditions; 50cm of snow
Snowstorm	February 8-10 1969	Southeastern NH	Paralyzing snow	27"of snow and high winds
Snowstorm	February 22-28 1969	Central NH	Unknown	34-98"of snow; very slow moving
Snowstorm "Blizzard of'78"	February 5-7 1978	Statewide	Trapped commuters on highways, businesses closed	Hurricane force winds; 25-33"of snow. People disregard warnings due to a series of missed forecasts
Snowstorm	April 5-7 1982	Southern NH	Unknown	Late season with thunderstorms and 18-22" of snow
Snow Emergency	March 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, and Strafford	Unknown	FEMA-3166-EM $4,500,000
Snow Emergency	March 11, 2003	Cheshire, Hillsborough, Merrimack, Rockingham and Strafford	Unknown	FEMA-3177-EM $3,000,000
Snow Emergency	March 30, 2005	Belknap, Carroll, Cheshire, Grafton, Hillsboro, Merrimack, Rockingham, Strafford and Sullivan	Unknown	FEMA-3207-EM $4,654,738
Snow Emergency	April 28, 2005	Carroll, Cheshire, Hillsboro, Rockingham and Sullivan	Unknown	FEMA-3211-EM $2,677,536
Severe Winter Storm	December 11, 2008	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham, Strafford, and Sullivan	Unknown	FEMA-1812-DR $19,789,657
Severe Winter Storm	February 23, 2010	Merrimack, Rockingham, Strafford, and Sullivan	Unknown	FEMA-1892-DR
Severe Winter Storm	March 14, 2010	Rockingham and Hillsborough	Unknown	FEMA-1913-DR
Earthquake	November 18, 1929	Grand Banks Newfoundland	No damage	Richter Magnitude Scale: 7.2[9]
Earthquake	December 20, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 341 miles away.
Earthquake	December 24, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 550 KM away.
Earthquake	June 15, 1973	Quebec/NH border	Minor damage	Richter Magnitude Scale: 4.8
Earthquake	June 19, 1982	West of Laconia	Little damage	Richter Magnitude Scale: 4.5

[9] For a complete description of the Richter Magnitude Scale see Appendix E.

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Drought	1929-36	Statewide	Unknown	Regional
Drought	1939-44	Statewide	Unknown	Severe in southeast NH
Drought	1947-50	Statewide	Unknown	Moderate
Drought	1960-69	Statewide	Unknown	Longest recorded continuous period of below normal precipitation
Drought Warning	June 6, 1999	Most of State	Unknown	Governor's office declaration; Palmer Drought Survey Index indicate "moderate drought" for most of state.
Drought	2001-2002	Statewide	Unknown	Third worst drought on record, exceeded only by the drought of 1956-1966 and 1941-1942

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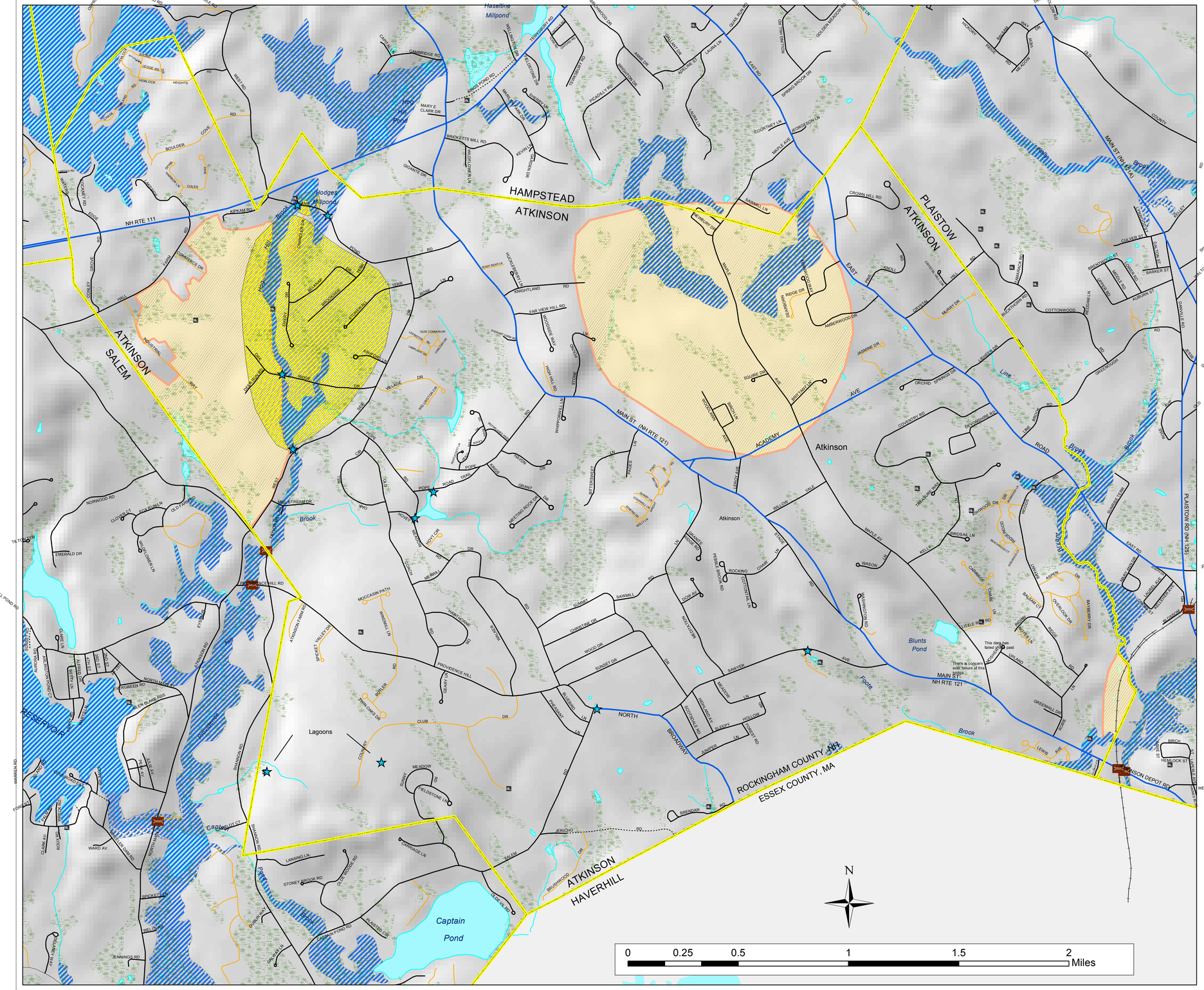
Past and Future Hazards Map
Atkinson, New Hampshire

Spring, 2013



- Flood Potential including Culverts
- Bridges
- Dams
- Wetlands

Flood Zone

- 500 Year Flood
- 100 Year Fllood

Other Hazards

- Dioxin Spill
- Zone of Potential Wildfire Danger

- Surface Water Features
- Active Railroad
- Abandoned Railroad

Roads by System Class

- <all other values>
- Class I
- Class II
- Class III
- Class IV
- Class V
- Class VI
- Private Roads

Base Features (transportation, political and hydrographic) were automated from the USGS Digital Line Graph data, 1:24,000, as archived in the GRANIT database at Complex Systems Research Center, Institute for the study of Earth, Oceans and Space, University of New Hampshire, Durham, NH; 1992-1999. The roads within the Rockingham Planning Region have been updated by Rockingham Planning Commission and by NH Department of Transportation through ongoing efforts.

Wetlands shown on this map are from soils classified as "very poorly drained" and "poorly drained" by the USDA Natural Resources Conservation Service. Soil boundaries are from NRCS Rockingham County Soil Survey, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only. Data automation completed by Complex Systems Research Center, UNH; October 1999. Soils delineation based on field work, conducted by the USDA Natural Resource Conservation Service, completed in 1985.

Flood Zones on this map are from the Digital Flood Insurance Rate Map (DFIRM) Database. The Digital Flood Insurance Rate Map (DFIRM) Database depicts flood risk information and supporting data used to develop the risk data. The primary risk classifications used are the 1-percent-annual-chance flood event (aka 100 year flood) and the 0.2-percent-annual-chance flood event (aka 500 year flood). The DFIRM Database is derived from Flood Insurance Studies (FISs), previously published Flood Insurance Rate Maps (FIRMs), flood hazard analyses performed in support of the FISs and FIRMs, and new mapping data, where available. The FISs and FIRMs are published by the Federal Emergency Management Agency (FEMA). This was provided by GRANIT, Complex Systems Research Center, UNH in May 2005.

