

ANNEX x:
Marlboro, VT

Marlboro Town-Specific Plan

INTRODUCTION AND PURPOSE

This appendix, when used with the appropriate sections of the basic plan, is an All-Hazard Mitigation Plan for the town of Marlboro. The purpose of this plan is to assist the town of Marlboro in identifying all of the hazards facing the town and to identify strategies to begin reducing risks from identified hazards.

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural and human-caused hazards and their effects. Based on the results of previous Project Impact efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies and measures during all of the other phases of Emergency Management – preparedness, response and recovery. Hazards cannot be eliminated, but it is possible to determine what the hazards are, where the hazards are most severe and identify local actions that can be taken to reduce the severity of the hazard.

Hazard mitigation strategies and measures alter the hazard by eliminating or reducing the frequency of occurrence, averting the hazard by redirecting the impact by means of a structure or land treatment, adapt to the hazard by modifying structures or standards or avoid the hazard by stopping or limiting development, and could include projects such as:

- Flood-proofing structures
- Tying down propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters
- Identifying and modifying high traffic incident locations and routes
- Ensuring adequate water supply
- Elevating structures or utilities above flood levels
- Identifying and upgrading undersized culverts
- Proactive land use planning for floodplains and other flood-prone areas
- Proper road maintenance and construction
- Ensuring critical facilities are safely located
- Establish and enforce appropriate building codes
- Public information

Local Planning Process

The local planning process followed the steps listed in the Regional All-Hazard Mitigation Plan in Section 2. Work commenced with the Local Emergency Management Organization of Marlboro, acting as the local Hazard Mitigation Planning Committee. A complete list of participants is listed in Annex B Page x.

The following hazard mitigation planning meetings were held:

- July 27, 2007; Marlboro Fire House

Hazard Mitigation Goals

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town's waterbodies, natural resources, and historic resources.
- Reduce the economic impacts from hazard events.
 - Minimize disruption to the road network and maintain access

- Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.
- Ensure that community infrastructure is not significantly damaged by a hazard event.
- Encourage hazard mitigation planning to be incorporated into other community planning projects, such as the Town Plan, Capital Improvement Plan, Rapid Response Plan and Town Emergency Plan.
- Ensure that members of the general public continue to be part of the hazard mitigation planning process.

Acknowledgements

The following people were involved in the hazard mitigation planning process:

- Lisa Hecht, Emergency Management Director
- David Elliott, Highways Department Foreman, Fire Chief

TOWN PROFILE

Community Background

Marlboro is a rural hill town of 26,240 acres or 41 square miles in southern Windham County. Marlboro is bordered to the north by Newfane and Dover, Wilmington the West, Halifax to the South and Brattleboro and Dummerston to the East. State highway 9 runs east west through Marlboro. Marlboro's population at the 2000 Census was 978 persons. Evacuation routes are detailed on Map x.

Marlboro is a rural town with a centrally located historic village surrounded by predominantly low-intensity rural-residential development scattered along winding secondary roads, most of which are narrow and unpaved. Most of the off-road back-lands have remained undeveloped since the middle of the nineteenth century. The most intensive use of land occurs at Marlboro College and the Marlboro School of Music, located 2 miles south of the village. Forest-related land use is very significant as a category of land use, agricultural land use accounts for very little of the total area. Residential land use is the largest category of land use. Commercial and industrial land use is almost entirely limited to Route 9.

The largest bodies of surface water in Marlboro are Sunset Lake, Hidden Lake, South Pond and the Green River. There are also several brooks, including Gulf, Worden, Bellows, Branch, Harrisville, Hinesburg and Whetstone Brooks. The highest point in Marlboro is Hogback Mountain at approximately 2,400 feet.

The climate is generally temperate with moderately cool summers and cold winters; as in the rest of Vermont. Average annual precipitation is around xx inches, snowfall averages xx inches. The weather is unpredictable, and large variations in temperature, precipitation, and other conditions may occur both within and between seasons.

Development Trends

The 2000 Census indicates a population of 978, and a growth rate of 6. percent over the 1990 population. This is lower than the 8.2 percent growth rate for the State, but higher than the 5 percent growth rate for Windham County during the same period. Since 1980, Marlboro has experienced a 41 percent increase in population.

