

Step 2

Define Goals and Objectives

Overview:

“What are goals and objectives?”

Goals are general guidelines that explain what you want to achieve in your community. They are usually long-term and represent global visions such as “protect public health and safety.”

Objectives define strategies or implementation steps to attain the identified goals. Unlike goals, objectives are specific, measurable, and have a defined completion date. They are more specific and outline the “who, what, when, where, and how” of reaching the goals.

Where are we now?



- Step 1:** Identify hazards and risks
- Step 2:** Define goals and objectives
- Step 3:** Identify alternatives for solving problems
- Step 4:** Select evaluation criteria
- Step 5:** Select feasible mitigation strategies
- Step 6:** Prepare a draft plan
- Step 7:** Prepare final plan
- Step 8:** Implement plan
- Step 9:** Monitor and periodically revise plan

“Why do we need to identify goals and objectives?”

Plans and actions based on clear goals and objectives are more likely to succeed in meeting the community’s needs.

Vassar, Michigan

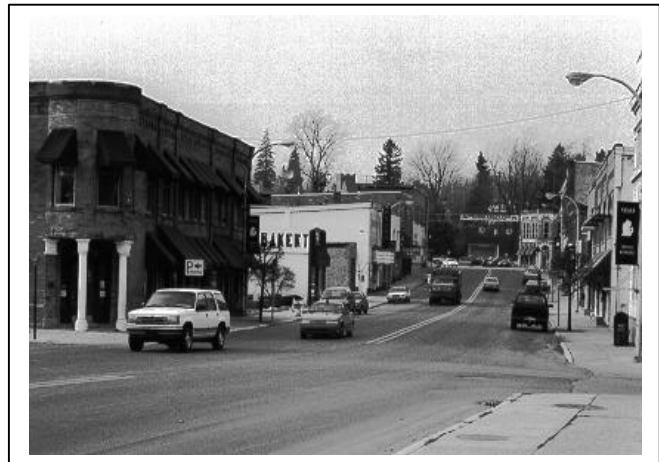
1998/99 Mitigation Planning Initiative

Goals

- ✓ Reduce flood losses.
- ✓ Improve response and recovery.
- ✓ Enhance community confidence.

Objectives

- ✓ Establish on-going floodway acquisition & land-use program.
- ✓ Rezone floodway to reflect current uses.
- ✓ Develop a written Flood Response & Recovery Plan.



Accomplishments (Mitigation Strategies Being Implemented)

- ✓ A floodway is being converted to a riverside park and recreation area.
- ✓ Homes in the flood fringe are being raised above the 100 year elevation.
- ✓ Remaining homes in the floodway are being removed.
- ✓ Community spirit has been renewed.

Typical goals might include, but are not limited to, the following:

- Minimize damage to public and private property
- Maintain essential public services
- Provide adequate warning time to residents in affected areas
- Promote economic development
- Manage growth/development
- Acquire open space and park land
- Preserve housing stock
- Maintain a positive community image

Goals will not be achieved if they exist in a vacuum or compete with other community goals. Hazard mitigation has a far greater chance for success when its goals are effectively integrated into other community goals. Combining goals in this manner can lead to a “win-win” situation where everyone benefits. A mitigation component may “tip the scale” to allow a marginal but beneficial project to move forward.

Objectives are developed to help achieve goals by dividing them into manageable components. For example, “eliminate flood damage” would be a goal. A supporting objective could be “adopt a zoning ordinance prohibiting new development in the floodplain.” This objective establishes a policy that prohibits building in an area vulnerable to a natural hazard. Successful completion of multiple objectives is needed for each individual goal. Some objectives may themselves have components that can be expressed as “action steps,” but it is vital to eventually identify in the plan all the details that will guide and encourage concrete actions to be taken.

Prioritizing goals and objectives

Once you have identified the goals and objectives, prioritize them so local officials can better focus their attention on developing alternatives.

Summary

Developing clear goals and objectives will help your community clarify problems, issues and opportunities in hazard mitigation as well as other areas. Well-articulated goals and objectives are more likely to succeed. An important part of developing goals and objectives is raising community awareness of the relationship between community development practices and the community’s level of hazard vulnerability and risk. Also, raising citizen awareness can help gain support for ongoing mitigation planning efforts.



Step 3

Identify Alternatives for Solving Problems

Overview

Often, there are different ways that objectives can be met, each of which may have pros and cons, costs and benefits. Brainstorming sessions will be useful for suggesting possible mitigation strategies, which are called *alternatives* until they are narrowed down to one strategy that can receive widespread support. The narrowing-down process will be covered in Steps 4 and 5. First, alternatives must be generated that may address each of the most important hazards in your community, as identified by the hazard analysis produced in Step 1, and to accomplish the goals and objectives identified and defined in Step 2.