Hazards, Dams, Spills and Wildfire areas were identified with the assistance of the Town of Atkinson Hazard Mitigation Committee, 2012-2013.

CHAPTER IV – CRITICAL FACILITIES

The Critical Facilities List for the Town of Atkinson has been identified by Atkinson's Hazard Mitigation Committee. The Critical Facilities List has been broken up into four categories. The *first category* contains facilities needed for Emergency Response in the event of a disaster. The *second category* contains Non-Emergency Response Facilities that have been identified by the committee as non-essential. These are not required in an emergency response event, but are considered essential for the everyday operation of Atkinson. The *third category* contains Facilities/Populations that the committee wishes to protect in the event of a disaster. The *fourth category* contains Potential Resources, which can provide services or supplies in the event of a disaster. Map 3: Critical Facilities at the end of this Chapter identifies the location of the facilities and the evacuation routes. A list of the critical facilities can be found in Table 4.

Table 5: Category 1 - Emergency Response Services and Facilities:

The first category contains facilities needed for Emergency Response in the event of a disaster.

Critical Facility	Facility Type	Map ID#
Fire Station	Public building	1
Town Hall	Public building	2
Police Station	Public building	3
Town Hall Garage	Public Building	4

Table 5: Category 2 - Non Emergency Response Facilities:

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

Critical Facility	Facility Type	Map ID#
Well (16)	Water Infrastructure	1
Pressured Hydrant (56)	Water Infrastructure	2
Dry Hydrant (22)	Water Infrastructure	3
Water tank	Water Infrastrucutre	4

Table 5: Category 3 - Facilities/Populations to Protect:

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

Critical Facility	Facility Type	Map ID #
Atkinson Academy	Public building	1
Elderly housing	Elderly Housing	2
Kimball House	Historic Site	3
Library	Public Building	4

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Critical Facility	Facility Type	Map ID #
Congregational Church	Public building	5
School 2	Public Building	6
Daycare Center	Child care	7
Elderly Housing	Elderly Housing	8
School 1	School	9
Atkinson Country Club	Recreation-Outdoor	10

Table 5: Category 4 - Potential Resources:

This category contains facilities that provide potential resources for services or supplies in the event of a natural disaster.

Critical Facility	Facility Type	Map ID #
Busby Corp	Heavy equipment supplies	1
Gas Station	Fuel	2
Palmer Gas and Oil	Fuel	3
Lewis Builders	Private Contractors	4
Difeo Oil and Propane	Fuel	5
Atkinson Community Center	Public building	6

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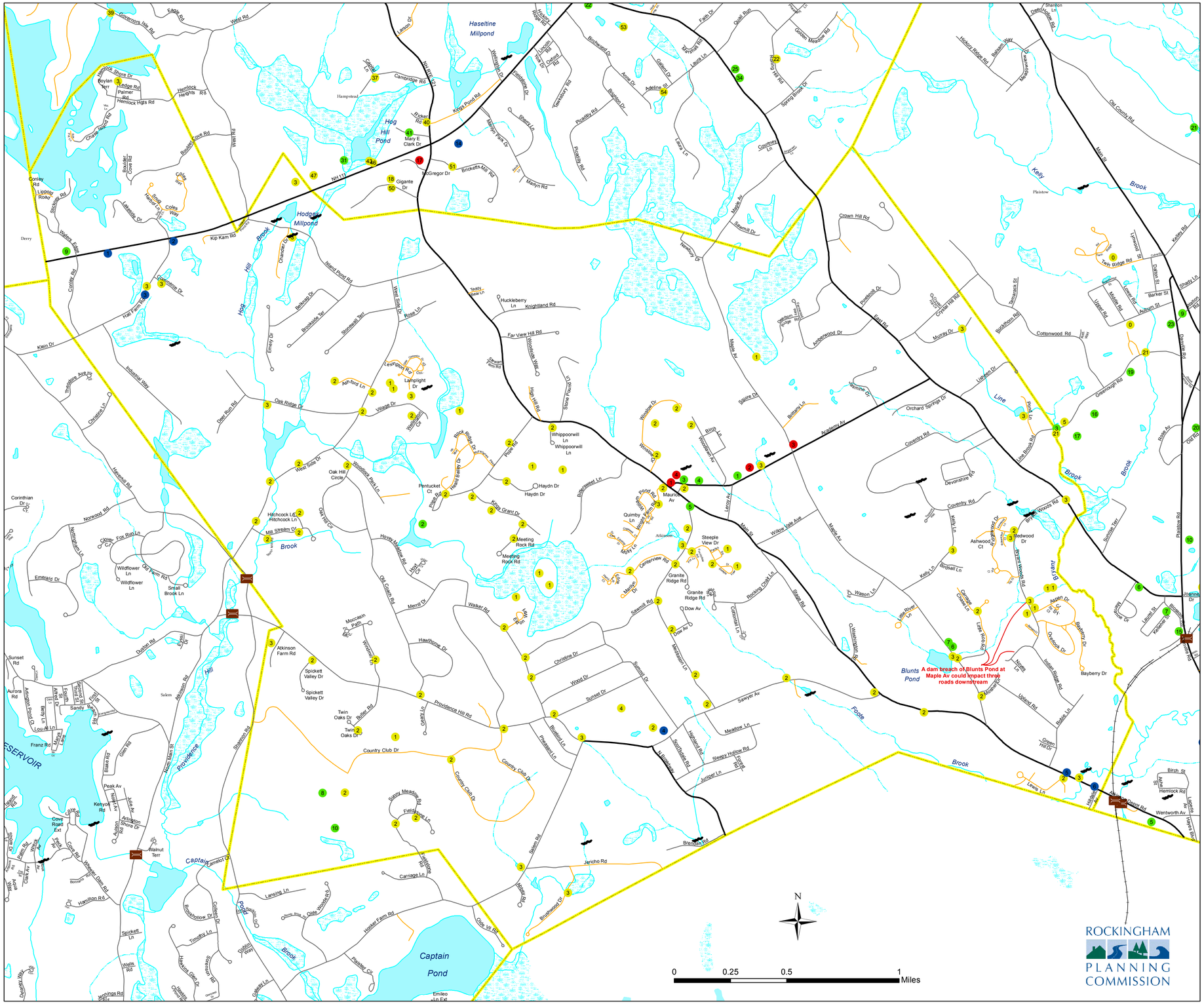
Map 3: Critical Facilities Map
Atkinson, New Hampshire



Red - Emergency Response Services		
1	Fire Department	Fire Station
2	Town Hall	Town Hall
3	Police Department	Police Station
4	Town Garage	Maintainence Facility
Blue - Potential Resources		
1	Busby Corp	Busby Corp
2	Gas Station	Emergency Fuel
3	Palmer Gas and Oil	Palmer Gas and Oil
4	Lewis Builders	Lewis Builders
5	Difeo Oil and Propane	Emergency Fuel
6	Atkinson Community Center	Atkinson Community Center
Green - Facilities/Populations to Protect		
1	Atkinson Acadamy	School
2	Elderly Housing	Elderly Housing
3	Kimball House	Historic Site
4	Library	Library
5	Congragational Church	Religious Facility
6	School 2	School
7	Daycare Center	Child Care
8	Elderly Housing	Elderly Housing
9	School 1	School
10	Atkinson Country Club	Recreation - Outdoor
Yellow - Non Emergency Response Facilities		
1	Well (16)	Water Infrastructure
2	Pressurized Hydrant (56)	Water Infrastructure
3	Dry Hydrant (22)	Water Infrastructure
4	WaterTank	Water Infrastructure

Dams
Bridges
Political Boundaries

Roads by Legislative Class
- State
- Local
- Private
- Not Maintained
- Railroad

Surface Water Features
- Stream or Shoreline
- Apparent Wetland Limit
- Intermittent Stream
- Other Surface Water Feature
- Wetlands_USGS

The critical facilities were selected and located by the Hazard Mitigation Committee of the town of Atkinson. The information was mapped by the Rockingham Planning Commission, Exeter, NH, for inclusion in the Hazard Mitigation Plan.

Dams are from the NH Department of Environmental Services Dams database. The RPC last updated their data in 2006. The bridges are from the NH Department of Transportation database. The RPC last updated their data in 2004.

