

# Orford Hazard Mitigation Plan Town of Orford, New Hampshire



*Jacob's Brook West, Photo from Town of Orford Website*

**DRAFT 1**  
**December 11, 2003**

## **Section I INTRODUCTION**

### **Background**

The New Hampshire Office of Emergency Management (NHOEM) has a goal for all communities within the State of New Hampshire to establish local hazard mitigation plans as a means to reduce future losses from natural or man-made hazard events before they occur. The NHOEM has provided funding to the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC), to conduct local Hazard Mitigation Plans for several of its communities. UVLSRPC began preparing a local Hazard Mitigation Plan for the Town of Orford in September 2003.

### **Purpose**

The *Orford Hazard Mitigation Plan* serves as a strategic planning tool for use by the Town of Orford in its efforts to reduce future losses from natural and/or man-made hazard events before they occur. This *Plan* does *not* constitute a section of the Master Plan.

### **Authority**

The Orford Hazard Mitigation Committee prepared the *Orford Hazard Mitigation Plan* with the assistance and professional services of the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) under contract with the New Hampshire Office of Emergency Management (OEM) operating under the guidance of the Federal Emergency Management Agency (FEMA). After a public hearing held in the Orford Town Hall, the Orford Board of Selectmen adopted the *Plan* on \_\_\_\_\_, 2004.

### **Scope of the Plan**

The scope of the *Orford Hazard Mitigation Plan* includes the identification of natural hazards affecting the Town, as identified by the Orford Hazard Mitigation Committee. The hazards were reviewed under the following categories as outlined in the State of New Hampshire Hazard Mitigation Plan:

- I. Flooding (Including hurricanes, 100-year floodplain events, debris-impacted infrastructure, erosion, mudslides, rapid snow pack melt, river ice jams, dam breach and/or failure)
- II. Wind (Including hurricanes, tornadoes, “Nor’easters,” downbursts and lightning)
- III. Fire (Including forest fires and issues such as isolated homes and residential areas)
- IV. Ice & Snow Events (Including heavy snow storms, ice storms, and “Nor’easters,”)
- V. Earthquake (Including landslides and other geologic hazards related to seismic activity)

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## Methodology

Using the *Hazard Mitigation Planning for New Hampshire Communities* handbook, as developed by the Southwest Regional Planning Commission (SWRPC), the Orford Hazard Mitigation Committee in conjunction with the UVLSRPC, developed the content of the *Orford Hazard Mitigation Plan* by following the ten-step process set forth in the handbook. The Committee held a total of \_\_\_ meetings beginning on May 28, 2003 and ending on \_\_\_\_\_. Once the Federal Emergency Management Agency (FEMA) has approved the *Plan*, the Orford Board of Selectmen will hold a public hearing to formally adopt the *Plan*.

The following are dates of meetings that were vital to the development of this Plan:

- May 28, 2003: Public Meeting
- September 17, 2003: Meeting with Mark Simmons, Emergency Manager
- October 16, 2003: First Orford Hazard Mitigation Committee meeting
- November 19, 2003: 2<sup>nd</sup> Orford Hazard Mitigation Committee meeting
- December 17, 2003: 3<sup>rd</sup> “ ”
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To complete this Plan, the Hazard Mitigation Committee followed the following planning steps:

### **Step 1: Map the Hazards**

Committee members identified areas where damage from natural disasters had previously occurred, areas of potential damage, and man-made facilities and infrastructure that were at risk for loss of life, property damage, and other risk factors. A GIS-generated base map provided by the UVLSRPC was used in the process.

### **Step 2: Determine Potential Damage**

Committee members identified facilities that were considered to be of value to the Town for emergency management purposes, for provision of utilities and services, and for historic, cultural and social value. A GIS-generated map was prepared to show critical facilities identified by the Orford Hazard Mitigation Committee. In addition, a summary listing of “Critical Facilities” is presented at the end of Section II.

### **Step 3: Identify Plans/Policies Already in Place**

Using information and activities in the handbook, the Committee and UVLSRPC staff identified existing mitigation strategies which are already implemented in the Town related to flood, wind, fire, ice and snow events and earthquakes. A summary chart and the results of this activity are presented in Section III of the *Plan*.

### **Step 4: Identify the Gaps in Protection/Mitigation**

Existing strategies were then reviewed for coverage, effectiveness and implementation, as well as need for improvement. Some strategies are contained in the Emergency Action Plan and were reviewed as part of this step. A summary chart and the results of these activities are presented in Section III of the *Plan*.

### **Step 5: Determine Actions to be Taken**

During an open brainstorming session, the Hazard Mitigation Committee developed a list of other possible hazard mitigation actions and strategies for the Town of Orford. Ideas proposed included prevention (*e.g.*, ), property protection (*e.g.*, ), structural projects (*e.g.*, ), emergency services (*e.g.*,) and public information (*e.g.*, ).

### **Step 6: Evaluate Feasible Options**

The Hazard Mitigation Committee reviewed each of the \_\_\_ hazard mitigation actions and strategies that were identified in the brainstorming session using Evaluation Charts from Step Six of the handbook. Each strategy was rated (good, average, or poor) for its effectiveness related to fourteen factors (*e.g.*, damage reduction, environmental impact, social acceptability and financial feasibility). Each factor was then scored according to the STAPLEE chart outlined in chapter seven of the handbook and all scores were totaled for each strategy. Strategies were ranked by overall score for preliminary prioritization then reviewed again under step eight.

### **Step 7: Coordinate with other Agencies/Entities**

UVLSRPC staff reviewed the Emergency Operations Plan (EOP) that was prepared by the town of Orford, as well as the Orford Master Plan. This was done in order to determine if any conflicts existed or if there were any potential areas for cooperation.

### **Step 8: Determine Priorities**

The Committee reviewed the preliminary prioritization list in order to make changes and determine a final prioritization for new hazard mitigation actions and existing protection strategy improvements identified in previous steps. UVLSRPC also presented recommendations for the Committee to review and prioritize.

### **Step 9: Develop Implementation Strategy**

Using the chart provided under step nine of the handbook, the Committee created an implementation strategy which included person(s) responsible for implementation (who), a schedule 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**

UVLSRPC staff compiled the results of steps one through nine in a draft document, as well as helpful and informative materials from the State of New Hampshire Natural Hazard Mitigation Plan, which served as the model for the Orford Hazard Mitigation Plan.

## **Orford Hazard Mitigation Committee**

Mark Simmons, Emergency Management Director  
Paul Dalton, Chair, Planning Board  
Tim Hebb, Orford Highway and Assistant Fire Chief  
Arthur Dennis, Fire Chief  
Kellen Haak, Orford Historical Society  
Bill McKee, Orford Village Water District/Conservation Commission  
Bruce Schwaegler, Resident  
Quentin Mack, Selectboard  
Guy Hebb, Planning Board  
Steve Calderwood, Police Chief  
Laura Veery, Resident  
Herbert Veery, Resident

Victoria Boundy, UVLSRPC

**OVERALL  
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 Office of Emergency Management (OEM), sets forth hazard mitigation goals and objectives for the State of New Hampshire. The Town of Orford concurred with these goals and adopted them for the Town:

1. To improve upon the protection of the general population, the citizens of the town and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the town's critical support services.
3. To reduce the potential impact of natural and man-made disasters on critical facilities in the town.
4. To reduce the potential impact of natural and man-made disasters on the town's infrastructure.
5. To improve emergency preparedness.
6. To improve the town's 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 the town's economy.
9. To reduce the potential impact of natural and man-made disasters on the town's natural environment.
10. To reduce the town's liability with respect to natural and man-made hazards generally.
11. To reduce the potential impact of natural and man-made disasters on the town'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 town.
12. To identify, introduce and implement cost effective hazard mitigation measures so as to accomplish the town's goals (above) and to raise the awareness and acceptance of hazard mitigation.

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**COMMUNITY PROFILE**

**Location, Topography and Weather Conditions**

The Town of Orford is located 20 miles north of the Lebanon/Hanover area and 20 miles west of Plymouth. The town’s western boundary is located along the Connecticut River. Orford is distinguished by its stately “Ridge” homes and its mountainous eastern sector dominated by Mt. Cube, which is traversed by the Appalachian Trail. Orford’s business center is in the village on Route 10. The Town Office is located in Orfordville on Rt. 25A.

Orford encompasses a total of approximately 29,800 acres. According to the 2000 U.S. Census the population of the Town is 1,091.

[ADD LOCATION MAP FOR TOWN OF ORFORD HERE]

Elevations in Orford range from a high of \_\_\_\_\_ to a low of \_\_\_\_\_. The average temperature of the area is approximately \_\_\_\_\_ (°F), with extremes ranging from an average monthly low of \_\_\_\_\_°F in January to an average monthly high of \_\_\_\_\_°F in July... The average annual precipitation is \_\_\_ inches, of which approximately \_\_\_ inches is snow.