Where are we now?



Step 1: Identify hazards and risks

Step 2: Define goals and objectives

Step 3: Identify alternatives for solving problems

Step 4: Select evaluation criteria

Step 5: Select feasible mitigation strategies

Step 6: Prepare a draft plan

Step 7: Prepare final plan

Step 8: Implement plan

Step 9: Monitor and periodically revise plan



Key Point

Five Basic Hazard Mitigation Approaches

- ✓ **Strategy #1 – Modify the Hazard** to remove or eliminate it. Modification will reduce its size or amount, or control the rate of release of the hazard. Examples include cloud seeding, slope planting (to reduce erosion), and stream widening or modification to improve water flow.
- ✓ **Strategy #2 – Segregating the Hazard** to try to "*keep the hazard away from the people.*" This is often accomplished in floodprone areas through the construction of structural protection measures such as dams, levees, floodwalls, etc. that redirect the impacts of a flood away from people and developed properties. This can be a highly effective strategy but also very expensive. Care must be taken to maintain structural solutions over time. Risks could be compounded if development continues behind a structure that is allowed to deteriorate!
- ✓ **Strategy #3 – Preventing or Limiting Development** in locations where people and structures would be at risk. This approach seeks to "*keep the people away from the hazard*" and includes a variety of land use planning and development regulation tools, such as comprehensive planning, zoning, floodplain management ordinances, capital improvements planning, disclosure laws, and the acquisition and relocation of hazard-prone properties. When properly applied, this strategy can be highly effective in promoting safe, sustainable development.
- ✓ **Strategy #4 – Altering Design or Construction** to make it less vulnerable to disaster damage. Also known as "*interacting with the hazard,*" it focuses on engineering structures to withstand potentially destructive impacts. Examples include elevation above flood levels, wind bracing, wet and dry floodproofing measures, and insulation of utility lines.
- ✓ **Strategy #5 – Early Warning and Public Education** to ensure that the public is aware of potential hazards, and that proper warning and communication systems are in place to save lives and protect property.

The text box on the preceding page presented five basic hazard mitigation approaches. Within that basic framework are numerous "tools" that can be used to help solve hazard-related problems and concerns. Some of those tools will now be described.

Common Hazard Mitigation Tools

Corrective Measures

When structures and communities are located in hazardous areas, corrective measures are directed at working with current conditions. Examples of corrective measures include:

1. **Acquisition:** Public acquisition and management of lands that are vulnerable to damage from local hazards. Following acquisition, land uses more appropriate to the degree of risk may be chosen. Public acquisition has been achieved by: a) purchase at full market value; b) purchase at less than full market value through such methods as foreclosure of tax delinquent property, bargain sales, purchase and lease back, etc.; c) donation, through reserved real estate, donation by will, donation and lease back; d) leases; and e) easements.
2. **Relocation:** Permanent evacuation of hazard-prone areas through movement of existing hazard-prone development and population to safer areas. The two common approaches to relocation are physical removal of buildings to a safer area with future use of the vacated area limited to permanent open space, and replacing existing land uses with others that are less vulnerable to the hazard.
3. **Redevelopment:** Rebuilding damaged areas in such a way that future damages are reduced and economic viability is improved. An example of this approach would be the redesign of deteriorated urban areas using renewal authorities and funds.
4. **Modifications:** Modifications can be made both to a site and to a structure. Examples include landscape grading, or retrofitting existing structures to be damage resistant (i.e., floodproofing existing buildings, adding structural braces to buildings to improve earthquake or wind resistance, etc.)

Public Works Measures

This category covers the most commonly known engineering measures used to contain or redirect natural hazards away from development and affected populations. Examples of these types of measures include:

1. **Structural Protection Measures:** Construction of measures that directly protect people and property at risk (in Michigan, primarily from flood hazards). Examples include dams, reservoirs, dikes, levees, seawalls, bulkheads, revetments, high flow diversions, and spillways.
2. **Land Treatment:** Measures which are intended to reduce the intensity of hazard effects by modifying the natural environment. Examples include reforestation, contour plowing, grading, and soil stabilization.

Planning and Regulatory Measures

Government has the power and resources to guide and influence the location, type, and amount of development within a jurisdiction. The tools of this "development management" are contained in the community's plans, regulations, public facilities and taxation measures, in addition to land acquisition policies which were discussed previously.