Roads and surface waters were downloaded from the NH GRANIT database at the Universit of New Hampshire.

Date: 8/7/2013 Document Path: O:\d-multiyear\d-NHOEM\d-towns\d-Atkinson_upd2012\d-maps\Atkinson_New_Facilitiesv2.mxd

CHAPTER V – POTENTIAL HAZARD AFFECTS

IDENTIFYING VULNERABLE FACILITIES

It is important to determine what the most vulnerable areas of the Town of Atkinson are and to estimate their potential loss. The first step is to identify the areas most likely to be damaged in a hazard event. To do this, the locations of buildings and other structures were compared to the location of potential hazard areas identified by the Hazard Mitigation Committee using GIS (Geographic Information Systems). Vulnerable buildings were identified by comparing their location to possible hazard events. For example, all of the structures within the 100-year floodplain were identified and used in conducting the potential loss analysis for flooding.

CALCULATING THE POTENTIAL LOSS

The next step in completing the loss estimation involved assessing the level of damage from a hazard event as a percentage of the buildings' assessed value. For the purposes of estimating losses and average values per residential structure was determined. The total value for residential structures was provided by the town: $ 417,918,500. This number was divided by the number of residences in town (2,958) to determine an average value per residence of $141,284. The damage estimates are divided into two categories based on hazard types: hazards that are location specific (e.g. flooding), and hazards that could affect all areas of Atkinson equally. Damage estimates from hazards with a specific location were calculated by determining how many structures were in the identified hazard area and using 2005 digital aerial images of Atkinson, and then making the damage estimates based on the average value of residential structures determined above. This method makes the assumption that all of the affected structures are residential. Damage estimates from hazards that could affect all of Atkinson equally are much rougher estimates, based on percentages of the total assessed value of the structures and utilities in Atkinson.

After identifying the parcels and buildings that are at risk, the next step was to calculate a damage estimate for each potential hazard area. FEMA provides a model for estimating damage for various flooding events, so the flood damage estimates provide information including: damage estimates for structures, contents of buildings, functional downtime and replacement time. For wildfire and urban conflagration, damage estimates were determined for the buildings in the potential hazard areas as well as estimates of the building content value, based on the same estimates from the flood model. The following discussion summarizes the potential loss estimates due to natural hazard events.

Flooding

These structures were identified by overlaying digital versions of FEMA's FIRM maps on 2005 digital aerial photography of the town of Atkinson. Because of the scale and resolution of the FIRM maps and imagery this is only an approximation of the total structures located within the 100-year floodplain (A-zone and AE-zone). The Federal Emergency Management Agency (FEMA) has developed a process to calculate potential loss for structures during flood. The potential loss for residential and non-residential structures was calculated separately. All structures were assumed to be single family residential units. The average assessed value of a residential structure was $141,284.

The costs for repairing or replacing bridges, railroads, power lines, telephone lines, and contents of structures are not included in this estimate. In addition, the figures used were based on buildings which are one or two stories high with basements. The percentage of structural damage and contents damage that could be expected for each flood depth is shown in Table 5, along with estimates of functional downtime (how long a business/residence would be down before relocating) and displacement time (how long a business/residence would be displaced from its flooded location).

The following calculation is based on **one-foot flooding** and assumes that, on average, one or two story buildings with basements receive 15% damage (Understanding Your Risks, Identifying Hazards and Estimating Losses, FEMA page 4-13):

Potential Structure Damage: 15%

Approximately 32 structures in the AE Zone valued at $211,176 = $1,013,644 potential damage

Approximately 8 structures in the A Zone valued at $211,176 = $253,411 potential damage

The following calculation is based on **two-foot flooding** and assumes that, on average, one or two story buildings with basements receive 20% damage (Understanding Your Risks, Identifying Hazards and Estimating Losses, FEMA page 4-13):

Potential Structure Damage: 20%

Approximately 32 structures in the AE Zone valued at $211,176 = $1,351,526 potential damage

Approximately 8 structures in the A Zone valued at $211,176 = $337,881 potential damage

Table 6: Percentages of structural and content damage, based on the assessed value of a flooded parcel. Also shows the functional downtime and displacement time for each flood event.

Flood Depth	One-foot	Two-foot	Four-foot
% Structural Damage: Buildings	15%	20%	28%
% Structural Damage: Mobile Homes	44%	63%	78%
% Contents Damage: Buildings	22.5%	30%	42%
% Contents Damage: Mobile Homes	30%	90%	90%
Flood Functional Downtime: Buildings	15 days	20 days	28 days
Flood Functional Downtime: Mobile Homes	30 days	30 days	30 days
Flood Displacement Time: Buildings	70 days	110 days	174 days

Flood Displacement Time: Mobile Homes	302 days	365 days	365 days

~Dam Breach and Failure

Dam breach and failure could impact Atkinson through flooding. Potential losses will depend on the extent of the breach and would mostly affect Roadway infrastructure. There are five man-made dams that could cause flooding if breeched:

- Lagoon at Atkinson Country Club
- Dam at the Killam property on Westside Drive
- Dam at Island Pond Road
- Dam adjacent to Community Center
- Dam in Derry on Big Island Pond

In addition, there are four large beaver dams that could cause flooding if breeched:

- Two dams on Hovey Meadow Pond off Merrill Drive
- Dam on the Stewart Farm Pond
- Dam on Saw Mill Swamp in Atkinson
-

Also, Blounts Pond is bordered by Lower Maple Ave, which acts like a dam in that it keeps water within the pond contained to a specific area. However, if this location of roadway fails or is breached by the water from Blounts Pond then Little Rob Road, Indian Ridge Road and Bryant Woods Road could be negatively impacted.

Hurricane/ High Wind Events

~Hurricane

Hurricanes do affect the Northeast coast periodically. Since 1900, 2 hurricanes have made landfall in the State of New Hampshire. Due to the coastal location of the Town of Atkinson, hurricanes and storm surges present a real hazard to the community. Even degraded hurricanes or tropical storms could still cause significant damage to the structures and infrastructure of the Town of Atkinson. The assessed value of all residential, commercial and industrial structures in the Town of Atkinson is $448,788,200 (Assuming 1% to 5% damage, a hurricane could result in $4,487,882 to $22,439,410 of structure damage.

~Tornado

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 is strikes an inhabited area, the impact could be severe. The assessed value of all residential, commercial and industrial structures in the Town of Atkinson is $448,788,200 (Assuming 1% to 5% damage, a hurricane could result in $4,487,882 to $22,439,410 of structure damage.

~Severe Lightning

The amount of damage caused by lightning will vary according to the type of structure hit and the type of contents inside. There is no record of monetary damages inflicted in the Town of Atkinson from lightning strikes.

Severe Winter Weather

~Heavy Snowstorms

Heavy snowstorms typically occur during January and February. New England usually experiences at least one or two heavy snow storms 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 Atkinson 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 and duration. Heavy Snowstorms in Atkinson could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

~Ice Storms

Ice storms often cause widespread power outages by downing power lines, making power lines at risk in Atkinson. They can also cause severe damage to trees. In 1998, an ice storm inflicted $12,466,202 worth of damage and in 2008 an ice storm, which mostly impacted southern NH communities, experienced over a reported $150 million dollars worth of property damage. Ice storms in Atkinson could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

Wildfire

The risk of fire is difficult to predict based on location. Forest fires are more likely to occur during years of drought. However, these areas are identified as at risk to wildfire (Map 2: Past and Future Hazards) by the Hazard Mitigation Committee. These areas include large tracts of open vegetation including forests and wetlands. Drought conditions increase the risks of wildfire in these open vegetated areas. The area of Atkinson at risk to potential wildfire is predominantly a residential portion of town. The total value of all the residential structures in Atkinson is $417,918,500. Assuming 1% to 5% damage these structures, a wildfire could result in $4,179,185 to $20,895,925 of structure damage.

Earthquakes

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and are often associated with landslides and flash floods. Four earthquakes in New Hampshire between 1924-1989 had a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border. If an earthquake were to impact the Town of Atkinson, underground lines would be susceptible. In addition, buildings that are not built to a high seismic design level would be susceptible to structural damage. For example, the assessed value of all residential, structures in the Town of Atkinson is $417,918,500. Based on Table 6 below, an earthquake could cause a range of damage depending on the construction and materials used to

build the structures. Making the assumption that all of the structures in Atkinson are single family homes built Pre-code, and wood frame construction, an earthquake could result in $16,716,740 of damage for a 0.07 PGA earthquake.