**Development Trends**

As rapid development has taken place in the Hanover/Lebanon area, nearby communities, including Orford, have also been experiencing growth. Orford’s population growth has primarily taken place along Orford’s main roads, but there is great potential for development in the outlying areas of Orford. There is no zoning ordinance in Orford, but there is great interest in protecting the rural nature of the town, as well as its natural and historic features.

**Population Trends for Orford and Nearby Communities**

| <b>Community</b> | <b>1960</b> | <b>1970</b> | <b>1980</b> | <b>1990</b> | <b>2000</b> |
|------------------|-------------|-------------|-------------|-------------|-------------|
| <b>Lebanon</b>   | 9299        | 9725        | 11134       | 12183       | 12568       |
| <b>Lyme</b>      | 1026        | 1112        | 1289        | 1496        | 1679        |
| <b>Orford</b>    | 667         | 793         | 928         | 1008        | 1091        |
| <b>Piermont</b>  | 447         | 462         | 507         | 624         | 709         |

*From: Orford Master Plan. Source: US Census*

## Section II

### HAZARD IDENTIFICATION & POTENTIAL RISK ASSESSMENT

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The Orford Hazard Mitigation Committee reviewed the list of hazards provided in the State of New Hampshire Hazard Mitigation Plan, and some hazard history for the State of New Hampshire and Grafton County in particular. A list of past hazard events in the region is listed on page \_\_\_\_\_. Armed with this information, the Committee conducted a Hazard Analysis and Risk Assessment for the Town of Orford (Page \_\_\_\_).

#### **A. Flooding**

The Orford Hazard Mitigation Committee reviewed the following kinds of hazards related to *flooding*:

##### *1. Hurricanes*

“A hurricane is a heat engine that derives its energy from ocean water. These storms develop from tropical depressions which form off the coast of Africa in the warm Atlantic waters. When water vapor evaporates, it absorbs energy in the form of heat. As the vapor rises, it cools within the tropical depression, then condenses, releasing heat, which sustains the system (State of New Hampshire Natural Hazards Mitigation Plan, p. 56).”

Since 1635, ten hurricanes have reached New Hampshire: 1635, 1778, 1804, 1815, 1869, 1938, 1954, 1960, 1985 and 1991 (*Ibid.*).

All areas of the town of Orford are potentially at risk for hurricane events.

##### *2. 100-year Floodplain Events*

“Localized street flooding occasionally results from severe thundershowers, or over larger areas, from more general rain such as tropical cyclones and coastal ‘northeasters.’ More general and dangerous floods are rare but some result in the spring from large rainfall quantities combined with warm, humid winds that rapidly release water from the snow pack ... General flooding is also caused by major hurricanes that closely follow major rainstorms. Significant flooding occurs periodically along the watercourses with resultant loss of lives and property (*Ibid.* p. 12).”

Similar to many other New Hampshire communities, the Town of Orford developed along the waterways. As a result of this development pattern, the floodplains ... were rapidly settled. The shift to industrialization during the mid-nineteenth century compounded the problem ...” as “[r]esidents moved to the floodplains ... Such encroachment has led to problems, as the floodplains are extensions of the watercourses and ... carry excessive runoffs naturally. Flood safety is a great concern along these watercourses and can be greatly enhanced by flood hazard mitigation planning (*Ibid.* pp. 12-13).”

Development in Orford is concentrated along the major highways, Routes 10 and 25A. Many residential dwellings (approximately \_\_\_\_), \_\_\_\_ of the town’s public buildings, and several stores and businesses in Orford are located in the floodplain. Approximately (\_\_\_\_) commercial, (\_\_\_\_) industrial and (\_\_\_\_) public and quasi-public structures lie in the Orford floodplain.



“Flood hazard mitigation ... is a management strategy in which current action and costs to reduce the occurrence and severity of potential flood disasters are balanced against potential losses from future floods. The goal ... is to eliminate or reduce the long-term risks to human life and property from flooding by reducing the cause of the hazard or reducing the effects through preparedness, response and recovery measures. Hazard Mitigation is the only phase of emergency management that can break the cycle of damage, reconstruction and repeated damage (*Ibid.* p. 13).”

### *3. River Ice Jams*

“Ice forming in riverbeds and against structures presents significant hazardous conditions [...] ... storm waters encounter these ice formations which may create temporary dams. These dams may create flooding conditions where none previously existed (i.e., as a consequence of elevation in relation to normal floodplains). Additionally, there is the impact of the ice itself on structures such as highway and railroad bridges. Large masses of ice may push on structures laterally and/or may lift structures not designed for such impacts (*Ibid.* p. 16).”

Bridges, culverts, water and sewer infrastructure, roads and water-based industrial sites may be especially vulnerable to this type of hazard.

### *4. Dam Breach and Failure*

“The Department of Environmental Services (DES), through its Dam Bureau, is charged with the responsibility of ensuring the public safety as it relates to the regulation of dams. Specifically, authority is granted in the *Revised Statutes Annotated*, Chapter 482 ‘Dams, Mills and Flowage.’ These laws enable DES to regulate the construction and reconstruction of dams, as well as to periodically inspect existing dams to ensure the design, construction, maintenance and operation meet accepted engineering standards ... These dams function to serve the needs of flood control, recreation, wildlife enhancement and water resources management (*Ibid.* p. 17).”

The Town of Orford has one Class A dam, at Indian Pond, which is shown on the GIS map.

## **B. Wind**

The Orford Hazard Mitigation Committee reviewed the following kinds of hazards related to *wind*:

### *1. Hurricanes*

Wind speeds within hurricanes may reach 250 miles per hour in a Category 5 hurricane, as measured on the Saffir-Simpson Hurricane Scale. Tropical depressions are considered to be of hurricane force when winds reach 74 miles per hour. Damage resulting from winds of this force can be substantial, especially considering the duration of the event which may last for many hours (*Ibid.* p. 56).

All areas of Orford are potentially at risk if a hurricane reaches Grafton County, NH.

## 2. Tornadoes

“A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. These events are spawned by thunderstorms and, occasionally by hurricanes, and may occur singularly or in multiples. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. Most vortices remain suspended in the atmosphere. Should they touch down, they become a force of destruction (*Ibid.* p. 54).”

All areas of Orford are potentially at risk for property damage and loss of life due to tornadoes.

## 3. “Nor’easters”

A Northeaster 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 wind, impact the coast and inland areas from a northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours in terms of duration. These storms have complex meteorological derivations (*Ibid.* p. 58).”

“Unlike the relatively infrequent hurricane, New Hampshire generally experiences at least one or two of these events each year with varying degrees of severity. These storms have the potential to inflict more damage than many hurricanes because ... high winds can last from 12 hours to 3 days, while the duration of hurricanes ranges from 6 to 12 hours. Infrastructure, including critical facilities, may be impacted by these events, and power outages and transportation disruptions (i.e. snow and/or debris impacted roads, as well as hazards to navigation and aviation) are often associated with the event (*Ibid.*).”

All areas of Orford are potentially at risk for property damage and loss of life due to “Nor’easters.”

## 4. Downbursts

“A downburst is a severe localized wind blasting down from a thunderstorm. These ‘straight line’ winds are distinguishable from tornadic activity by the pattern of destruction and debris. Depending on the size and location of these events, the destruction to property may be devastating. Downbursts fall into two categories.” Microbursts cover an area less than 2.5 miles in diameter, and macrobursts cover an area at least 2.5 miles in diameter (*Ibid.* p. 59)”

Potentially all locations in Orford are at risk for property damage and loss of life due to downbursts.

## 5. Lightning

“During the development of a thunderstorm, the rapidly rising air within the cloud, combined with the movement of the precipitation within the cloud, causes electrical charges to build up within the cloud. Generally, positive charges build up near the top of the cloud, while negative charges build up near the bottom. Normally, the Earth’s surface has a slight negative charge. However, as the negative charges build up near the base of the cloud, the ground beneath the cloud and the area surrounding the cloud becomes positively charged. As the cloud moves, these induced positive charges on the ground follow the cloud like a shadow. Lightning is a giant spark of electricity that occurs between the positive and negative charges within the atmosphere or

between the atmosphere and the ground. In the initial stages of development, air acts as an insulator between the positive and negative charges. However, when the potential between the positive and negative charges becomes too great, there is a discharge of electricity that we know as lightning (*Ibid.* p. 63).”

Lightning kills an average of 87 people per year in the United States, and New Hampshire has the 16<sup>th</sup> highest casualty rate in the nation (*Ibid.* p. 63) All areas of Orford are potentially at risk for property damage and loss of life due to lightning.