1. **Plans:** Land use plans specify the planned location of types of development activity, including commercial, industrial, and residential. As a hazard mitigation tool, plans can also identify hazard areas such as floodplains, fault zones, landslide and high-erosion areas, and hazardous waste sites. Land use plans can guide concentrated development away from these hazard areas by designating them for open space or other low density uses.
2. **Zoning:** Zoning ordinances are used to regulate the use of land and structures to ensure the public health, safety, and general welfare. Hazard areas such as floodplains can be zoned as low density districts. Hazard areas can also be identified in other zoning districts where special performance standards may be applied to development.

3. **Regulations:** Certain regulations, such as subdivision regulations, place requirements and standards for the conversion of raw land into building sites. These types of regulations can require floodproofing of such facilities as water and sewer lines, and storm drains. The subdivider can be required to prevent environmental degradation (e.g. using cluster developments) and mitigate hazards (e.g. retention basins). Development in high-hazard areas can be prevented or protected by requiring elevation or floodproofing. The regulations may also require that hazard information appear on deeds for lots within the development.

Environmental regulations also provide an opportunity to accomplish hazard mitigation. Since sensitive areas are protected by these regulations, mitigation can be accomplished when this protection reduces hazard impacts, and when the protection guides new development away from these areas.

4. **Codes:** Building codes protect lives and property by setting standards for construction materials, techniques, and design procedures. Both performance codes and specification codes can be valuable hazard mitigation tools when used to require protection of new construction (or substantial redevelopments). Housing and sanitary codes establish minimum standards, one for occupancy and the other for waste disposal. Special standards may be established for hazard-prone areas.
5. **Disclosure:** Hazard mitigation goals can be accomplished by requiring sellers and real estate brokers to inform prospective buyers about the vulnerability of buildings and lots to specific hazards.
6. **Moratoria:** Ordinances or regulations can be applied to delay rebuilding after a disaster until mitigation priorities have been established. This can be done either before, or immediately following a disaster.
7. **Development Rights:** This type of regulation or policy may prevent development in hazardous areas by purchasing the development rights from the seller. The land can then be maintained as open space, or leased back for agricultural purposes. Another option is to transfer the development rights to another location that is safer. By increasing densities in the safer location in exchange for decreased densities in the hazard zone, both sellers and developers can realize a profit while accomplishing hazard mitigation at little or no cost to government.
8. **Open Space Planning:** By employing some of the same strategies as for acquisition of developed properties, jurisdictions can lessen the potential for natural hazards by acquiring vulnerable undeveloped areas.

Persuasion and Encouragement

Other mitigation strategies are available to discourage new development in hazardous areas and encourage practices which are consistent with mitigation goals. These include:

1. **Incentives:** Financial incentives and disincentives, such as taxes, mortgage standards, and insurance credits can be used to conform with mitigation objectives. An example of a disincentive would be the denial of loans to would-be borrowers who cannot show that hazard-related standards are being met.
2. **Location:** Leading by example, such as a clear and consistent government policy aimed at preventing the location of public buildings in hazardous areas, may discourage private development in these locations. An extension of this policy would be the denial of public services, such as water, power, and sewage into these areas. Finding alternatives to repairing or rebuilding damaged public facilities which service hazard-prone areas may also set an example for the private sector.

Public Education and Awareness

Public awareness programs are necessary to periodically inform and remind people about an area's hazards, and the measures necessary to minimize potential damage and injury. Tools in this category include:

1. **Public Relations:** Providing general information or establishing public consensus can be accomplished through a formal or informal public relations program.
2. **Public Information:** Information about hazards or mitigation efforts can be disseminated through the media.

3. **Public Hearings:** The public may obtain information and express opinions about mitigation efforts at public forums run by appropriate government agencies.
4. **Surveys and Polls:** Government agencies or other organizations can gather information about public support for mitigation efforts.
5. **Public Education:** Learning experiences, such as workshops and seminars, may be used to communicate hazard mitigation information to special target audiences.

Incorporating alternatives into a plan

Perhaps one of the best ways to identify alternatives for solving hazard-related problems is to display the information in table format. For example:

City of Vassar, Michigan.