Table 7: Earthquake Damage and Loss of Function Table. Building Damage and Functional Loss are based on the type of Structure and the PGA (g). Two PGA (Peak Ground Acceleration) were chosen for this Table, 0.07 and 0.20 which represent a low and high example of potential earthquake in Atkinson, NH.

		Wood Frame Construction				**Reinforced Masonry**				**Unreinforced Masonry**	
PGA (g)		High	Mod.	Low	Precode	High	Mod.	Low	Precode	Low	Precode
0.07	**Single Family**	**0.1**	**0.2**	**0.3**	**0.4**	**0.1**	**0.2**	**0.4**	**0.5**	**0.6**	**1.0**
0.20		**1.3**	**1.7**	**2.8**	**3.3**	**1.3**	**2.5**	**6.1**	**9.0**	**6.5**	**9.4**
0.07		0	0	1	1	0	1	2	7	6	12
0.20		2	3	9	15	4	16	58	106	64	114
0.07	**Apartment**	**0.1**	**0.2**	**0.3**	**0.3**	**0.1**	**0.2**	**0.4**	**0.5**	**0.6**	**0.8**
0.20		**1.5**	**1.9**	**3.0**	**3.2**	**1.5**	**2.6**	**5.4**	**6.9**	**5.5**	**7.5**
0.07		0	0	1	1	0	1	2	8	7	13
0.20		2	3	10	16	4	19	72	129	76	147
		Steel Frame (Braced)				**Reinforced Masonry**				**Unreinforced Masonry**	
		High	Mod.	Low	Precode	High	Mod.	Low	Precode	Low	Precode
0.7	**Retail Trade**	**0.2**	**0.3**	**0.4**	**0.5**	**0.1**	**0.2**	**0.4**	**0.6**	**0.7**	**1.0**
0.20		**2.4**	**2.8**	**3.8**	**5.6**	**1.5**	**2.7**	**5.9**	**8.3**	**6.1**	**8.7**
0.07		0	0	0	0	0	0	0	1	1	2
0.20		2	3	6	12	1	3	12	22	14	24
		Pre-Cast Concrete Tilt-up				**Light Metal Building**					
		High	Mod.	Low	Precode	High	Mod.	Low	Precode		
0.07	**Wholesale Trade**	**0.2**	**0.4**	**0.5**	**0.6**	**0.4**	**0.7**	**1.0**	**1.6**		
0.20		**2.6**	**4.1**	**8.3**	**10.8**	**3.8**	**5.4**	**10.3**	**14.8**		
0.07		0	1	1	2	1	2	3	6		
0.20		4	8	22	36	6	13	28	43		
0.07	**Office Building**	**0.2**	**0.3**	**0.4**	**0.6**	**0.2**	**0.3**	**0.4**	**0.5**		
0.20		**2.0**	**2.9**	**5.6**	**8.1**	**2.5**	**2.9**	**3.7**	**5.2**		
0.07		0	0	0	1	0	0	0	1		
0.20		1	3	11	21	2	3	5	11		
		Pre-cast Concrete Tilt-up									
		High	Mod.	Low	Precode						
0.07	**Light Industrial**	**0.1**	**0.4**	**0.4**	**0.5**						
0.20		**2.6**	**3.9**	**6.0**	**7.4**						
0.07		0	1	1	2						
0.20		4	7	21	34						

2.0	Building Damage = % of damage based on value
2	Loss of Function (# of Days)
	No Information

High, Moderate, Low and Precode refer to general seismic design level

CHAPTER VI – EXISTING HAZARD MITIGATION ACTIONS

This section identifies those programs that are currently in place as hazard mitigation actions or strategies for the Town of Atkinson, NH. The table below (Table 7), displays existing ordinance, regulations, plans and Town departments that plan for, or react to, natural hazards to mitigate possible damage.

Table 8: Existing Hazard Mitigation Actions

Existing Protection	Area Covered	Responsible Local Agent	Effectiveness (Poor, Avg., Good)	Recommended Changes-Actions-Comments
Zoning Ordinance	Town-wide	Code Enforcement Officer	Good	Contains wetland and floodplain provisions.
Subdivision Regulations	Town-wide	Planning Board	Good	Is annually updated and evaluated according to state statutes and land use planning purposes. Utilities required to be placed underground.
Site Plan Review Regulations	Town-wide	Planning Board	Good	Storm frequency data should be updated to current standards to ensure stormwater management from non-residential development is optimal.
Road way construction standards	Town-wide	Planning Board/Board of Selectmen	Good	Is annually updated and evaluated according to state statutes and land use planning purposes.
Master Plan	Town-wide	Planning Board	Good	The Planning Board reviews and is in the update process.
Building Codes	Town-wide	Building Inspector	Good	The code is in line with state and federal standards.
Emergency Operations Plan	Town-wide	EMD	Average	Recently updated
Emergency Services: Police Department	Town-wide	Police Chief	Good	5full-time officers and 20 part-time officers.
Emergency Services: Fire Department	Town-wide	Fire Chief	Good	32 vollunteers
Highway Department	Town-wide	Road Agent	Good	Storm drain, catch basin and culvert maintenance, snow removal, road-side mowing, Tree maintenance within Town Right-of-Way
Wetlands Protection	Wetland setbacks required	Planning Board/ Board of Selectmen	Good	The Town has an effective setback and buffer requirement (100') between development and defined wetlands but may want to increase pre-treatment mechanisms to ensure good water quality prior to discharging into a wetland.
Police and Fire Mutual Agreements Mutual Aid	Town-wide	Police Chief and Fire Chief	Good	The town and regional partners continue to evaluate and uphold effective regional emergency response.
Capital Improvement Program	Town-wide	Planning Board	Good	Reviewed annually. Project administrator should review this plan for project inclusion.

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Existing Protection	Area Covered	Responsible Local Agent	Effectiveness (Poor, Avg., Good)	Recommended Changes-Actions-Comments
Unitil tree trimming program	Town-wide	Highway Department	Good	Atkinson works with Unitil to ensure trees are cleared away from power lines on municipal roadways.
NFIP	Town-wide	Building Inspector	Good	Atkinson maintains status as a participating NFIP community.
Steep Slope Protection	Town-wide	Planning Board/Code Enforcement	Good	Lot sizes increased to 3 acres if a proposed lot has slopes over 25%.

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CHAPTER VII – POTENTIAL MITIGATION ACTIONS

POTENTIAL MITIGATION STRATEGIES

The Action Plan was developed by analyzing the existing Town programs, the proposed improvements and changes to these programs. Additional programs were also identified as potential mitigation strategies. These potential mitigation strategies (Table 8) were ranked in five categories according to how they accomplished each item:

- Prevention
- Property Protection
- Structural Protection
- Emergency Services
- Public Information and Involvement

Table 9: Potential Mitigation Actions

Mitigation Strategies or Action	Mitigation Category	Hazard(s) Mitigated	Description	Status 2013: New/Complete/Deferred/ Removed
Develop a management plan with Unitil for trimming trees along town roads to prevent power outages	Prevention	All Hazards	A coordinated management plan with Unitil for trimming trees near power lines and other structures will lessen the potential for power outages in town.	Deferred- Emergency services are continuing to review this Mitigation Action and work with Unitil.
Develop a MOU (Memorandum of Understanding) with companies that provide back-up support for snow removal	Prevention Emergency Services	Severe Winter Weather	An MOU with companies to provide back-up support for snow removal will help the town effectively remove snow from roads during times of severe winter weather.	Deferred- The Highway department is continuing to review this Mitigation Action with partnering companies.
Develop an Emergency Operations Plan	Emergency Services	All Hazards	An Emergency Operation Plan helps prepare emergency services for effective response during hazard events.	Complete
Update Floodplain Ordinance/ Join the NFIP (National Flood Insurance Program)	Structural Protection	Flooding	Join NFIP to help property owners obtain flood insurance through FEMA.	Complete