### **C. Wildfire**

The Orford Hazard Mitigation Committee reviewed *wildfire*:

“Historically, large NH wildland fires run in roughly 50 year cycles. The increased incidence of large wildland fire activity in the late 1940’s and early 1950’s is thought to be associated, in part, with debris from the Hurricane of 1938. Significant woody ‘fuel’ was deposited in the forests during that event. Present concerns of New Hampshire Department of Resources and Economic Development, Division of Forests & Lands are that the Ice Storm of 1998 has left a significant amount of woody debris in the forests of the region as may fuel future wildfires (*Ibid.* p. 34).”

“NH averages 500 fires per year and averages ½ acre or less per fire due to the excellent coordination between Fire Towers and local Fire Departments (*Ibid.* p. 34).” There are several areas of the Town of Orford that are susceptible to wildfires. These areas have been identified on the GIS map.

### **D. Ice & Snow Events**

The Orford Hazard Mitigation Committee reviewed the following kinds of hazards related to *ice* and *snow*:

#### *1. Heavy Snow Storms*

“A heavy snowstorm is generally considered to be one which deposits four or more inches of snow in a twelve-hour period... A blizzard is a winter storm characterized by high winds, low temperatures, and driving snow- according to the official definition given in 1958 by the U.S. Weather Bureau, the winds must exceed 35 miles per hour and the temperatures must drop to 20°F (-7°C) or lower. Therefore, intense Nor’easters which occur in the winter months are often referred to as blizzards. The definition includes the conditions under which dry snow, which has previously fallen, is whipped into the air and creates a diminution of visual range. Such conditions, when extreme enough, are called ‘white outs’ (*Ibid.* pp. 69-70).”

All areas of Orford are potentially at risk for property damage and loss of life due to heavy snows.

#### *2. Ice Storms*

“When a mass of warm moist air collides with a mass of cold arctic air, the less dense warm air will rise and the moisture may precipitate out in the form of rain. When this rain falls through the colder more dense air and comes in contact with cold surfaces, the latent heat of fusion is removed by connective and/or evaporative cooling. Ice forms on these cold surfaces and may continue to form until the ice is quite deep, as much as several inches. This condition may strain

branches of trees, powerlines and even transmission towers to the breaking point and often creates treacherous conditions for highway travel and aviation. Notwithstanding the unique beauty of such events, the weight of formed ice (especially with a following wind) may cause power and phone lines to snap and the towers that support them to fail under the load of ice and/or bending or broken tree limbs. Debris impacted roads make emergency access, repair and cleanup extremely difficult. The recent Ice Storm of January 1998 was not unique in either its spatial scope or its devastating consequences. A similar event in 1929 is believed to have been comparable to this event (*Ibid.* p. 80).” All areas of Orford are potentially at risk for property damage and loss of life due to ice storms.

### 3. “Nor’easters”

In the winter months, [Towns within] the State may experience the additional coincidence of blizzard conditions with many of these events as well as the added impact of the masses of snow and/or ice upon infrastructure thus, impacting upon transportation and the delivery of goods and services for extended periods of time, as well as various related impacts upon the economy. The entire area of the State may be impacted by these events... Heavy snow and/or rainfall may be experienced in different areas of the State and the heavy rains may contribute to flood conditions. Nor’easter events which occur toward the end of a winter season may exacerbate the spring flooding conditions by depositing significant snow pack at a time of the season when spring rains are poised to initiate rapid snow pack melting (*Ibid.* p. 70).”

All areas of Orford are potentially at risk for property damage and loss of life due to “Nor’easters.”

## E. Earthquake

The Orford Hazard Mitigation Committee reviewed the following kind of seismic hazards:

### 1. Earthquakes

“A series of vibrations induced in the Earth’s crust by the abrupt rupture and rebound of rocks in which elastic strain has been slowly accumulating (*Ibid.* p. 37).” “In general, New England is considered to have a moderate seismic vulnerability but a high seismic risk because of our built environment (*Ibid.* p. 43).” All areas of Orford are potentially at risk for property damage and loss of life due to earthquakes.

| New England States Historical Earthquakes                     |                 |                  |
|---|-----------------|------------------|
| State   | Years of Record | # Of Earthquakes |
| Connecticut   | 1568 - 1989     | 137              |
| Maine   | 1766 - 1989     | 391              |
| Massachusetts   | 1627 - 1989     | 316              |
| New Hampshire   | 1728 - 1989     | 270              |
| Rhode Island  | 1766 - 1989     | 32               |
| Vermont   | 1843 - 1989     | 69               |
| Total Number of Earthquakes within New England 1215.          |                 |                  |
| Total Number of Earthquakes in the Northeast, 1538-1989 4498. |                 |                  |

Source: NESEC website

## 2. Landslides

“Webster: ‘The sliding of a mass of soil, detritus or rock on or from a steep slope.’ More specifically, a landslide is the downward movement of slope forming materials reacting under the force of gravity including: mudflows, mudslides, debris flows, rockslides, debris avalanches, debris slides and earth flows. ...Landslides may be formed when a layer of soil atop a slope becomes saturated by significant precipitation and slides along a more cohesive layer of soil or rock (*Ibid.* p. 45).”

According to the Orford Hazard Mitigation Committee, there is not much potential for landslides to occur in the Town of Orford.

### Past Hazards Events in Orford, Grafton County, and the State of New Hampshire

| Hazard   | Date                | Area Affected<br>(River Basin or Region) | Remarks/Description  |
|----------|---------------------|--|--|
| Flooding | April 19-22, 1862   | Connecticut River                        | Highest stream stages to date on CT River; due solely to snowmelt.   |
| Flooding | October 3-5, 1869   | Connecticut River                        | Tropical storm lasting 36 hrs. Rainfall, 6-12 in.  |
| Flooding | November 3-4, 1927  | Connecticut River                        |  |
| Flooding | March 11-21, 1936   | Statewide                                | Double flood; due to rainfall and snowmelt   |
| Flooding | September 21, 1938  | Statewide                                | Hurricane  |
| Flooding | June 15-16, 1943    | Upper CT River                           | Intense rain exceeding four inches   |
| Flooding | August 1955         | CT River Basin                           | Heavy rains caused extensive damage throughout basin   |
| Flooding | April 1976          | Connecticut River                        | Rain and snowmelt  |
| Flooding | July - August 1986  | Statewide                                | Severe summer storms: heavy rains, tornados flash flood, and severe winds (FEMA DR-771-NH)   |
| Flooding | August 7-11, 1990   | Statewide                                | A series of storm events with moderate to heavy rains. FEMA DR-876-NH  |
| Flooding | August 19, 1991     | Statewide                                | Hurricane Bob - effects felt statewide   |
| Flooding | 1992                | Jacobs Brook, Orford                     | Anecdotal  |
| Flooding | October 1996        | North/West NH                            | Grafton County Declared: FEMA-DR-1077-NH   |
| Flooding | October - Nov. 1995 | North/West NH                            | Grafton County Declared: FEMA DR-1144-NH   |
| Ice Jam  | January 19, 1996    | Connecticut River                        | The jam extended ¼ mile upstream and ¼ mile downstream of the Orford/Fairlee Bridge.   |
| Ice Jam  | March 10, 1992      | Jacobs Brook                             | Ice jam formed at a bend in the river caused flooding March 10-11 and March 26-27. Jam caused residential and road flooding, disruption to private, residential water supply and sewage, riverbank erosion, erosion around bridge abutments, structural damage to private bridge, and NH Rt. 25A pavement. Evacuation was recommended but not complied with. Town used highway dept. equipment in effort to break jam. |
| Ice Jam  | March 27, 1992      | Jacobs Brook                             | Route 25A in Orfordville closed for a while  |

