

## **Local Hazard Mitigation Plan Update 2008:**

### **Windham, VT**

#### **Windham 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 Windham. The purpose of this plan is to assist the town of Windham 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 Town Selectboard of Windham, acting as the local Hazard Mitigation Planning Committee. The Selectboard will continue to monitor the Plan in the years ahead, making changes where necessary as conditions evolve. A complete list of participants are provided below

Margaret Dwyer, Chairman, Select Board

Walter Woodruff, Select Board

Mary Boyer, Select Board

Rick Weitzel, Fire Chief and Town Emergency Management Director

The following hazard mitigation planning meetings were held:

- August 11, 2008 Regular Meeting of the Windham Selectboard
- The Draft Plan was also circulated to Town Emergency Management Director Rick Weitzel and Highway Department Foreman Rodney Watkins for review and comment
- Public Involvement was solicited through duly warned meeting of the Selectboard posted at Town Offices and local newspapers. The general public did not show up for comments
- The Town of Windham as of 2006 Census figures, has a population of 345. The small population size has made public outreach difficult

For future plan updates the public will be encouraged to comment throughout the planning process via duly warned meetings of Town boards as well as possible inclusion of discussion of emergency plans on Town meeting day. Public participation is generally low in Town, but public officials will continue to make emergency planning a public process.

### **Hazard Mitigation Goals**

- Reduce the loss of life and injury resulting from all hazards.
- Reduce the impact of hazards on the town's water bodies, 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:

- ( Rick Weitzel), Emergency Management Director
- ( Rodney Watkins), Highways Department Foreman,
- ( Rick Weitzel), Fire Chief
- (Margaret Dwyer),Chairman, Selectboard
- (Walter Woodruff) Selectboard
- (Mary Boyer) Selectboard
- (Josh O'Neill), Windham Regional Commission; Assistant Planner

## **TOWN PROFILE**

### **Community Background**

The Town of Windham covers approximately 24,500 acres in the Upper Valley of the Saxton's River Watershed area of Windham County. Development in Windham has been overwhelmingly residential in nature. Most of this residential development is located along Windham Hill Road or on unpaved secondary roads. It is generally characterized as scattered, low density single family development. There are pockets of more dense residential uses in Windham Center, South Windham and near the former Timberside Ski Area. Because residential properties in Windham

do not have public sewer systems, residences tend to be located where soils are more suitable for individual wastewater disposal systems.

The public road network in Windham consists of town highways and roads. Windham can be reached from Windham Hill Road which connects with Route 30 in West Townshend; Route 121 which runs east/west through Town and connects Windham with its neighbors Grafton and Londonderry; and from a small section of State Highway 11 which runs through the northwest corner of Town. Several smaller roads also enter Windham from neighboring towns.

The Town stores its road equipment at the Town Garage located on Windham Hill Road. A covered salt and sand shed, built in 2000, is located on site. There is a reserve fund for equipment replacement to assist in the purchasing of new equipment for the Highway Department.

Lands within Windham drain into the West, Williams, and Saxton's river watersheds. These three watersheds are identified by the State Agency of Natural Resources, for planning and management purposes, as Basin 11. In fact, Windham contains much of the headwater areas of this basin. Efforts are currently underway to develop a Basin Management Plan for Basin 11. This is a public process that inventories uses and problems and develops strategies for maintaining or enhancing water quality; identifies strategies to remedy problems, and assigns Water Management Types to maintain or attain desired water quality. Issues such as water quality, erosion control, storm water runoff, deforestation and buffer loss, and flow regulation and flood control are addresses within the basin planning process.

The climate is generally temperate with moderately cool summers and cold winters; as in the rest of Vermont. Average annual precipitation is around ( 52) inches, snowfall averages ( 90) inches. The weather is unpredictable, and large variations in temperature, precipitation, and other conditions may occur both within and between seasons.

### **Development Trends**

According to 2000 Census data, the number of persons living year-round in the Town of Windham increased from 223 to 328 between 1980 and 2000. This represents a rate of growth of nearly 47% during that time period, nearly two and half times greater than that of either the State of Vermont (19%) or Windham County (20%). Census data indicated that Windham was the fourth smallest town in the Windham Region in 2000. After experiencing a decrease of over 50% during the first half of the 20<sup>th</sup> Century, Windham began to experience population growth. From 1970-2000 Windham's population has nearly doubled from 174 person to 328 persons.

## **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	L	CA	MOD	Potentially the Entire Town
Flood	L	CR	HIGH	Structures, Roads, Bridges
100-year flood	P	CR	MOD	Structures, Roads, Bridges
Flash flood	L	CR	HIGH	Structures, Roads, Bridges, Water Source Contamination
Hazardous materials	P	L	LOW	Residences, Businesses
Radiological Incident	L	CA	LOW	Residences, Businesses, Agricultural Producers
Structure Fire	HL	N	LOW	Structures
Power Failure	HL	L	MOD	Residences
Winter & Ice Storm	HL	L	MOD	Structures, Roads, Bridges, Residences
High Wind	HL	L	MOD	Structures, Roads, Bridges, Residences
Air crash	P	N	LOW	Structures
Water Supply Contamination	U	L	MOD	Wellhead Protection Areas, Residences
Hurricane	P	L	LOW	Residences, Agricultural Producers
Earthquake	U	CA	LOW	Residences, Agricultural Producers, Roads, Bridges

Dam Failures	U	N	LOW	Structures, Roads, Bridges, Residences
Drought	U	N	LOW	Private Well Failures, Residences and Businesses in wooded areas prone to wildfire
Highway Accidents	L	N	LOW	Winter Road Conditions
Railroad Accidents	U	N	LOW	No Railroad in Windham
Wildfire	P	CR	HIGH	Structures on Wooded Sites
Landslide	L	N	LOW	Roads, Streams
School Safety Issues	P	L	LOW	School Students, and Faculty
Terrorism	U	N	LOW	Residents, Structures