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Mitigation Strategies or Action	Mitigation Category	Hazard(s) Mitigated	Description	Status 2013: New/Complete/Deferred/ Removed
Join mutual aid for Highway/Public Works Departments	Prevention	All Hazards	Mutual aid programs help communities maintain effective emergency response services.	Complete
Join SWAT of Southern NH	Emergency Services	All Hazards	None	Removed- The committee felt that this former mitigation action is not a priority for this particular planning exercise and document.
INET connectivity between municipalities	Emergency Services	All Hazards	None	Removed- The committee felt that this former mitigation action is not a priority for this particular planning exercise and document.
Train town staff to use local cable access	Public Information and Involvement	All Hazards	None	Deferred- Staff training on how to use the TV equipment is still a priority for the town.
Use town newsletter to inform residents about emergency preparedness	Public Information and Involvement	All Hazards	None	Deferred- Emergency services are continuing to review this Mitigation Action and utilize this activity for public outreach.
Identify special needs populations	Emergency Services	All Hazards	Identifying special needs or elder populations in town will help effectively coordinate emergency response during major hazard events.	Deferred- Emergency services are continuing to review this Mitigation Action and work with Elder Affairs for identifying segments of the population.
Establish emergency contact with Comcast	Public Information and Involvement	All Hazards	None	Complete
Install generators in Atkinson Academy, Town Hall, Community Center and Police Station	Emergency Services Structural Protection	All Hazards	Modified- Generators have been obtained for the Atkinson Academy, Community Center and Police Station.	Deferred- The town hopes to obtain a generator for the town hall by 2014.
Establish the Community Center as a Red Cross approved shelter	Emergency Services	All hazards	Modified- there are some structural issues with the community center that needs to be addressed prior to use.	Deferred- Emergency Services would like to fix any structural problems that may be hindering implementation of this strategy.

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Mitigation Strategies or Action	Mitigation Category	Hazard(s) Mitigated	Description	Status 2013: New/Complete/Deferred/ Removed
Purchase a boat for fire station to access homes on islands	Emergency Services	All hazards	None	Deferred- The fire chief and community are trying to financially plan for implementation of this action
Purchase a Wheelchair Accessible Van	Emergency Services	All hazards	None	Complete
Purchase an ATV	Emergency Services	All Hazards	None	Deferred- The police chief is in the process of evaluating this purchase and certifying riders for the equipment
Upgrade communications infrastructure	Emergency Services	All Hazards	None	Deferred- The Selectmen and town emergency personnel are evaluating where the "cell/radio dead zones" are located in town
Island Pond Road culvert replacement (3 Culverts)	Prevention Property Protection	Flooding	The culverts that are currently located in this area are too small and are in need of being replaced with larger culverts that will help promote water flow.	**New**
West Side Drive; replace and include a 7ft culvert slip lining	Prevention Property Protection	Flooding	Replacing and inserting slip lining will help alleviate flood potential on this portion of West Side Drive.	**New**
Develop a Culvert Maintenance Program (MS4)	Prevention Property Protection	Flooding	This strategy will help ensure municipal water infrastructure in town is both treating storwater runoff and allowing for adequate water flow to occur.	**New**
Evaluate and maintain the dams at the Community Center	Prevention Property Protection	Flooding	Ensuring the dams by the community center are structurally sound will help prevent possible property damage from a dam breach.	**New**
Ensure access to wildfire areas, as shown on the Past and Future Hazards Map, within new developments	Prevention Property Protection	Wildfire	Ensuring access ways or easements on new development plans to areas of past or potential wildfire zones will help emergency personnel effectively respond to this hazards threat.	**New**
Evaluate and develop standards for the use of Town water on the recreational fields	Prevention	Drought	The use of potential surface water ponds and establishing standards to prevent water overuse, might effectively prevent groundwater overburden on the town's aquifer during periods of drought.	**New**
MS4 required outreach	Public Information and Involvement	Flooding	The EPA MS4 program requires outreach to citizens that are located within designated MS4 areas as defined by the EPA about	**New**

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Mitigation Strategies or Action	Mitigation Category	Hazard(s) Mitigated	Description	Status 2013: New/Complete/Deferred/ Removed
			stormwater management and what contributes to causing poor surface water quality.	
Mitigate invasive plant and insect species as appropriate	Prevention	All	Periods of rain and or drought can cause various invasive plant and insect species to thrive that will harm existing natural plant species and humans.	**New**

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CHAPTER VIII – PRIORITIZATION OF MITIGATION ACTIONS

The goal of each strategy or action is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy. A set of questions developed by the Committee that included the STAPLEE method was developed to rank the proposed mitigation actions. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies identified in Table 8:

- Does it reduce disaster damage?
- Does it contribute to other goals?
- Does it benefit the environment?
- Does it meet regulations?
- Will historic structures be saved or protected?
- Could it be implemented quickly?

STAPLEE criteria:

- **Social**: Is the proposed strategy socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical**: Will the proposed 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 the strategy need environmental regulatory approvals?

Each proposed mitigation strategy was evaluated using the above criteria and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation chart with total scores for each strategy can be found in the collection of individual tables under Tables 9.1 to 9.17.

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Table 10.1: Develop a management plan with Unitil for trimming trees along town roads to prevent power outages

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	2
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**36**

Table 10.2: Develop MOU with companies that provide backup support for snow removal

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**37**

Table 10.3: Train town staff to use local cable access

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**37**

Table 10.4: Use news letter to inform residents about emergency preparedness

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**39**

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Table 10.5: Identify special needs populations

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**33**

Table 10.6: Install generators in Atkinson Academy, Town Hall, Community Center and Police Station

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**32**

Table 10.7: Establish community center as a Red Cross approved shelter

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	1
E: Are other Environmental approvals required?	3
Score	**30**

Table 10.8: Purchas an ATV

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	2
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	3
Score	**30**

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Table 10.9: Upgrade communications infrastructure

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	1
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	1
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	1
E: Are other Environmental approvals required?	3
Score	**26**

Table 10.10: Island Pond Road culvert replacement (3 culverts)

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	1
Score	**35**

Table 10.11: West Side Drive; replace and include a 7′ culvert slip lining

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	1
Score	**35**

Table 10.12: Develop a culvert maintenance program (MS4)

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	1
Score	**35**

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Table 10.13: Evaluate and maintain the dams at the community center

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	1
Score	**35**

Table 10.14: Ensure access to wildfire areas, as shown on the past and future hazards map, within new developments

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	1
E: Are other Environmental approvals required?	1
Score	**34**

Table 10.15: Evaluate and develop standards for the use of town water on the recreational fields

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	1
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	1
E: Are other Environmental approvals required?	1
Score	**28**

Table 10.16: MS4 required outreach

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	1
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	2
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	3
Score	**31**

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Table 10.17: Mitigate invasive plant and insect species as appropriate

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	1
Score	**33**

Table 10.18: Purchase a boat for fire station to access homes on islands

Criteria	Evaluation Rating (1-3)
Does it reduce disaster damage?	2
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Could it be implemented quickly?	1
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	2
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Score	**33**

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CHAPTER IX – ACTION PLAN

This step involves developing an action plan that outlines who is responsible for implementing each of the prioritized strategies determined in the previous step, as well as when and how the actions will be implemented. The following questions were asked 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?

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

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

Table 10 is the Action Plan. In addition to the prioritized mitigation projects, the Action Plan includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

Table 11: Action Plan for proposed mitigation actions

Score	Project	Responsibility/ Oversight	Funding/ Support	Estimated Cost	Timeframe
39	Use town newsletter to inform residents about emergency preparedness	Town Administrator	None	None	2013/14
37	Develop a MOU (Memorandum of Understanding) with companies that provide back-up support for snow removal	Highway Department Road Agent	None	None	2013/14
37	Train town staff to use local cable access TV equipment	Dave Williams, Station Manger	None	None	2014
36	Develop a management plan with Unitil for trimming trees along town roads to prevent power outages	Highway Department Road Agent	None	None	2013-2018
35	Island Pond Road culver t replacement (3 Culverts)	Highway Department Road Agent	Federal and State Grants, Municipal Budget	$390,000	2016