|   |  |                       |  |
|---|--|-----------------------|--|
|   |  |                       | because of flooding. The flooding was said to be caused by the ice jam event two weeks earlier (listed above)  |
| Tornado   | August 20, 1816                                  | Grafton County        | No further information available   |
| Tornado   | September 9, 1821                                | Grafton County        | “ ”  |
| Tornado   | July 16, 1880                                    | Grafton County        | F2 Scale (113-157 mph winds; considerable damage)  |
| Tornado   | August 11, 1966                                  | Grafton County        | F2 Scale   |
| Tornado   | May 11, 1973                                     | Grafton County        | F2 Scale   |
| Hurricane   | 1938   |                       |  |
| Downburst   | July 6, 1999                                     | Grafton County        | Two roofs blown off structures; power outages; downed trees, utility poles, and wires  |
| Winter Storms (“Nor’easters, blizzards, snowstorms) | Too numerous to mention here - See Appendix ____ | Northeast             | Most notable events between the years 1955-1985: blizzards of February 1958 and January 1966, triple snowstorms of 1960/61 winter, wind and snowstorm of February 1978, “Presidents’ Day Storm of 1979, and paralyzing urban storm of February 1983. |
| Ice Storm   | Dec. 17-20, 1929                                 | NH                    | Disruption and damage to telephone, telegraph, and power system.   |
| Ice Storm   | Dec. 29-30, 1942                                 | NH                    | Glaze storm; severe intensity  |
| Ice Storm   | Dec. - Jan., 1969/70                             | NH                    | Power disruption to many communities   |
| Ice Storm   | Jan. 8-25, 1979                                  | NH                    | Major disruptions to power and transportation  |
| Ice Storm   | January 7, 1998                                  | NH                    | 52 communities in nine counties impacted, six injuries, one fatality, road closures, power outages, telephone service failure, other damages.  |
| Wildfire  | 1996   | Orford                | Anecdotal; Lightning strike; three acres burned east of Indian Pond Rd.  |
| Earthquake  | December 20, 1940                                | Ossipee, NH           | 5.5 on Richter scale (this list of earthquakes are those with magnitude 4.2 or more, 1924 - 1989.)   |
| Earthquake  | December 24, 1940                                | Ossipee, NH           | 5.5  |
| Earthquake  | December 28, 1947                                | Dover-Foxcraft, ME    | 4.5  |
| Earthquake  | June 10, 1951                                    | Kingston, RI          | 4.6  |
| Earthquake  | April 26, 1957                                   | Portland, ME          | 4.7  |
| Earthquake  | April 10, 1962                                   | Middlebury, VT        | 4.2  |
| Earthquake  | June 15, 1973                                    | In NH @ Quebec border | 4.8  |
| Earthquake  | January 19, 1982                                 | West of Laconia, NH   | 4.5  |

*Sources: Town of Orford residents; New Hampshire Office of Emergency Management; Northeast States Emergency Consortium (NESEC) Website; US Army Corps of Engineers Ice Jam Database*

### Hazard Analysis and Risk Assessment - Town of Orford

The Town of Orford Hazard Mitigation Committee reviewed each potential hazard and rated both the likelihood as **unlikely, possible, likely,** and **highly likely** and impact of that hazard as **limited, moderate, critical,** or **catastrophic**, and from both of those ratings determined a Community Vulnerability rating (**low, moderate,** or **high**). The Committee also identified the most vulnerable facilities and populations for each hazard type.

| <b>Hazard</b>                                  | <b>Likelihood</b> | <b>Impact</b>           | <b>Vulnerability</b> | <b>Most Vulnerable</b>  |
|--|-------------------|-------------------------|----------------------|---|
| Flooding                                       | Possible          | Moderate                | Moderate             | Roads, culverts, bridges, water system, bank erosion                    |
| Flash Flood                                    | Possible          | Limited                 | Low                  | Same as flooding  |
| Hazardous Materials                            | Likely            | Limited                 | Moderate             | Orford-Fairlee Bridge, road access, transportation, people, groundwater |
| Wildfire                                       | Possible          | Critical                | Moderate             | Remote houses, forestland   |
| Winter Storm                                   | Highly Likely     | Limited                 | Moderate             | Roads, commuters, power   |
| Ice Storm                                      | Likely            | Limited to Catastrophic | Moderate             | Roads, commuters, power   |
| Hurricane                                      | Possible          | Limited to Cat.         | Low                  | Trees, flooding, houses, bridges, bridge to VT, power                   |
| Earthquake                                     | Possible          | Limited                 | Moderate             | Masonry buildings, bridge to VT, school                                 |
| Highway/Road accidents                         | Highly Likely     | Limited                 | Moderate             | Two main routes, power lines  |
| Dam Breach                                     | Unlikely          | Limited to Crit.        | Low                  | Indian Pond Dam @ Indian Pond Rd.                                       |
| Drought  | Likely            | Limited                 | Moderate             | Wells   |
| School safety (earthquake, domestic terrorism) | Possible          | Limited to Crit.        | Moderate             | Rivendell School - regional school with ~350 students                   |
| Tornado  | Unlikely          | Limited                 | Low                  | Village Center  |

## **Critical Facilities**

A critical facility is a building, structure, or location which:

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

*(Guide to Hazard Mitigation Planning for New Hampshire Communities)*

Critical Facilities can be divided into structures, buildings, and locations:

### **Structures**

- Orford-Fairlee Bridge
- Lower Baker Pond Bridge
- Village Water District
- Indian Pond Dam
- Indian Pond Road Culvert

### **Buildings**

- Orfordville Congregational Church
- Rivendell School
- Congregational Church, Main Street
- Town Hall
- Town Garage
- Fire House
- Ridge Professional Park
- Paradigm Construction Company

### **Locations**

- Ridge Homes
- Pastures Campground
- Jacob's Brook Campground
- Upper Baker Pond - Summer Camps



### Critical Facilities in Orford

| Facility Name                           | Type                                  | Generator            | 100-Year | 500-Year | Bldg. Size | Type of Hazard Impact Most Vulnerable To                              | \$ Value |
|---|---------------------------------------|----------------------|----------|----------|------------|---|----------|
| Orfordville Congregational Church       | Emergency Shelter                     | No, and no heat      | Yes      | Yes      |            | Flooding, Road Accidents, Bank Erosion, Ice Storm                     |          |
| Rivendell School                        | Emergency Shelter                     | No                   |          |          |            | HazMat, Domestic terrorism, Earthquake, Ice storm                     |          |
| Main St. Congregational Church          | Alternate emergency shelter           | No                   | No       |          |            | HazMat, Earthquake, Ice Storm   |          |
| Orford-Fairlee Bridge                   | Bridge                                | ---                  | ---      | ---      | ---        | HazMat, earthquake, traffic accidents, flood, winter storms           |          |
| Lower Baker Pond Bridge                 | Bridge                                | ---                  | ---      | ---      | ---        | Flooding (semi-annually), Traffic accidents, HazMat, Winter Storms    |          |
| Town Hall                               | Admin., Police HQ, EOP                | No                   |          |          |            | Terrorism, HazMat, Earthquake, snow falling off roof, Winter Storms   |          |
| Town Garage                             | Emergency Response                    | No                   |          |          |            | HazMat, Earthquake, Winter Storms                                     |          |
| Water District                          |                                       | No                   |          |          |            | HazMat, Terrorism, flooding   |          |
| Fire House                              | Emergency Response                    | No                   | No       | Yes      |            | Severe flooding, Earthquake   |          |
| Ridge Homes, National Register District | Areas at Risk                         | ---                  |          |          |            | Traffic accidents, HazMat, Flooding (?), Earthquake (brick buildings) |          |
| Pastures Campground, Rt. 10             | Areas at Risk                         | ---                  | Yes      | Yes      | ---        | Flooding, Wind events (?)   |          |
| Jacob's Brook Campground                | Areas at Risk, 20 trailers/tent sites | ---                  | Yes      | Yes      | ---        | Flooding, Wind events   |          |
| Upper Baker Pond - two summer camps     | Areas at Risk                         | Yes, wired in summer | Yes?     | Yes      | ---        | Flooding, domestic terrorism, HazMat                                  |          |
| Indian Pond Dam (Class A)               | Infrastructure, recently rebuilt      | ---                  | Yes      | Yes      | ---        | Dam breach or failure   |          |
| Ridge Professional Park (~50 people)    | Economic Importance, Area at Risk     |                      |          |          |            | Earthquake (brick and cement block construction)                      |          |
| Indian Pond Rd. Culvert (by outflow)    | Infrastructure                        | ---                  |          |          |            | Flooding events   |          |
| Paradigm Construction Co.               | Potential emergency shelter           |                      |          |          |            |   |          |

**SECTION III  
EXISTING MITIGATION STRATEGIES & PROPOSED IMPROVEMENTS**

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**Review of Existing Programs**

The Orford Hazard Mitigation Committee identified the following existing mitigation strategies related to:

**A. Flooding**

- Routine Culvert Maintenance
- Town Radio System
- Hazardous Materials Regulations (State)
- Floodplain Development Ordinance
- Capital Improvement Plan
- Conservation Commission/Fund
- Shoreland Protection Act
- FEMA information on Town website
- Town Highway Operations

**B. Wind**

- Electrical Back-Up Generators
- Tree warden/maintenance program

**C. Wildfire**

- Fire Department
- Town Radio System
- Tree Warden/maintenance program

**D. Hazardous Materials Events**

- State of NH Hazardous Materials Regulations

**E. Ice & Snow Events**

- Town Highway Operations
- Routine culvert maintenance
- Electrical Back-Up Generators
- Mutual Aid
- Citizen preparedness information on Town Website

**F. Earthquake**

- Citizen Preparedness information on town website
- Electrical Back-Up Generators

**G. Erosion**

- Shoreland Protection Act
- Subdivision regulations
- Excavation Regulations

**H. School Safety/Domestic Terrorism**

- Rivendell Emergency Plan
- Police Chief
- Emergency Management Director

### Description of Existing Programs

#### **Routine culvert maintenance**

The Town of Orford Highway Department maintains culverts on an as-needed basis.