COMMUNITY HAZARD INVENTORY AND VULNERABILITY ASSESSMENT

Methodology

A **vulnerability analysis** for each community begins with an inventory of possible hazards and an assessment of the risk that they pose. These are the questions to be answered. What hazards can affect your community? How bad can it get? How likely are they to occur? What will be affected by these hazards? How will these hazards affect you? The **magnitude** (percentage of the community affected) of the impact of the hazard can be classed as follows:

- Negligible: < 10% of properties damaged/Minimal disruption to quality of life.
- Limited: 10% to < 25% of properties damaged/Loss of essential facilities/services for up to 7 days/few (< 1% of population) injuries possible.
- Critical: 25% to 50% of properties damaged/Loss of essential facilities/services for > 7 days < 14 days/Major (< 10% of population) injuries/few deaths possible.
- Catastrophic: > 50% of properties damaged/loss of essential facilities/services for > 14 days/Severe (> 10% of population) injuries/multiple deaths possible.

The **frequency** of occurrence (Likelihood) is classified as shown:

- Unlikely: < 1% probability in the next 100 years.
- Possible: 1% to 10% probability in the next year, or at least one chance in the next 100 years.
- Likely: 10% to 100% probability in the next year, or at least one chance in the next 10 years.
- Highly Likely: Near 100% probability in the next year.

Additionally, seasonal patterns that may exist are considered, what areas are likely to be affected most, the probable duration of the hazard, the speed of onset (amount of warning time, considered with existing warning systems).

The combination of the **magnitude** of the hazard and the **frequency** was used to determine the **community vulnerability** as HIGH, MODERATE or LOW. For example, a flood event is highly likely (nearly 100% probability in the next year) in many communities but the degree of impact varies. A highly likely flood with critical or catastrophic impact rates the community vulnerability as HIGH. Another community with a highly likely or likely (at least one chance in the next 10 years) flood with a limited impact would receive a vulnerability rating of MODERATE. The vulnerability of a community having the occurrence of an event as possible or unlikely with limited or negligible impact would be LOW.

Likelihood:

- U = unlikely
- P = possible
- L = likely
- HL = highly likely

Impact:

- N = negligible
- L = limited
- CR = critical
- CA = catastrophic

Possible Hazard	Likelihood	Impact	Community Vulnerability	Most vulnerable facilities and populations
Tornado/Microburst	P	L	LOW	
Flood	P	L	MOD.	
100-year flood	P	CR	MOD.	
Flash flood	L	L	HIGH	
Hazardous materials	P	L	LOW	w/in 100' of Rt 9
Radiological Incident	P	L	MOD	Population in EPZ, w/in 100' of Rt 9
Structure Fire	L	N	LOW	
Power Failure	HL	L	MOD.	
Winter & Ice Storm	HL	L	MOD.	
High Wind	HL	L	MOD.	
Air crash	P	N	LOW	
Water Supply Contamination	N/A	N/A	N/A	
Hurricane	P	L	LOW	
Earthquake	U	N	LOW	
Dam Failures	P	N	LOW	
Drought	U	N	LOW	
Highway Accidents	HL	N	LOW	
Railroad Accidents	N/A	N/A	N/A	
Wildfire	L	L	MOD	Residences
Landslide	P	N	LOW	
School Safety Issues	P	CR	MOD	
Terrorism	U	L	LOW	

Detailed Hazard Analysis - Highest Hazards

Flash Floods

There are no recent records of ice jams or 100-year flood events in Marlboro; however, flash floods are a locally probable hazard event. Flash floods typically occur during summer when a large thunderstorm or a series of rain storms result in high volumes of rain over a short period of time. Higher-elevation drainage areas and streams are particularly susceptible to flash floods. Flash floods are likely in Marlboro, and potential damage to Marlboro Road could limit access to Town, as it is the only road into the community.

Winter Storms

Winter storms, with snow, ice and freezing temperatures in varying combinations, are fairly commonplace in Marlboro and occur townwide. Heavy wet snows of early fall and late spring, as well as ice storms, often result in loss of electric power, leaving people without adequate heating capability. The other threat from these storms is downed trees, resulting in power failures and impassable roads or driveways.