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Score	Project	Responsibility/ Oversight	Funding/ Support	Estimated Cost	Timeframe
35	West Side Drive; replace and include a 7ft culvert slip lining	Town Administrator and Highway Department Road Agent	Federal and State Grants, Municipal Budget	$130,000	2016
35	Develop a Culvert Maintenance Program (MS4)	Town Administrator and Highway Department Road Agent	Municipal Budget	$80,000 per year	2014
35	Evaluate and maintain the dams at the Community Center	Highway Department Road Agent with NHDES	Municipal Budget	None	2013-2018
34	Ensure access to wildfire areas, as shown on the Past and Future Hazards Map, within new developments	Planning Board, Conservation Commission, Fire Department	None	None	2013-2015
33	Mitigate invasive plant and insect species as appropriate	Town Administrator	Federal and State Grants, Municipal Budget	$50,000	2013-2018
33	Identify special needs populations	Town Administrator	None	None	2013-2014
33	Purchase a boat for fire station to access homes on islands	Fire Chief	Federal and State Grants, Municipal Budget	$15,000	2014-2016
32	Install generators in Atkinson Town Hall	Town Administrator,	Federal and State Grants, Municipal Budget	$35,000-$40,000	2013-2014
31	MS4 required outreach	Town Administrator	Federal and State Grants, Municipal Budget	$10,000	2014
30	Establish the Community Center as a Red Cross approved shelter	Town Administrator, Fire Chief	Federal and State Grants, Municipal Budget	$1.2 million	2016
30	Purchase an ATV	Police Chief	Municipal Budget	$6,000-$8,000	2014

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Score	Project	Responsibility/ Oversight	Funding/ Support	Estimated Cost	Timeframe
28	Evaluate and develop standards for the use of Town water on the recreational fields	Town Administrator and Highway Department Road Agent	None	None	2014
26	Upgrade communications infrastructure	Selectmen, Fire Chief, Police Chief	Federal and State Grants, Municipal Budget	TBD, but costs should be reasonable for the likely benefit	2015

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CHAPTER X – INCORPORATING, MONITORING, EVALUATING AND UPDATING THE PLAN

Incorporating the Plan into Existing Planning Mechanisms

Upon completion and approval by FEMA and the State of New Hampshire, the Plan will be adopted as a standalone document of the Town and as an appendix of the Town's Emergency Operations Plan (EOP). An update of the EOP is continuing; future updates to the EOP will incorporate the Plan as a referenced appendix, but the two plans will always be printed as separated documents. The EOP is subject to annual review.

The town has utilized the current Hazard Mitigation Plan and the following strategies for incorporation into other planning mechanisms:

- The town utilized the Hazard Mitigation Plan to update their floodplain ordinance and to join the NFIP in 2009;
- The community also utilized the plan to help assist in the update of the 2012 emergency operation plan;
- The town utilized the plan for budgeting and appropriating the correct amount of funds needed to purchase generators for Atkinson Academy, the community center and fire department, as well as a wheelchair accessible van.

The Plan will also be consulted when the Town updates its Capital Improvement Program (CIP) and or Master Plan. The Planning Board is responsible for updating the CIP annually, and will review the Action Plan, as it has done before, during each update. This committee in conjunction with Atkinson Emergency Management will determine what items can and should be added to the CIP based on the Town's annual budget and possible sources of other funding.

As mentioned, this plan should also be reviewed prior to any Master Plan Chapter updates especially as it relates to Natural Hazards and Future Land Use. The towns Planning Board or Master Plan committee is responsible for these future updates and Emergency Management and the town's Planning Board will be responsible for incorporating information from this plan within those updates.

Monitoring, Evaluating and Updating the Plan

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

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In order to track progress and update the Mitigation Strategies identified in the Action Plan (Table 9), it is recommended that the Town revisit the Plan annually, or after a hazard event. If it is not realistic or appropriate to revise the Plan every year, then the Plan will be revisited no less than every five years per FEMA requirements. The Emergency Management Director is responsible for initiating this review with members of the Town that are appropriate including members of the public. In keeping with the process of adopting the 2013 Plan Update and per NH State RSA 91-A, a public meeting to receive public comment on Plan maintenance and updating will be held during any review of the Plan. This publicly noticed meeting (via town website, and postings in the town office, library, or local newspaper) will allow for members of the community not involved in developing the Plan to provide input and comments each time the Plan is revised. The final revised Plan will be adopted by the Board of Selectmen appropriately, at a second publicly noticed meeting.

Changes should be made to the Plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this Plan to determine feasibility of future implementation.

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APPENDIX A:
SUMMARY OF 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 offices usually administer preventative measures.

1. Planning and Zoning

Land use plans are put in place to guide future development, recommending where - and where not - development should occur. Sensitive and vulnerable lands can be designated for uses that would not be incompatible with occasional flood events - such as parks or wildlife refugees.

A Capital Improvements Program 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 flood plain, 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, which either stand-alone or are contained within a zoning ordinance.

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.

Building Codes: Standards can be incorporated into building codes that address flood proofing for all new and improved or repaired buildings.

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 creating 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 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 watercourses 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 their yard without concern for runoff patterns.

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. 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. Flood proofing can be accomplished through barriers to flooding, or by treatment to the structure itself.

Barriers: Levees, floodwalls and berms can keep floodwaters from reaching a building. These are useful, however, only in areas subject to shallow flooding.

Dry Flood proofing: This method seals a building against the water by coating the walls with waterproofing compounds or plastic sheeting. Openings, such doors, windows, etc. are closed either permanently with removable shields or with sandbags.

Wet Flood proofing: 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:

- Floor drain plugs and floor drain standpipe, which keep water from flowing out of the lowest opening in the house.
- Overhead sewer - keeps water in the sewer line during a backup.
- 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.

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.

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 improve 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. And, many communities in New Hampshire also have local wetland ordinances.

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, however, since it takes many years for a new wetland to achieve the same level of quality as an existing one.

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. And, 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.

Practices to reduce erosion and sedimentation have two principal components: (1) minimize erosion with vegetation and; (2) capture sediment before it leaves the site. Slowing the runoff increases infiltration into the soil, thereby controlling the loss of topsoil from erosion and the resulting sedimentation. Runoff can be slowed by vegetation, terraces, contour strip farming, no-till farm practices, and impoundments (such as sediment basins, farm ponds, and wetlands).

3. Best Management Practices

Best Management Practices (BMPs) are measures that reduce nonpoint source pollutants that enter waterways. Nonpoint 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:

- activating the emergency operations center (emergency director)
- sandbagging designated areas (public works department)
- closing streets and bridges (police department)
- shutting off power to threatened areas (public service)
- releasing children from school (school district)
- ordering an evacuation (selectmen/city council/emergency director)
- 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. Buildings or locations vital to the flood response effort:

- emergency operations centers
- police and fire stations
- hospitals
- highway garages
- selected roads and bridges
- evacuation routes
- Buildings or locations that, if flooded, would create secondary disasters
- hazardous materials facilities
- water/wastewater treatment plants
- schools
- nursing homes

All such facilities should have their own flood response plan that is coordinated with the community's plan. Nursing homes, other public health facilities, and 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:

- patrolling evacuated areas to prevent looting.
- providing safe drinking water.
- vaccinating residents for tetanus.
- clearing streets.
- 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.

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 of discussed below. The shortcomings of structural approaches are that:

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

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:

- are expensive;
- occupy a lot of land;
- require periodic maintenance;
- may fail to prevent damage from floods that exceed their design levels; and
- may eliminate the natural and beneficial functions of the floodplain.

Reservoirs should only be used after a thorough watershed analysis that identifies the most appropriate location, and ensures that they would not cause flooding somewhere else. Because they are so expensive and usually involve more than one community, they are typically implemented with the help of state or federal agencies, such as the Army Corps of Engineers.

Levees/Floodwalls

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

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.

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.

Dredging: Dredging is often cost-prohibitive because the dredged material must be disposed of somewhere else, and 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.

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.

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.

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 Office of Emergency Management, the NH Office of State Planning, or your regional planning commission.

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:

- Mass mailings or newsletters to all residents.
- Notices directed to floodplain residents.
- Displays in public buildings, malls, etc.
- Newspaper articles and special sections.
- Radio and TV news releases and interview shows.
- A local flood proofing video for cable TV programs and to loan to organizations.
- A detailed property owner handbook tailored for local conditions.
- Presentations at meetings of neighborhood groups.

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.

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.

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.

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.

Environmental Education

Education can be a great mitigating tool, if people can learn what not to do before damage occurs. And 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.

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

II. EARTHQUAKES

A. PREVENTIVE

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

B. PROPERTY PROTECTION

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

C. EMERGENCY SERVICES

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

D. EMERGENCY SERVICES

Slope stabilization.

III. DAM FAILURE

A. PREVENTIVE

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

B. PROPERTY PROTECTION

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

C. EMERGENCY SERVICES

Dam conditioning monitoring.
Warning and evacuation plans based on dam failure.