#### **Town Radio System**

The Police Department has digital radio communications, but the Fire Department does not.

#### **Hazardous Materials Regulations**

New Hampshire regulations regarding Hazardous Materials, etc., are enforced in the Town of Orford (?).

#### **Floodplain Development Ordinance**

Orford has been participating in the National Flood Insurance Program since \_\_\_\_\_. Flood Insurance Rate Maps and the Flood Boundary and Floodway Map, all bearing the effective date of \_\_\_\_\_ are used for flood insurance purposes and are on file with the Orford Planning Board. There are approximately \_\_\_\_\* structures located in the FEMA designated Special Flood Hazard Areas (SFHA's) as identified on the \_\_\_\_\_ NFIP maps for Orford. There are \_\_\_\_\_ structures in Orford that have NFIP flood insurance policies. There have been \_\_\_\_\_ claims made since \_\_\_\_\_ for a total of \$\_\_\_\_\_ in insured losses. There are no "Repetitive Loss Properties" insured under the NFIP for the town of Orford.

\*Estimated count – No records containing this data exist in the town.

#### **Capital Improvement Plan**

This plan recommends capital improvement projects needed, classifies them according to urgency and need, and provides a time sequence for their implementation.

#### **Conservation Commission/Fund**

#### **Shoreland Protection Act**

The Act, passed into law in 1994, establishes minimum standards for the future subdivision, use, and development of the shoreland's within 250 feet of the state's public waters. When repairs, improvements, or expansions are proposed to existing development, the law requires these alterations to be consistent with the intent of the Act.

#### **FEMA information on Town website**

The Town website has fact sheets on hazard and emergency preparedness, from FEMA, the NH Office of Emergency Management, Department of Homeland Security, and the Red Cross.

#### **Town Highway Operations**

#### **Electrical Back-Up Generators**

The following facilities have electrical back-up generators:

**Tree Warden/Maintenance Program**

The Tree Warden maintains trees on Town land (?). The Town of Orford participates in the Tree City USA program.

**State of NH Hazardous Materials Regulations****Mutual Aid Compact**

The Town of Orford participates in a Mutual Aid agreement with 33 towns in the NH/VT Bistate region.

**Emergency Operations Plan**

The Orford Emergency Plan was updated in February 2003 and covers emergency response protocol, notification, emergency shelters, and other emergency response information. The Emergency Plan does *not* have a section on Hazardous Material Response.

**Subdivision regulations**

Subdivision regulations deal with such issues as layout of lots and streets, adequate drainage, provisions of water and sewer services and how one development relates to the overall scheme of municipal design.

**Excavation regulations**

Regulate the operation and reclamation of commercial pits.

**Rivendell School Emergency Plan****Emergency Management Director****Summary of Recommended Improvements**

The Orford Hazard Mitigation Team recommended improvements to existing programs as follows:

- Strengthen Land Use section of Orford Master Plan (how?)
- Seek funding to update the Emergency Plan with a section on Hazardous Materials
- Set up a timeline for updating the Capital Improvement Plan
- Research what other towns are doing to upgrade radio communications
- Research incentive programs for recruiting on-call firefighters
- Revise and strengthen Floodplain Ordinance (Make floodplain development more restrictive)
- Investigate a new Emergency Operations Center
- Pursue funding for new back-up generators for \_\_\_\_\_

**Existing Protection Matrix**

A summary matrix of existing hazard mitigation strategies is presented on the next page. This matrix includes the type of existing protection (Column 1), its current status (Column 2), enforcement of the strategy (Column 3), the effectiveness and identified improvements/changes needed (Column 4), and possible follow-up action steps (Column 5).

| <b>Existing Protection</b>  | <b>Current Status</b>   | <b>Enforcement</b>                            | <b>Effectiveness/improvements or changes needed</b>   | <b>Possible Action Steps</b>  |
|-----------------------------|---|---|---|---|
| Orford Master Plan          | Revised August 2001   | Planning Board                                | Needs to be continually updated.  | Could use stronger land use section                                       |
| Orford Emergency Plan       | Disaster preparation and emergency response; Updated in 2003              | Emergency Manager enforces                    | Needs to address hazmat   | Include section on hazardous materials; research funding source to do so. |
| Subdivision regulations     | Established standards for new roads                                       | Planning Board operates; Selectboard enforces | Not definitive enough in language. Zoning needs to be revisited.  | Strengthen language. Revisit possibility of creating zoning ordinance.    |
| Routine culvert maintenance | Culverts maintained as needed   | Town Highway                                  | No formal program, but in pretty good shape currently.  |   |
| Capital Improvement Plan    | For services requiring capital items                                      | Planning Board                                | Needs updating  | Set a timeline for updating   |
| Radio Communications        | Police Dept. has digital  | Police Dept.                                  | Fire Dept. hesitant to move to digital. Town looking at setting up their own repeater but is a major expense. | Research what other towns are doing                                       |
| Fire Dept.                  | 10 on-call firefighters   | Fire Chief                                    | Difficulty recruiting. Difficulty with radio communications.  | Research further incentives for recruitment                               |
| Police Chief                | New chief hired in 2003; spots for two more officers                      |   | Equipment needs (specify)   |   |
| Tree Warden                 | Maintains trees; Tree City USA member (town)                              | Road Agent                                    |   |   |
| Conservation Commission     | Wetland protection; conservation easements; education; aquifer protection |   |   | Educating public is a challenge (more details)                            |
| Mutual Aid                  | NH/VT - 33 Towns  |   | Imbalance in participation; bistate arrangement being questioned  |   |

|   |   |                             |  |   |
|---|---|-----------------------------|--|---|
| National Flood Insurance Program (NFIP)                 |   | Planning Board Chair?       | Doesn't protect floodplains; maps are not accurate                                   | Revise and strengthen ordinance (recommendation in Master Plan) |
| Emergency Management Director                           |   |                             | Currently Town Hall serves as Emergency Operations Center - is inadequate            | Research options for EOC  |
| Rivendell School Emergency Plan                         |   |                             |  |   |
| Orford Village District Water Plan                      | Dated 4/3/03; required by state to be updated every 6 years | Water District Director (?) | State is requiring that Orford get a new water system; town is now looking for well. |   |
| Back-Up Generators                                      |   |                             |  |   |
| Shoreland Protection Act                                |   |                             |  |   |
| Web pages on emergency management and hazard mitigation |   |                             |  |   |

**Section IV**  
**NEWLY IDENTIFIED MITIGATION STRATEGIES & CRITICAL EVALUATION**

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**Summary of New Strategies**

The Orford Hazard Mitigation Committee brainstormed potential mitigation actions at a meeting on Wednesday, December 17, 2003. The new proposed measures were placed in the following five categories:

- Property Protection
- Structural Projects
- Emergency Services
- Public Information
- Equipment Purchases

**Property Protection**

**Structural Projects**

**Emergency Services**

**Public Information**

**Equipment Purchases**

### Summary of Critical Evaluation

The Orford Hazard Mitigation Committee prioritized each of the newly identified mitigation strategies and those improvements recommended in Column 5 of the Existing Protection Matrix using the following factors:

- Ability to reduce disaster damage
- Ability to complete or be combined with other actions
- Impact on the environment
- Ability to meet regulations
- Ability to save or protect historic structures
- Ability to meet other community objectives
- The duration of its implementation period
- Social acceptability
- Technical feasibility and potential success
- Administrative workability
- Political acceptability
- Legal implementation
- Economic impact
- Environmental capability

**Table \_\_\_\_ : STAPLEE Analyses of Proposed Mitigation Strategies (WILL BE DONE FOR EACH PROPOSED ACTION)**

**Mitigation Action:**

| Criteria           | STAPLEE Evaluation | Score | Additional Cost/Benefit Consideration |
|--------------------|--------------------|-------|---------------------------------------|
|                    |                    |       |                                       |
|                    |                    |       |                                       |
|                    |                    |       |                                       |
|                    |                    |       |                                       |
|                    |                    |       |                                       |
|                    |                    |       |                                       |
| <b>FINAL SCORE</b> |                    |       |                                       |