Wildfire / Structure Fire

Wildfires can spread to residential areas, thus forcing whole communities to evacuate. When fires are followed by heavy rains, the potential for mudslides and flooding is increased. Most of Marlboro is heavily forested. Hence, the potential, given the right conditions, for widespread forest fires is great. Downed trees, as result of the 1998 ice storm, greatly increase the potential for a large, devastating forest fire in this area. However, wildfire conditions do not occur frequently due to the relatively high annual precipitation level. Northern New England did experience some large forest fires in the late 1940s. Portions of the Vermont forest are now beyond the natural burn cycle. Communities or residents located in or along the edges of forested areas are particularly at risk. Wildland fires are most likely in the summer and fall months.

Structure fires are highly likely but not common in Marlboro. Structure fires can result in loss of property and/or life. They can affect a single residential structure or spread to other homes, businesses or apartment complexes. Residential fires kill more people in the U.S. each year than all natural disasters combined. In Vermont, 12 fatal fires resulting in 22 civilian deaths occurred in 2000. The most significant common factor in fire fatalities in Vermont continues to be the absence of a functioning smoke detector in the sleeping area of residential structures. Fires can be caused by improperly disposing of ashes with live coals from wood stoves or faulty electrical wiring.

Power Failure

Power failure is a common event in Marlboro and can occur anywhere in town. Power failures are typically the result of power lines damaged by high winds or heavy snow/ice storms. Power failures may also result from disruptions in the New England or national power grid, as indicated by the widespread power outages in 2003. Dead or dying trees in close proximity to power lines pose a particular threat for power failure.

High Wind

High wind events are highly likely in Marlboro, with the potential for limited resulting damage. The mostly likely local threats for high winds are from nor'easters, hurricanes, downbursts or wind shear. Trees downed by high winds can block roads, and down power and communications lines. Mobile home parks and houses on ridge lines are at greater risk from wind damage. Most high winds events in Marlboro have resulted in minor damage from downed trees and power lines.

Risk Assessment - Potential Loss Estimates

In order to determine potential dollar losses to vulnerable structures due to natural and man-made hazards, each higher-risk hazard type was analyzed below. Human losses are not calculated during this exercise, but could be expected to occur depending on the type and severity of the hazard. Potential loss estimates are based on vulnerability and risk discussions held during Marlboro Hazard Mitigation Committee meetings.

Flash floods

Flash floods typically occur in high elevation drainage areas as a result of summer thunderstorm activity. Damage from flash floods is difficult to predict since, flash flood areas are not mapped at this time. Infrastructure and structures along higher elevation streams and drainage areas are most susceptible to damage from flash flooding. Drainage ditches and culverts xxxx are the biggest concern for local flash flooding events.

Wildfires / Structure Fires

Damage from wildfires is difficult to project. Forest fires are more likely during years of drought or during drier seasons (late summer or fall). Fire danger is generally universal and can occur practically at any time. Damage would depend upon the extent of the fire, the number and type of buildings damaged and the contents destroyed within the structures.

Structure fires are highly likely, but are typically not an annual event in Marlboro. With an average assessed residential value of \$240,100 in April 2007, and assuming one structural fire resulting in the total loss of a structure happens on average once every two years, structural fires could result in \$120,000 in damage in an average year.

Winter / Ice Storms

Damage from heavy snow and ice storms can vary depending upon wind speeds, snow or ice accumulation, storm duration, and structural conditions (such heavy snow and ice accumulation on large, flat roofed structures). The assessed value of all residential and commercial property is \$119,464,500.00. Assuming a range of town-wide damage of 1% to 5%, a heavy snow or ice storm could result in \$119, 464 to \$597,322 of total damage.

Power Failure

Potential loss estimates are difficult to predict for power failures, which typically are isolated in geographic area and short in duration. Therefore, they often have only minimal impact to people and property. Power failures usually result in minor inconveniences to residents; however, longer duration events might result in the loss of perishable items and business losses. Power outages in winter months could result in the loss of home heating, bursting water pipes and resulting structural water damage.

Existing Hazard Mitigation Programs, Projects and Activities

The following policies, programs and activities related to hazard mitigation are currently in place and/or being implemented in the town of Marlboro. The Committee analyzed these programs for their effectiveness and noted improvements needed.