### Detailed Hazard Analysis - Highest Hazards

#### **Flash Floods**

Floods have been the most common and costly hazard to affect the Town. Flooding can occur anytime of the year as a result of heavy rains, a thunderstorm, tropical storm, hurricane or Nor'easters. It can result from the overflow of major rivers and their smaller tributaries, or inadequate local drainage. Historically, floods have been a factor in over 80 percent of all federally declared disasters. People living in close proximity to bodies of water such as rivers, lakes, and streams are at risk from flooding. There is a 26 percent chance of experiencing a flood during the life of a 30-year mortgage compared to a 4 percent chance of a fire. Windham is not currently a member of the NFIP and one of the reasons is that the Town experiences erosion based flooding from smaller tributaries much more than it experiences inundation based flooding, which is the type of flooding targeted through the NFIP. The issue of erosion based flood mitigation is currently being addressed through a stream geomorphic assessment study of the Saxton's River Watershed. It is hoped that the fluvial erosion based mapping to come out of this study will help enable the Town to develop more effective land use regulations to mitigate future flood damage. Joining the NFIP is also another step that is being explored at this time. Flash floods are likely in Windham, and potential damage to Route 30 or Route 121 could limit access to Town, as they are major travel corridors through Town and through the region.

#### **Winter Storms**

Winter storms and ice storms can cause power lines to fail, damage trees and impede access to homes and businesses. The Region has experienced 24 snowstorms and ice storms that have resulted in damages of approximately \$3,074,000. On Town Meeting Day in 2001, a region wide snowfall resulted in a presidential declaration for a snow emergency (FEMA-3167-EM). The Town applied for assistance from this declaration.

#### **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 Windham 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 Windham. 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 Windham 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 Windham, 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 Windham 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 Windham 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 are the biggest concern for local flash flooding events. In 2007 Windham County was part of a Presidentially Declared Disaster associated with severe storms and flooding during the period of April 15-21 2007. For the Town of Windham, costs associated with this disaster and local flooding in previous years has been shared through funding from the state. From 2003-2006 flood repair costs have varied with total costs of \$942,621 for 2003 and \$1,184,144 in 2004 and no flood costs reported for 2005 and 2006.

#### ***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 Windham. With an average assessed residential value of \$163,235 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 \$81,617 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 \$84,229,300. Assuming a range of town-wide damage of 1% to 5%, a heavy snow or ice storm could result in \$842,293 to \$4,211,465 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 Windham. 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	New Plan Adopted 2008
Emergency Operations Plan	Municipal procedures for emergency response	All Emergencies	None Identified
Town of Windham Rapid Response Plan (RRP)	Basic municipal procedures for emergency response	RRP Updated in 2008	NIMS Compliant
School Emergency Response Protocol	School procedures for emergency response	School Crisis Plan	Needs Coordination With RRP
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	Public Works MAA signed 07/17/03	None identified
RACES Emergency Communications Program	Radio Amateur Civil Emergency Services	RACES provides essential communications and warning links to supplement State and local government assets	None Identified

		during emergencies.	
Road Standards	Design and construction standards for roads and drainage systems	VTrans Standards	None Identified
Subdivision Regulations	Regulates the division of land, standards for site access and utilities	NA	NA
Sewage Regulations	Regulates on-site sewage systems	State Function Now	None Recognized
Site Plan Review (SPR)	Site development standards	Development Standards Enumerated in Section in Article III of Town Zoning Regulations	None Identified

Maintenance Programs	Bridge & Culvert Inventory	Updated Annually	None Identified
Wetland protection – VT Wetland Rules	Protected by 1990 Vermont Wetland Rules	Protection of environment, water resources, wildlife, biota	None Identified
Installed Town Office/School Generator	Generator	Emergency Energy	None Identified

**Identified Hazard Mitigation Programs, Projects, and Activities**

The Windham 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**

- The Town Selectboard accepted a bid by Gurney Brothers Construction Inc. at their July 17, 2008 Meeting, to install a new Steel Structural Plate Arch Culvert.
- The Town is replacing the Cobb Brook Bridge #27 on Golding Rd. (TH#19)
- This project is to replace bridge #27 that is structurally deficient. The new bridge will be built on the same alignment; the new bridge waterway opening will be 20’ minimum clear span by 6’ minimum clear height.

**Equipment Purchase**

- 2007 International 4X4 Dump Truck w/spreader, plow, & wing. Purchase agreement for 3 years of payments at 2% interest; \$31,000 each year
- Town Equipment Fund January through December 2007 total expenses = \$84,519.16
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- **Implementation Schedule for Prioritized Mitigation Projects<sup>1</sup>**

The following implementation schedule was developed by the Windham 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.

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<sup>1</sup> Adapted from Windham Regional Pre-Disaster Mitigation Plan

<b>MITIGATION ACTION</b>	<b>WHO (LEADERSHIP)</b>	<b>WHEN (DEADLINE)</b>	<b>HOW (FUNDING SOURCE)</b>	<b>Project Priority Score</b>
Fluvial Erosion Mapping	Windham Regional Commission, Windham County Conservation District,	2009	Grant	18
Annual Culvert Program Based on Inventory	Selectboard, Highway Foreman	As Needed	General Fund	28
Replace Two Bridges	Road Crew, Selectboard	2008/09	Grants	34
Dry Hydrant Maintenance	Fire Company	Continuing	Grant	36
NIMS Compliance and Training	Selectboard and Fire Company	Continuing	General Fund	30
Road Repair and Ongoing Bank Stabilization and Erosion Control	Highway Foreman	Continuing	General Fund and State Grants	34