### **Preliminary Prioritization**

The Orford Hazard Mitigation Committee assigned the following scores to each strategy for its effectiveness related to the STAPLEE critical evaluation factors listed on the previous page:

| <b><u>Score</u></b> | <b><u>Action</u></b> | <b><u>Reference</u></b> |
|---------------------|----------------------|-------------------------|
|                     | (PROPOSED PROJECT)   | (HAZARD)                |
|                     | ETC.                 |                         |

**Section V**  
**PRIORITIZED IMPLEMENTATION SCHEDULE & FUNDING SOURCES**

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**Implementation Strategy for Priority Mitigation Actions**

The Orford Hazard Mitigation Committee created the following prioritized schedule for implementation:

| <b>Mitigation Action</b> | <b>Who (Leadership)</b> | <b>When (Deadline)</b> | <b>How (Funding Source)</b> |
|--------------------------|-------------------------|------------------------|-----------------------------|
|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |
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|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |
|                          |                         |                        |                             |

**Section VI**  
**ADOPTION AND IMPLEMENTATION OF THE PLAN**

---

A good plan needs to provide for periodic monitoring and evaluation of its successes and challenges, and to allow for updates of the Plan where necessary. In order to track progress and update the Mitigation Strategies identified in the Plan, it is recommended that the Town of Orford revisit the Hazard Mitigation Plan *annually, or after a hazard event*. The Orford Emergency Management Director is responsible for initiating this review and should consult with the Hazard Mitigation Committee. Changes should be made to the plan to accommodate for projects that have failed, or that are not considered feasible after a review for their consistency with STAPLEE criteria, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked highest, but that were identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this plan, to determine feasibility for future implementation. During the annual review period, there should be a public hearing to receive public comment, and the Board of Selectmen should adopt the final Plan. The public should continue to be involved in the hazard mitigation planning process.

**IMPLEMENTATION THROUGH EXISTING PROGRAMS**

In future years, the information in this plan may be incorporated as a separate chapter in the Master Plan. In addition, the Board of Selectmen, during the Capital Improvement Process, will review and consider the inclusion of proposed projects outlined in this plan. The Town's Emergency Management Director will ensure ongoing consistency between the Town's Hazard Mitigation Plan and the Emergency Plan.

[SAMPLE LETTER OF RESOLUTION]

**Town of Orford, New Hampshire  
Planning Board  
A Resolution Approving the Orford Hazard Mitigation Plan  
(Date)**

WHEREAS, the Town of Orford received assistance from the Upper Valley Lake Sunapee Regional Planning Commission through funding from the NH Office of Emergency Management to prepare a hazard mitigation plan; and

WHEREAS, several planning meetings to develop the hazard mitigation plan were held between (dates) and then presented to the Board of Selectmen for review and discussion at public hearings on (date); and

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

WHEREAS, the Board of Selectmen held a public meeting on (date) to formally approve and adopt the Orford Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Orford Board of Selectmen approve the Orford Hazard Mitigation Plan.

APPROVED and SIGNED this ( ) day of ( ) 2004.

\_\_\_\_\_  
, Chairman  
Orford Board of Selectmen

\_\_\_\_\_  
\_\_\_\_\_

ATTEST

\_\_\_\_\_  
( ), Town Clerk

**RESOURCES USED IN THE PREPARATION OF THIS PLAN**

NH OEM's *State of New Hampshire Natural Hazards Mitigation Plan* (9/99)

Massachusetts's *Flood Hazard Mitigation Planning: A Community Guide* (6/97)

*Guide to Hazard Mitigation Planning for New Hampshire Communities, prepared for NH OEM  
by the Southwest Regional Planning Commission* (October 2002)

FEMA's *Community Based Hazard Mitigation Planning: Lowering the Risks and Costs of  
Disasters* (8/98)

Town of Orford *Master Plan* (2001 update)

Town of Orford *Emergency Management Plan* (2002)

## **APPENDICES**

**Appendix A: Technical Resources**

**Appendix B: Technical and Financial Assistance**

**Appendix C: Matrix of Federal All-Hazards Grants**

**Appendix D: Meeting Minutes**

**Appendix A:**  
**Technical Resources**

**APPENDIX A:**

**TECHNICAL RESOURCES**

**1) Agencies**

|   |                |
|---|----------------|
| <b>New Hampshire Office of Emergency Management</b> .....         | 271-2231       |
| Hazard Mitigation Section .....                                   | 271-2231       |
| <b>Federal Emergency Management Agency</b> .....                  | (617) 223-4175 |
| <b>NH Regional Planning Commissions:</b>                          |                |
| Upper Valley Lake Sunapee Regional Planning Commission .....      | 448-1680       |
| <b>NH Executive Department:</b>                                   |                |
| Governor’s Office of Energy and Community Services .....          | 271-2611       |
| New Hampshire Office of State Planning .....                      | 271-2155       |
| <b>NH Department of Cultural Affairs:</b> .....                   | 271-2540       |
| Division of Historical Resources .....                            | 271-3483       |
| <b>NH Department of Environmental Services:</b> .....             | 271-3503       |
| Air Resources .....   | 271-1370       |
| Waste Management .....  | 271-2900       |
| Water Resources .....   | 271-3406       |
| Water Supply and Pollution Control .....                          | 271-3504       |
| Rivers Management and Protection Program .....                    | 271-1152       |
| <b>NH Office of State Planning and Energy Programs</b> .....      | 271-2155       |
| <b>NH Municipal Association</b> .....                             | 224-7447       |
| <b>NH Fish and Game Department</b> .....                          | 271-3421       |
| <b>NH Department of Resources and Economic Development:</b> ..... | 271-2411       |
| Natural Heritage Inventory .....                                  | 271-3623       |
| Division of Forests and Lands .....                               | 271-2214       |
| Division of Parks and Recreation .....                            | 271-3255       |
| <b>NH Department of Transportation</b> .....                      | 271-3734       |
| <b>Northeast States Emergency Consortium, Inc. (NESEC)</b> .....  | (781) 224-9876 |
| <b>US Department of Commerce:</b>                                 |                |
| National Oceanic and Atmospheric Administration:                  |                |
| National Weather Service; Gray, Maine .....                       | 207-688-3216   |



**US Department of the Interior:**

US Fish and Wildlife Service ..... 225-1411  
US Geological Survey ..... 225-4681  
US Army Corps of Engineers.....(978) 318-8087

**US Department of Agriculture:**

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

**2) Mitigation Funding Resources**

404 Hazard Mitigation Grant Program (HMGP) ..... NH Office of Emergency Management  
406 Public Assistance and Hazard Mitigation ..... NH Office of Emergency Management  
  
Community Development Block Grant (CDBG)..... NH OEM, NH OSP, also refer to RPC  
  
Dam Safety Program ..... NH Department of Environmental Services  
  
Disaster Preparedness Improvement Grant (DPIG) ..... NH Office of Emergency Management  
  
Emergency Generators Program by NESEC<sup>‡</sup> ..... NH Office of Emergency Management  
  
Emergency Watershed Protection (EWP) ProgramUSDA, Natural Resources Conservation Service  
  
Flood Mitigation Assistance Program (FMAP) ..... NH Office of Emergency Management  
  
Flood Plain Management Services (FPMS) ..... US Army Corps of Engineers  
  
Mitigation Assistance Planning (MAP) ..... NH Office of Emergency Management  
  
Mutual Aid for Public Works ..... NH Municipal Association  
  
National Flood Insurance Program (NFIP) <sup>†</sup> ..... NH Office of State Planning  
  
Power of Prevention Grant by NESEC<sup>‡</sup> ..... NH Office of Emergency Management  
  
Project Impact..... NH Office of Emergency Management  
  
Roadway Repair & Maintenance Program(s) ..... NH Department of Transportation  
  
Section 14 Emergency Stream Bank Erosion & Shoreline Protection  
.....US Army Corps of Engineers  
  
Section 103 Beach Erosion.....US Army Corps of  
Engineers

|   |   |
|---|---|
| Section 205 Flood Damage Reduction..... | US Army Corps of Engineers                          |
| Section 208 Snagging and Clearing ..... | US Army Corps of Engineers                          |
| Shoreline Protection Program.....       | NH Department of Environmental Services             |
| Various Forest and Lands Program(s)     | NH Department of Resources and Economic Development |
| Wetlands Programs.....                  | NH Department of Environmental Services             |

‡NESEC – Northeast States Emergency Consortium, Inc. is a 501(c)(3), not-for-profit natural disaster, multi-hazard mitigation and emergency management organization located in Wakefield, Massachusetts. Please, contact NH OEM for more information.

† Note regarding **National Flood Insurance Program (NFIP)** and **Community Rating System (CRS)**:

The National Flood Insurance Program has developed suggested floodplain management activities for those communities who wish to more thoroughly manage or reduce the impact of flooding in their jurisdiction. Through use of a rating system (CRS rating), a community’s floodplain management efforts can be evaluated for effectiveness. The rating, which indicates an above average floodplain management effort, is then factored into the premium cost for flood insurance policies sold in the community. The higher the rating achieved in that community, the greater the reduction in flood insurance premium costs for local property owners. The NH Office of State Planning can provide additional information regarding participation in the NFIP-CRS Program.