D. EMERGENCY SERVICES

Dam improvements, spillway enlargements.
Remove unsafe dams.

IV. WILDFIRES

A. PREVENTIVE

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

B. PROPERTY PROTECTION

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

C. NATURAL RESOURCE PROTECTION

Prohibit development in high-risk areas.

D. EMERGENCY SERVICES

Fire Fighting

V. WINTER STORMS

A. PREVENTIVE

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

B. PROPERTY PROTECTION

Storm shutters and windows
Hurricane straps on roofs and overhangs
Seal outside and inside of storm windows and check steals in spring and fall.
Family and/or company severe weather action plan & drills:

include a NOAA weather radio
designate a shelter area or location
keep a disaster supply kit, including stored food and water
keep snow removal equipment in good repair; have extra shovels, sand, rock, salt and gas
know how to turn off water, gas, and electricity at home or work

C. NATURAL RESOURCE PROTECTION

Maintenance program for trimming tree and shrubs

D. EMERGENCY SERVICES

Early warning systems/NOAA Weather Radio
Evacuation Plans

APPENDIX B:
TECHNICAL AND FINANCIAL ASSISTANCE FOR HAZARD MITIGATION

Local Municipalities must have a FEMA-approved Hazard Mitigation Plan in order to be eligible for the Hazard Mitigation Grant Program (for a disaster declared after November 1st, 2004) and the Pre-disaster Mitigation Project Grants. Information on these two Grant Programs is listed below. Additional hazard mitigation grant program information follows.

HAZARDS MITIGATION GRANT PROGRAM (HMGP)

Authorized under Section 404 of the Stafford Act, the Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster
Hazard Mitigation Grant Program funding is only available in States following a Presidential disaster declaration. Eligible applicants are:

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

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf. HMGP funds may be used to fund projects that will reduce or eliminate the losses from future disasters. Projects must provide a long-term solution to a problem, for example, elevation of a home to reduce the risk of flood damages as opposed to buying sandbags and pumps to fight the flood. In addition, a project's potential savings must be more than the cost of implementing the project. Funds may be used to protect either public or private property or to purchase property that has been subjected to, or is in danger of, repetitive damage.

PRE-DISASTER MITIGATION PROGRAM

The Pre-Disaster Mitigation (PDM) program provides technical and financial assistance to States and local governments for cost-effective pre-disaster hazard mitigation activities that complement a comprehensive mitigation program, and reduce injuries, loss of life, and damage and destruction of property. FEMA provides grants to States and Federally recognized Indian tribal governments that, in turn, provide sub-grants to local governments (to include Indian Tribal governments) for mitigation activities such as planning and the implementation of projects identified through the evaluation of natural hazards.

ADDITIONAL HAZARD MITIGATION GRANT PROGRAMS:

FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM

FMA provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP). There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating communities to implement measures to reduce flood losses. Ten percent of the Project Grant is made available to States as a Technical Assistance Grant. These funds may be used by the State to help administer the program. Communities receiving FMA Planning and Project Grants must be participating in the NFIP. A few examples of eligible FMA projects include: the elevation, acquisition, and relocation of NFIP-insured structures. Additional information can be read on the Mitigation Planning pages.

Funding for the program is provided through the National Flood Insurance Fund, and FMA is funded at $20 million nationally. States are encouraged to prioritize FMA project grant applications that include repetitive loss properties. The FY 2001 FMA emphasis encourages States and communities to address target repetitive loss properties identified in the Agency's Repetitive Loss Strategy. These include structures with four or more losses, and structures with 2 or more losses where cumulative payments have exceeded the property value. State and communities are also encouraged to develop Plans that address the mitigation of these target repetitive loss properties.

BEM EMERGENCY MANAGEMENT ASSISTANCE PROGRAM

APPENDIX B

TECHNICAL AND FINANCIAL ASSISTANCE FOR HAZARD MITIGATION

GUIDELINES:
Emergency Management Assistance (EMA) funding is available to local communities and eligible Agencies for projects that fall in FOUR general areas of Emergency Management: Planning activities; Training activities; Drills and Exercises; and Emergency Management Administration. Contact your New Hampshire Bureau of Emergency Management (BEM) local Field Representative for additional information and an APPLICATION PACKET.
The following list of possible projects and activities is meant to guide you in selecting projects for an EMA Grant Submission. This list of suggested projects is not intended to be all-inclusive. Local communities or agencies may have other specific projects and activities that reflect local needs based on local capability assessments and local hazards.

Planning Activities may include:

- Develop a Hazard Mitigation Plan for your community.
- Prepare a hazard mitigation project proposal for submission to BEM.
- Create, revise, or update Dam Emergency Action plans.
- Update your local Emergency Operations Plan (EOP). Consider updating a number of specific annexes each year to ensure that the entire plan is updated at least every four years.
- If applicable, develop or incorporate a regional HazMat Team Annex into your EOP.
- Develop an Anti-Terrorism Annex into your EOP.
- Develop a local/regional Debris Management Annex into your EOP.
- Develop and maintain pre-scripted requests for additional assistance (from local area public works, regional mutual aid, State resources, etc.) and local declarations of emergency.
- Develop and maintain written duties and responsibilities for EOC staff positions and agency representatives.
- Develop and maintain a list of private non-profit organizations within your local jurisdiction to ensure that these organizations are included in requests for public assistance funds.
- Prepare a submission for nomination as a “Project Impact” Community.

Training Activities may include:

- Staff members attend training courses at the Emergency Management Institute.
- Staff members attend a “field delivered” training course conducted by BEM.
- Staff members attend other local, State, or nationally sponsored training event, which provides skills or knowledge relevant to emergency management.
- Staff members complete one or more FEMA Independent Study Courses.
- Identify and train a pre-identified local damage assessment team.

Drills and Exercises might include:

- Conduct multi-agency EOC Exercise (Tabletop or Functional) and forward an Exercise Evaluation Report, including after action reports, to BEM (external evaluation of exercises is strongly encouraged). Drills or Exercises might involve any of the following scenarios:
    - Hurricane Exercise
    - Terrorism Exercise
    - Severe Storm Exercise
    - Communications Exercise
    - Mass Causality Exercise involving air, rail, or ship transportation accident
- Participate in multi-State or multi-Jurisdictional Exercise and forward Exercise Report to BEM.
- HazMat Exercise with Regional HazMat Teams
- BEM Communications Exercises
- Observe or evaluate State or local exercise outside your local jurisdiction.
- Assist local agencies and commercial enterprises (nursing homes, dams, prisons, schools, etc.) in developing, executing, and evaluating their exercise.
- Assist local hospitals in developing, executing and evaluating Mass Care, HazMat, Terrorism, and Special Events Exercises.
- Administrative Projects and Activities may include:
- Maintain an Emergency Operations Center (EOC) and alternate EOC capable of accommodating staff to respond to local emergencies.
- Establish and maintain a Call-Down List for EOC staff.
- Establish and maintain Emergency Response/Recovery Resource Lists.
- Develop or Update Emergency Management Mutual Aid Agreements with a focus on Damage Assessment, Debris Removal, and Resource Management.

- Develop and maintain written duties and responsibilities for EOC staff positions and agency representatives.
- Develop or Update Procedures for tracking of disaster-related expenses by local agencies.

FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM

FMA was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA regulations can be found in 44 CFR Part 78. Funding for the program is provided through the National Flood Insurance Fund. FMA is funded at $20 million nationally. FMA provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

There are three types of grants available under FMA: Planning, Project, and Technical Assistance Grants. FMA Planning Grants are available to States and communities to prepare Flood Mitigation Plans. NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project Grants. FMA Project Grants are available to States and NFIP participating communities to implement measures to reduce flood losses. Ten percent of the Project Grant is made available to States as a Technical Assistance Grant. These funds may be used by the State to help administer the program. Communities receiving FMA Planning and Project Grants must be participating in the NFIP. A few examples of eligible FMA projects include: the elevation, acquisition, and relocation of NFIP-insured structures.

States are encouraged to prioritize FMA project grant applications that include repetitive loss properties. The FY 2001 FMA emphasis encourages States and communities to address target repetitive loss properties identified in the Agency's Repetitive Loss Strategy. These include structures with four or more losses, and structures with 2 or more losses where cumulative payments have exceeded the property value. State and communities are also encouraged to develop Plans that address the mitigation of these target repetitive loss properties.