Type of Existing Protection	Description	Effectiveness/Enforcement/Hazard that is addressed	Gaps in Existing Protection/Improvements Needed
Town Plan	Plan for coordinated town-wide planning for land use, municipal facilities, etc.	Flooding Addressed	Town Plan to be updated in 2007
Emergency Operations Plan	Municipal procedures for emergency response	N/A	N/A
Town of Marlboro Rapid Response Plan (RRP)	Basic municipal procedures for emergency response	RRP	NIMS compliance
School Emergency Response Protocol	School procedures for emergency response	Underway	N/A
LEPC 6 Hazardous Materials Plan	Procedures for hazmat emergency response at regional level	LEPC 6 has the plan	Continued involvement with the LEPC
Mutual Aid – Emergency Services	Agreement for regional coordinated emergency services	Keene (NH) Mutual Aid – written agreement/contract for Fire/Ambulance and HazMat	None identified
Mutual Aid – Public Works	Agreement for regional coordinated emergency highway maintenance services		None identified
Road Standards	Design and construction standards for roads and drainage systems	Just updated with VTrans standards	None identified
Subdivision Regulations	Regulates the division of land, standards for site access and utilities		None identified
Sewage Regulations	Regulates on-site sewage systems	See State Agency	None identified
Flood Hazard Area Regulations	Regulates development in FEMA flood hazard areas	Article VII Zoning Regulations	N/A
Site Plan Review (SPR)	Site development standards	See zoning and Subdivision regulations	Included in current draft zoning update

National Flood Insurance Program (NFIP)	Provides ability for residents to acquire flood insurance	NFIP member updated March 2007	N/A
Maintenance Programs	Bridge & Culvert Inventory	Updated in 200x	
Building Code	Regulates building construction standards	No enforcement for single or 2 family dwellings Public Buildings are covered by some Labor & Industry Codes	N/A
Wetland protection – VT Wetland Rules	Protected by 1990 Vermont Wetland Rules	OK	None identified

Identified Hazard Mitigation Programs, Projects, and Activities

The Marlboro Hazard Mitigation Committee identified the following new hazard mitigation activities based on an evaluation of hazard event vulnerability not addressed by existing hazard mitigation initiatives and the feasibility of new activities.

Engineering Projects

- Reduce grade on Adams Brook Rd. from 18-20 percent to 11 percent thus reducing likelihood of wash-outs which then force closure of Augur Hole Rd, a class 2 road that provides a crucial detour for State Route 9 and an evacuation route for Marlboro and Newfane residents

Equipment Purchase

XXXX
XXXX

Implementation Schedule for Prioritized Mitigation Projects¹

The following implementation schedule was developed by the Marlboro Hazard Mitigation Committee. Mitigation actions are listed in priority order, with the most critical needs listed at the top of the list. The following criteria were used in establishing project priorities. Each criterion was rated according to a numeric scale, with each score indicating the potential benefits of each project:

“0”	Not Applicable
“1”	Poor
“2”	Average
“3”	Good

- Does the action reduce damage?
- Does the action contribute to community objectives?
- Does the action meet existing regulations?
- Does the action protect historic structures or structures critical to town operations?
- Can the action be implemented quickly?
- Is the action socially acceptable?
- Is the action technically feasible?
- Is the action administratively possible?
- Is the action politically acceptable?
- Is the action legal?
- Does the action offer reasonable benefits compared to its cost of implementation?
- Is the action environmentally sound?

The ranking of these criteria is largely based on the best available information and best judgment as many projects are not fully scoped out at this time. The actions are listed in the table below in order of how they scored based upon this ranking system (36 is the highest possible score). The full scoring matrix used is located at the end of this annex.

¹ Adapted from Windham Regional Pre-Disaster Mitigation Plan

MITIGATION ACTION	WHO (LEADERSHIP)	WHEN (DEADLINE)	HOW (FUNDING SOURCE)	Project Priority
Regrade Adams Brook Rd	Selectboard	As funding allows	HMGP + local funds	1
Annual culvert program based on inventory	Selectboard		Budget	2
Maintain ditches	Selectboard		Budget	2
Interoperable Communication	Emergency Management Committee			4