### 3) Websites

| Sponsor  | Internet Address  | Summary of Contents   |
|--|---|---|
| Natural Hazards Research Center, U. of Colorado      | <a href="http://www.colorado.edu/litbase/hazards/">http://www.colorado.edu/litbase/hazards/</a> | Searchable database of references and links to many disaster-related websites.    |
| Atlantic Hurricane Tracking Data by Year             | <a href="http://wxp.eas.purdue.edu/hurricane">http://wxp.eas.purdue.edu/hurricane</a>           | Hurricane track maps for each year, 1886 – 1996                                   |
| National Emergency Management Association            | <a href="http://nemaweb.org">http://nemaweb.org</a>   | Association of state emergency management directors; list of mitigation projects. |
| NASA – Goddard Space Flight Center “Disaster Finder: | <a href="http://www.gsfc.nasa.gov/nrd/disaster/">http://www.gsfc.nasa.gov/nrd/disaster/</a>     | Searchable database of sites that encompass a wide range of natural disasters.    |
| NASA Natural Disaster                                | <a href="http://ltpwww.gsfc.nasa.gov">http://ltpwww.gsfc.nasa.gov</a>                           | Searchable database of  |

|  |   |   |
|--|---|---|
| Reference Database   | /ndrd/main/html   | worldwide natural disasters.  |
| U.S. State & Local Gateway   | <a href="http://www.statelocal.gov/">http://www.statelocal.gov/</a>                                       | General information through the federal-state partnership.                      |
| National Weather Service   | <a href="http://nws.noaa.gov/">http://nws.noaa.gov/</a>   | Central page for National Weather Warnings, updated every 60 seconds.           |
| USGS Real Time Hydrologic Data   | <a href="http://h20.usgs.gov/public/realtime.html">http://h20.usgs.gov/public/realtime.html</a>           | Provisional hydrological data   |
| Dartmouth Flood Observatory  | <a href="http://www.dartmouth.edu/artsci/geog/floods/">http://www.dartmouth.edu/artsci/geog/floods/</a>   | Observations of flooding situations.  |
| FEMA, National Flood Insurance Program, Community Status Book          | <a href="http://www.fema.gov/fema/csb.htm">http://www.fema.gov/fema/csb.htm</a>                           | Searchable site for access of Community Status Books                            |
| Florida State University Atlantic Hurricane Site                       | <a href="http://www.met.fsu.edu/explores/tropical.html">http://www.met.fsu.edu/explores/tropical.html</a> | Tracking and NWS warnings for Atlantic Hurricanes and other links               |
| National Lightning Safety Institute                                    | <a href="http://lightningsafety.com/">http://lightningsafety.com/</a>                                     | Information and listing of appropriate publications regarding lightning safety. |
| NASA Optical Transient Detector  | <a href="http://www.ghcc.msfc.nasa.gov/otd.html">http://www.ghcc.msfc.nasa.gov/otd.html</a>               | Space-based sensor of lightning strikes   |
| LLNL Geologic & Atmospheric Hazards                                    | <a href="http://wwwep.es.llnl.gov/wwwep/ghp.html">http://wwwep.es.llnl.gov/wwwep/ghp.html</a>             | General hazard information developed for the Dept. of Energy.                   |
| The Tornado Project Online   | <a href="http://www.tornadoobject.com/">http://www.tornadoobject.com/</a>                                 | Information on tornadoes, including details of recent impacts.                  |
| National Severe Storms Laboratory                                      | <a href="http://www.nssl.uoknor.edu/">http://www.nssl.uoknor.edu/</a>                                     | Information about and tracking of severe storms.                                |
| Independent Insurance Agents of America IIAA Natural Disaster Risk Map | <a href="http://www.iaaa.iix.com/ndcmap.htm">http://www.iaaa.iix.com/ndcmap.htm</a>                       | A multi-disaster risk map.  |
| Earth Satellite Corporation  | <a href="http://www.earthsat.com/">http://www.earthsat.com/</a>   | Flood risk maps searchable by state.  |
| USDA Forest Service Web  | <a href="http://www.fs.fed.us/land">http://www.fs.fed.us/land</a>   | Information on forest fires and land management.                                |

**Appendix B:**  
**Technical and Financial Assistance**

## APPENDIX B:

### TECHNICAL AND FINANCIAL ASSISTANCE FOR HAZARD MITIGATION Note – *Communities must have an approved Hazard Mitigation Plan to be eligible for HMGP and PDM grants.*

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#### ◆ HAZARD MITIGATION GRANT PROGRAM - "Section 404 Mitigation"

***The Hazard Mitigation Grant Program (HMGP) in New Hampshire is administered in accordance with the 404 HMGP Administration Plan which was derived under the authority of Section 404 of the Stafford Act in accordance with Subpart N. of 44 CFR.***

*The program receives its funding pursuant to a Notice of Interest submitted by the Governor's Authorized Representative (or GAR, i.e. the Director of NHOEM) to the FEMA Regional Director within 60 days of the date of a Presidentially Declared Disaster. The amount of funding that may be awarded to the State/Grantee under the HMGP may not exceed 15% of (over and above) the overall funds as are awarded to the State pursuant to the Disaster Recovery programs as are listed in 44 CFR Subpart N. Section 206.431 (d) (inclusive of all Public Assistance, Individual Assistance, etc.). Within 15 days of the Disaster Declaration, an Inter-Agency Hazard Mitigation Team is convened consisting of members of various Federal, State, County, Local and Private Agencies with an interest in Disaster Recovery and Mitigation. From this meeting, a Report is produced which evaluates the event and stipulates the State's desired Mitigation initiatives.*

Upon the GAR's receipt of the notice of an award of funding by the Regional Director, the State Hazard Mitigation Officer (SHMO) publishes a Notice of Interest (NOI) to all NH communities and State Agencies announcing the availability of funding and solicits applications for grants. The 404 Administrative Plan calls for a State Hazard Mitigation Team to review all applications. The Team is comprised of individuals from various State Agencies.

***Eligible Subgrantees include:***

- State and Local governments,
- Certain Not for Profit Corporations
- Indian Tribes or authorized tribal organizations
- Alaskan corporations not privately owned.

Minimum Project Criteria

- Must conform with the State's "409" Plan
- Have a beneficial impact on the Declared area
- Must conform with:
  - NFIP Floodplain Regulations
  - Wetlands Protection Regulations
  - Environmental Regulations
  - Historical Protection Regulations
- Be cost effective and substantially reduce the risk of future damage
- Not cost more than the anticipated value of the reduction of both direct damages and subsequent negative impacts to the area if future disasters were to occur i.e., min 1:1 benefit/cost ratio
- Both costs and benefits are to be computed on a "net present value" basis
- Has been determined to be the most practical, effective and environmentally sound alternative after a consideration of a range of options
- Contributes to a long-term solution to the problem it is intended to address
- Considers long-term changes and

**Eligible Projects** may be of any nature that will result in the protection to public or private property and include:

- Structural hazard control or protection projects
- Construction activities that will result in protection from hazards
- Retrofitting of facilities
- Certain property acquisitions or relocations
- Development of State and local mitigation standards
- Development of comprehensive hazard mitigation programs with implementation as an essential component
- Development or improvement of warning systems

## **FLOOD MITIGATION ASSISTANCE (FMA) PROGRAM**

New Hampshire has been a participant in the Flood Mitigation Assistance Program (FMA or FMAP) since 1996/97. In order to be eligible, a community must be a participant in the National Flood Insurance Program.

In 1997, the State was awarded funds to assist communities with Flood Mitigation Planning and Projects. A Planning Grant from the 1996/97 fund was awarded to the City of Keene in 1998. In preparation for the development of the Flood Mitigation Plan, the Planning Department of the City of Keene created a digital data base of its floodplain including the digitizing of its tax assessing maps as well as its Special Flood Hazard Areas in GIS layers. The Plan Draft was submitted to FEMA for review and approval in March of 2000. The Plan includes a detailed inventory of projects and a "model" project prioritization approach.

### **Flood Mitigation Assistance Program**

- NFIP Funded by a % of Policy Premiums
- Planning Grants
- Technical Assistance Grants to States (10% of Project Grant)
- Project Grants to communities
- Communities must have FEMA approved Flood Mitigation Plan to receive Project Funds

In 1998, the FMAP Planning Grant was awarded to the Town of Salem. Given the complexity of the issues in the Spicket River watershed, the Town of Salem subcontracted a substantial portion of the development of its Flood Mitigation Planning to SFC Engineering Partnership of Manchester, NH, a private engineering firm. Salem submitted a Plan and proposed projects to the State and FEMA in May of 1999 which were approved by FEMA. This made Salem the first community in NH to have a FEMA/NFIP approved Flood Mitigation Plan.