APPENDIX C:
SAFFIR/SIMPSON HURRICANE SCALE

Courtesy of National Hurricane Center

This can be used to give an estimate of the potential property damage and flooding expected along the coast with a hurricane.

Category	Definition	Effects
One	Winds 74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal road flooding and minor pier damage
Two	Winds 96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	Winds 111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL may be flooded inland 8 miles or more.
Four	Winds 131-155 mph	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	Winds greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

Above information can be found at: http://www.fema.gov/hazards/hurricanes/saffir.shtm

Figure 2: Hurricane Landfall History

APPENDIX D:
FUJITA TORNADO DAMAGE SCALE

Developed in 1971 by T. Theodore Fujita of the University of Chicago

SCALE	WIND ESTIMATE *** (MPH)	TYPICAL DAMAGE
F0	< 73	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	73-112	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
F3	158-206	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

*** IMPORTANT NOTE ABOUT F-SCALE WINDS: Do not use F-scale winds literally. These precise wind speed numbers are actually guesses and have never been scientifically verified. Different wind speeds may cause similar-looking damage from place to place -- even from building to building. Without a thorough engineering analysis of tornado damage in any event, the actual wind speeds needed to cause that damage are unknown.

Information depicted above can be found at: http://www.spc.noaa.gov/faq/tornado/f-scale.html

APPENDIX E:
THE RICHTER MAGNITUDE SCALE

Earthquake Severity

Magnitudes	Earthquake Effects
Less than 3.5	Generally not felt, but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0-7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Information above found at: http://www.seismo.unr.edu/ftp/pub/louie/class/100/magnitude.html

The Richter Magnitude Scale

Seismic waves are the vibrations from earthquakes that travel through the Earth; they are recorded on instruments called seismographs. Seismographs record a zig-zag trace that shows the varying amplitude of ground oscillations beneath the instrument. Sensitive seismographs, which greatly magnify these ground motions, can detect strong earthquakes from sources anywhere in the world. The time, locations, and magnitude of an earthquake can be determined from the data recorded by seismograph stations.

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. On the Richter Scale, magnitude is expressed in whole numbers and decimal fractions. For example, a magnitude 5.3 might be computed for a moderate earthquake, and a strong earthquake might be rated as magnitude 6.3. Because of the logarithmic basis of the scale, each whole number increase in magnitude represents a tenfold increase in measured amplitude; as an estimate of energy, each whole number step in the magnitude scale corresponds to the release of about 31 times more energy than the amount associated with the preceding whole number value.

At first, the Richter Scale could be applied only to the records from instruments of identical manufacture. Now, instruments are carefully calibrated with respect to each other. Thus, magnitude can be computed from the record of any calibrated seismograph.

Earthquakes with magnitude of about 2.0 or less are usually call microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. Events with magnitudes of about 4.5 or greater - there are several thousand such shocks annually - are strong enough to be recorded by sensitive seismographs all over the world. Great earthquakes, such as the 1964 Good Friday earthquake in Alaska, have magnitudes of 8.0 or higher. On the average, one earthquake of such size occurs somewhere in the world each year. The Richter Scale has no upper limit. Recently, another scale called the moment magnitude scale has been devised for more precise study of great earthquakes. The Richter Scale is not used to express damage. An earthquake in a densely populated area which results in many deaths and considerable damage may have the same magnitude as a shock in a remote area that does nothing more than frighten wildlife. Large-magnitude earthquakes that occur beneath the oceans may not even be felt by humans.

Above information can be found at: http://neic.usgs.gov/neis/general/handouts/richter.html

APPENDIX F:
Documentation of Planning Process

February 4, 2013
Atkinson Fire Department
PO Box 6
Atkinson, NH 03811

Dear Prospective Atkinson Hazard Mitigation Committee Member,

The federal government has mandated that all local communities complete and update every 5 years a local Hazard Mitigation Plan in order to qualify for future FEMA funding in case of a disaster. The Rockingham Planning Commission has received a grant to develop and update these local Hazard Mitigation Plans for communities in the region and the Town of Atkinson is one of them. There is no cost to the Town, other than your time participating in the planning process. The goal of the plan will be to reduce the personal and economic costs of hazard events in the community. This effort will enhance and strengthen the economic structure and long-term stability of the community, regardless of when a disaster strikes.

Through this planning process, projects are identified that will mitigate and make the next natural disaster to effect Atkinson as undisruptive as possible. The goal is to enlist the support of community stakeholders to sponsor or support projects that help the community mitigate risk and future damages associated with storm events. The planning process does not happen overnight. It will take time for certain projects to be completed. However, the local All Hazards Mitigation Plan is the document that will bring all pre-disaster mitigation efforts to a central location. The Town needs your input in developing this plan.

You have been selected by your local Emergency Management Director to serve as a member of the local Hazards Mitigation Planning Committee for update of the Town of Atkinson's Hazard Mitigation Plan. Your status within the community and your knowledge and long term involvement would be most helpful. Your time commitment would involve a total of between 3 – 5 hours. This is a very structured program with many guidelines so time will not be wasted sitting around re-inventing the wheel. It is important that you not delegate this function but be willing to participate personally. We need to have decision makers involved who have certain knowledge and responsibilities in town.

The first meeting to begin this plan update is scheduled for _____ at the Atkinson Fire Department. Please contact the Atkinson Fire Chief if you cannot attend.

Thank you for your serious consideration of this request.

Sincerely,

Dylan L Smith,
RPC Senior Planner

Hazard Mitigation Committee
Meeting #1

Natural Hazards Mitigation Plan Update Meeting
Emergency Management
Atkinson, New Hampshire
Place: Atkinson Fire Department
Date/Time: March 14, 2013; 1pm

Agenda

1. **Welcome and Introduction**
   - Review of Hazard Mitigation Goals and Objectives

2. **Identify Hazards and conduct Risk Analysis**
   - What are the hazards? – Past and potential
   - What is at risk from those hazards?

3. **Develop Base Map with Critical Facilities (Step 2)**
   - Identify Critical Facilities on a Base Map.

4. **Vulnerability Assessment (Step 3)**
   - List hazards from hazards map - identify what is at risk/vulnerable
   - Estimate potential losses

5. **Capability Assessment (Step 5)**
   - Identify Existing Mitigation Strategies

6. **Questions and Answers**

7. **Set Goals for Next Meeting**

Hazard Mitigation Committee
Meeting #2

Natural Hazards Mitigation Plan Update Meeting
Emergency Management
Atkinson, New Hampshire
Place: Atkinson Town Offices
Date/Time: April 9, 2013; 1pm

Agenda

5. Vulnerability Assessment (Step 3)

- Review Critical Facilities/Past and Potential Hazards Map
- List hazards from hazards map - identify what is at risk/vulnerable
- Estimate potential losses/Analyze Probability of hazard event

2. Review Development trends in town (Step 4)

3. Capability Assessment (Step 5)

- Identify Existing Mitigation Strategies

4. Capability Assessment (Step 6A)

- Identify New Mitigation Strategies/Projects

5. Questions and Answers

6. Set Goals for Next Meeting

Hazard Mitigation Committee
Meeting #3

Natural Hazards Mitigation Plan Update Meeting
Emergency Management
Atkinson, New Hampshire
Place: Atkinson Town Offices
Date/Time: May 21, 2013; 2pm

Agenda

1. **Capability Assessment (Step 6A)**

   - Identify New Mitigation Strategies

2. **Evaluate Each Strategy/Project (Step 6B)**

   - Using the STAPLEE METHOD.

3. **Prioritize Proposed Mitigation Strategies (Step 7)**

   - 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?

4. **Establish an implementation strategy for each new mitigation Strategy defining the following three questions (Step 8)**

   - Who will lead the effort?
   - How will it be implemented? *(Technical and Financial resources)*
   - When will it take place?

5. **Questions and Answers**

6. **Set Goals for Next Meeting**

Hazard Mitigation Committee
Meeting #4

Natural Hazards Mitigation Plan Update Meeting
Emergency Management
Atkinson, New Hampshire
Place: Atkinson Town Offices
Date/Time: June 20, 2013; 2pm

Agenda

1. **Establish an implementation strategy for each new mitigation strategy defining the following three questions (Step 8)**

   - Who will lead the effort?
   - How will it be implemented? *(Technical and Financial resources)*
   - When will it take place?

2. **Questions and Answers**

3. **Next Steps**

APPENDIX G:

Approval Letters from Town Governing Body and FEMA