

## **Mitigation Checklist**

Mitigation activities are all those actions that eliminate or reduce the probability of a disaster occurring or minimize the effects of those disasters that do occur. The National Governors Association Emergency Preparedness Study found that mitigation is a relatively minor part of state and local emergency management efforts. Several factors probably account for this situation:

- The state of the art—Mitigation measures for many hazards still need to be developed.
- Public apathy—The need for mitigation is often obvious only after a disaster has occurred.
- Cost and profits—Mitigation programs can affect other areas financially. Programs that restrict development in floodplains, for example, are likely to depress land values and property tax revenues.

The 10 fundamental principles and objectives of the National Mitigation Strategy outlined by the Federal Emergency Management Agency (FEMA) are:

1. Risk reduction measures ensure long-term economic success for the community as a whole rather than short-term benefits for special interests.
2. Risk reduction measures for one natural hazard must be compatible with risk reduction measures for other natural hazards.
3. Risk reduction measures must be evaluated to achieve the best mix for a given location.
4. Risk reduction measures for natural hazards must be compatible with risk reduction measures for technological hazards and vice versa.
5. All mitigation is local.
6. Disaster cost and the impact of natural hazards can be reduced by emphasizing proactive mitigation before emergency response; both pre-disaster (preventive) and post disaster (corrective) mitigation is needed.
7. Hazard identification and risk assessment are the cornerstones of mitigation.
8. Building new federal-state-local partnerships and public-private partnerships is the most effective means of implementing measures to reduce the impact of natural hazards.
9. Those who knowingly choose to assume greater risk must accept responsibility for that choice.
10. Risk reduction measures for natural hazards must be compatible with protection of natural and cultural resources.

The National Governors Association lists the following examples of municipal management and technical areas as appropriate mitigation efforts (summarized by the International

Association of Fire Chiefs, 1997).

### **Mitigation Activity**

The National Governors Association study data suggest that effective mitigation efforts will increase the effectiveness of preparedness activities, which in turn improves response and recovery. Mitigation activities clearly should be a much more important part of emergency management planning and implementation. Following are a few examples of municipal management and technical areas appropriate for mitigation efforts and related to such efforts:

- Building standards
- Land use management
- Communication systems
- Laws and ordinances
- Construction
- Warning systems
- Emergency operation center
- Welfare
- Equipment and apparatus
- Preservation of resources
- Financing
- Inspection
- Hazard analysis
- Crowd control procedures
- Public education
- Technical information
- Transportation controls
- Insurance

### **Mitigation Measures**

The following mitigation measures are related to certain selected natural hazards.

#### **Floods and flash floods**

- Land use management, with special attention to floodplains
- Federal flood insurance
- Building construction and codes
- Warning systems
- Control and protective works (e.g., flood proofing, dams, reservoirs, levees, dikes,

drainage systems)

### **Hurricanes**

- Cloud seeding and other hurricane modification techniques
- Building code regulation for hurricane-force winds and for reasonable wave force
- Mobile home anchorage requirements
- Evacuation routes and facilities
- Use of national flood insurance and insurance for wind hazards
- Land use controls adapted to local conditions
- Use of flood and wind-proofing technology, especially in public facilities
- Possible use of well-constructed, high-rise evacuation centers
- Preparedness, response, relief, and rehabilitation measures, including effective warning capability

### **Tornadoes**

- Building codes, with provisions for high wind resistance (some of which may also apply to other hazards)
- Warning systems
- In-house shelters
- Insurance

### **Earthquakes**

- Improved delineation of seismic risk areas
- Earthquake-resistant new construction
- Steps to minimize damage to existing structures
- Land use management
- Earthquake insurance
- Seismic risk disclosure in property transactions
- Advanced earthquake prediction technology, accompanied by state evaluation of earthquake prediction
- Reduction of associated hazards, with special attention to lifelines engineering and critical facilities
- Differentiation between measures related to advance prediction and those applicable to disaster occurrences

### **Droughts**

- Land use regulation especially applicable to drought-prone areas
- Soil erosion controls
- Improved agricultural cultivation practices
- Regulated irrigation practices
- Water supply protection and conservation
- Improved drought prediction and forecasting
- Stimulation of rainfall by weather modification (e.g., cloud seeding)
- Desalination of seawater

### **Blizzards and other winter storms**

- Prediction and warning systems
- Response plans especially adapted to such events
- Flexible scheduling of public events and activities
- Alternate energy supply systems

### **Avalanches**

- Maps of avalanche zones as an aid to public and private land management
- Land use constraints on public lands and on sites undergoing construction activities
- Prevention through terrain modification
- Triggering small avalanches to forestall larger ones
- Disclosure of hazard potential in real estate transactions
- Warning systems
- Relief and recovery readiness for ice and snow conditions

### **Shoreline erosion**

- Coastal zoning that includes land use controls
- Shoreline zoning programs to protect critical areas
- Building code restrictions
- Public purchase or eroding shore lands
- Structural installations, including stabilization by means of sea walls
- Land fill

## **Landslides**

- Land use management
- Application of geologic engineering knowledge and practice to prevent or correct land sliding
- Strip-mining regulation

## **Tsunamis**

- Warning systems
- Evacuation of threatened areas
- Tsunami prediction
- Education programs
- Limited structural and land use controls

## **Expansive soils**

- Land use management
- Building codes
- Grading codes
- Policy requiring preconstruction control of soil moisture, soil density, and site drainage control
- Provision of soil analysis in real estate transactions
- Injection of substitute fluids

## **Volcanoes**

- Land use management
- Possible lava flow controls
- Prediction and warning systems
- Evacuation routes

## **High winds**

- Building codes
- Mobile home tie downs
- Tree-shelter belts