## *Eligible Projects*

*(44 CFR Part 78)*

- Elevation of NFIP insured residential structures
- Elevation and dry-proofing of NFIP insured non-residential structures
- Acquisition of NFIP insured structures and underlying real property
- Relocation of NFIP insured structures from acquired or restricted real property to sites not prone to flood hazards
- Demolition of NFIP insured structures on acquired or restricted real property
- Other activities that bring NFIP insured structures into compliance with statutorily authorized floodplain management requirements
- Beach nourishment activities that include planting native dune vegetation and/or the installation of sand-fencing.
- Minor physical mitigation projects that do not duplicate the flood prevention activities of other Federal agencies and lessen the frequency of flooding or severity of flooding and decrease the predicted flood damages in localized flood problem areas. These include: modification of existing culverts and bridges, installation or modification of flood gates, stabilization of stream banks, and creation of small debris or flood/storm water retention basins in small watersheds (not dikes, levees, seawalls etc.)

### ◆ PRE-DISASTER MITIGATION PROGRAM (PDM)

FEMA has long been promoting disaster resistant construction and retrofit of facilities that are vulnerable to hazards in order to reduce potential damages due to a hazard event. The goal is to reduce loss of life, human suffering, economic disruption, and disaster costs to the Federal taxpayer. This has been, and continues to be accomplished, through a variety of programs and grant funds.

Although the overall intent is to reduce vulnerability before the next disaster threatens, the bulk of the funding for such projects actually has been delivered through a "post-disaster" funding mechanism, the Hazard Mitigation Grant Program (HMGP). This program has successfully addressed the many hazard mitigation opportunities uniquely available following a disaster. However, funding of projects "pre-disaster" has been more

difficult, particularly in states that have not experienced major disasters in the past decade. In an effort to address "pre-disaster mitigation", FEMA piloted a program from 1997-2001 entitled "Project Impact" that was community based and multi-hazard oriented.

Through the Disaster Mitigation Act of 2000, Congress approved creation of a national Predisaster Hazard Mitigation program to provide a funding mechanism that is not dependent on a Presidential disaster declaration. For FY2002, \$25 million has been appropriated for the new grant program entitled the *Pre-Disaster Mitigation Program (PDM)*. This new program builds on the experience gained from Project Impact, the HMGP, and other mitigation initiatives.

Here are the high points of the FY 2002 PDM program:

The program will be administered by each State, with a base allocation of \$250,000, and additional funds provided via a population formula.

Eligible projects include:

- State and local hazard mitigation planning
- Technical assistance [e.g. risk assessments, project development]
- Mitigation Projects
  - Acquisition or relocation of vulnerable properties
  - Hazard retrofits
  - Minor structural hazard control or protection projects
- Community outreach and education [up to 10% of state allocation]

The emphasis for FY2002 will be on mitigation planning, to help localities meet the new planning requirements of the Disaster Mitigation Act of 2000.

Each state establishes grant selection criteria and priorities based on:

- The State Hazard Mitigation Plan
- The degree of commitment of the community to hazard mitigation
- The cost effectiveness of the proposed project
- The type and degree of hazard being addressed
- For project grants, "good standing" of the community in the National Flood Insurance Program

The funding is 75% Federal share, 25% non-Federal, except as noted below. The grant performance periods will be 18 months for planning grants, and 24 months for mitigation project grants. The PDM program is available to regional agencies and Indian tribes. Special accommodation will be made for "small and impoverished communities", who will be eligible for 90% Federal share, 10% non-Federal.



◆ **DISASTER PREPAREDNESS IMPROVEMENT GRANT (DPIG)**

*FEMA and the State co-sponsor the DPIG Program, which supports the development and updating of disaster assistance plans and capabilities and promotes educational opportunities with respect to preparedness and mitigation. Authority: See Subchapter E. of 44 CFR.*

**Past DPIG initiatives include:**

- Support of the position of Protection Planner/Hazard Mitigation Officer
- Installation of river gauges
- Support of the NH State Environthon School Program
- Coordinate the Voluntary Organizations Active in Disasters (VOAD) Program (See Resource Profile Annex) NHOEM via the DPIG has sponsored annual meetings with training workshops
- Sponsoring Dam Safety Training initiatives and workshops
- Production and distribution of a handbook for small embankment dam owners
- Inventory of the State's Dams
- Review of Dam Plans
- Sponsored extensive statewide, two day workshops for Granite State Incident Stress Debriefing Teams and funded educational materials
- Community visits and production of informational materials
- Assist with Plan Annex update for local Haz Mat planning.
- Funding workshops for NH Road Agents in cooperation with the T2 program of the Technology Transfer Center at the University of New Hampshire

**Present DPIG funded Hazard Mitigation initiatives**

- Support the position of Protection Planner/Hazard Mitigation Officer
- Continued support of the Environthon Program
- Development of this Plan
- Providing Technical Assistance to State and local officials
- Development of Emergency Operations Plans (EOPs) for Significant and High Hazard dams

***Disaster Preparedness Improvement Grant***

- *Evaluate natural hazards on a continuing basis and develop programs and actions required to mitigate such hazards*
- *Provide Technical Assistance*
- *Grants to States of up to \$50,000 annually*
- *(50% State match - cash or in kind)*

**Eligible Projects Include:**

- Evaluations of Natural Hazards
- Hazard Mitigation activities (i.e. Plan/ policy/program/strategy development
- Plan updates
- Handbooks: publication & distribution
- Creating exercise materials
- Developing Standard Operating Procedures
- Training state employees
- Report of formal analysis of State enabling legislation and authorities
- Update inventory of State/local Critical Facilities
- Develop a tracking system of critical actions to be taken post-event
- Creating Damage Assessment Plans and defining procedures
- Developing Plans for procedures when no Federal Aid is forthcoming
- Creating Plans for Search and Rescue Operations
- Developing Disaster accounting procedures

*This list is not exhaustive*

**Future DPIG funded Hazard Mitigation initiatives**

- Continued Support the position of Protection Planner/Hazard Mitigation Officer
- Continued support of the Environthon Program
- Update and maintenance of this Plan
- Provide Technical Assistance to State and local officials
- Support of other planning, technical assistance and training as indicated
- Digitization of EOPs for the State's "Significant" and "High Hazard" dams to provide rapid access to information in Emergency situations and to facilitate Plan maintenance.

## COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM

*These Federal funds are provided through the U.S. Department of Housing and Urban Development (HUD) and are administered by the CDBG Program of the New Hampshire Office of State Planning.*

Some CDBG disaster related funding has been transferred to FEMA recently and the SHMO is scheduled to receive guidance as to which specific funds and, new program management criteria.

The specific CDBG funds designated for hazard mitigation purposes are made available to address "unmet needs" pursuant to a given Disaster Declaration to States which request them. For these funds, project selection guidance is provided by NHOEM and NHOSP administers the grant.

Pursuant to Declaration DR-1144-NH, \$557,000.00 was made available to the State and pursuant to DR-1199-NH, the grant award is targeted at \$1,500,000.00.

In October of 1998, HUD announced the program guidelines for the expenditure of the DR-1144-NH related funding and the community of Salem applied for, and has received preliminary approval for funding to acquire a 19 unit trailer park in the Floodplain.

### **Community Development Block Grant**

- *U.S. Dept. of Housing and Urban Development*
- *Funds for a Declared Disaster's "Unmet Needs"*
- *Projects must meet one of three National Objectives*
- *Provide a direct benefit to low and moderate income persons or households*
- *Prevent or eliminate slums and blight*
- *Eliminate conditions which seriously and immediately threaten the public health and welfare*

*Additional conditions with respect to the expenditure of these funds includes the provision that at least 50% of the grant award must be expended in a manner which benefits individuals who earn 80% or less than the area's (county's) median income.*

### **Mitigation Programs of Other NH State Agencies**

The following agencies of the State of New Hampshire are directly or indirectly involved in activities that include Hazard Mitigation Planning and/or program implementation.

#### **NH Department of Transportation Bureau of Repair and Maintenance**

*NH OSP/NFIP Program*

*NH OSP Coastal Program*

*NH DRED Division of Forests and Lands*

*NH DES Water Resources Division – Dam Safety Program*

*NH DES Wetlands Program*

*NH DES Shoreline Protection Program*

**Appendix C:**  
**Matrix of Federal All-Hazards Grants**

**Appendix D:**  
**Meeting Minutes**