GOAL: Reduce flood losses to the fullest extent possible.
OBJECTIVE(s): Reduce losses associated with Cass River flooding.
RANGE OF ALTERNATIVE SOLUTIONS:
<u>ALTERNATIVE 1</u> Acquire floodway buildings/properties.
<u>ALTERNATIVE 2</u> Elevate floodway buildings/properties.
<u>ALTERNATIVE 3</u> Wet floodproof floodway buildings/properties.
<u>ALTERNATIVE 4</u> Dry floodproof floodway buildings/properties.
<u>ALTERNATIVE 5</u> Dredge/widen the Cass River to increase water flow.
<u>ALTERNATIVE 6</u> "Relocate" the Cass River by altering its present course.
<u>ALTERNATIVE 7</u> Build a floodwall or dike levee to protect floodway buildings/properties.
<u>ALTERNATIVE 8</u> Join the National Flood Insurance Program to provide limited financial relief for flood victims.
<u>ALTERNATIVE 9</u> Do nothing and absorb flood losses as they occur.

One of the alternatives that should be included in your community's assessments is a "do nothing" alternative, such as the last item in the table above. An alternative of this kind will help people understand the current risks from the hazard, and the need to take action of some kind to mitigate the impacts of that hazard.

In some cases, people may need some ideas with which to propose alternatives that may help mitigate local hazards. On the following pages is an extensive list of "mitigation strategies" for the many hazards that have been identified in the state of Michigan.

To continue reading about the hazard mitigation planning process, turn to page 84.

POSSIBLE MITIGATION STRATEGIES – BY HAZARD

Each hazard has a list of associated mitigation strategies. In front of each strategy are boldface letters that represent specific groups or organizations that are pertinent to implementing the described mitigation-related activity. Up to three categories are listed for each mitigation strategy. Here is a list of the code letters and what they refer to:

- B** Business owners & managers (including site developers and builders and government administrators whose activities are similarly associated with the selection, design, and operation of specific sites performing economic or community functions)
- C** Public Citizens and those who provide educational services or marketing campaigns to them
- E** Emergency management coordinators and related persons (LEPCs, incident commanders, etc.)
- F** First-responders (law enforcement, fire fighters, medical services, other response services at all levels)
- I** Insurance agencies & industry, including the NFIP
- L** Elected officials and Legislators
- N** Non-profit organizations and government departments which support them or have similar concerns (welfare provision, environmental protection, etc.)
- O** Building Officials and other inspection, regulation, and code enforcement Officials (health, fire, etc.)
- P** Planning departments, consultants, officials, engineers, and others involved in similar activities guiding long-term development patterns and conditions in a community, a larger area, or at development sites
- R** Researchers, engineers, architects, etc. involved in the study and design of human environments and support infrastructure; also includes public works, utility providers, and others dealing with infrastructure design, development and maintenance (Road Commissioners, Drain Commissioners, etc.)

Civil Disturbances (prison or institutional rebellions, disruptive political gatherings, violent labor disputes, urban protests or riots, or large-scale uncontrolled festivities)

- E, F** Law enforcement training, staffing, and resource provision.
- B, F, R** Incident anticipation and planning, and video documentation of events for later study and use.
- E, F** Local law enforcement mutual aid, and support from the Michigan State Police and National Guard.
- B, P** It is possible that design, management, integration, and lowered density of poor or blighted areas may reduce vandalism, crime, and some types of riot events. Crime Prevention Through Environmental Design (CPTED) is a field of planning that deals with this.
- B, C, I** Insure structures and property in risky areas.
- B, E** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- O, P** Design requirements for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, etc. that take into consideration emergency and security needs.

Drought

- R** Storage of water for use in drought events (especially for human needs during extreme temperatures).
- L** Measures or ordinances to prioritize or control water use (especially when needed to fight fires).
- B, C** Encouragement of water-saving measures by consumers (especially during irrigation and farming).
- R** Anticipation of potential drought conditions, and preparation of drought contingency plans.
- P, R** Designs and plans for water delivery systems that include a consideration of drought events.
- B, C, I** Obtaining agricultural insurance.

Earthquakes – (biggest Michigan threats would be to pipelines, buildings that are poorly designed and constructed, and shelving, furniture, mirrors, gas cylinders, etc. within structures that could fall and cause injury or personal property damage)

- L, O** Adopt and enforce appropriate building codes.
- B, C** Use of safe interior designs and furniture arrangements.
- B, C, I** Obtain insurance.
- P, R** "Harden" critical infrastructure systems to meet seismic design standards for "lifelines."
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Extreme Temperatures

- C, L, N** Organizing outreach to vulnerable populations during periods of extreme temperatures, including establishing and building awareness of accessible heating and/or cooling centers in the community, and other public information campaigns about this hazard.
- C, E, L** Increased coverage and use of NOAA Weather Radio.

- L, O Housing/landlord codes enforcing heating requirements.
- C, L, N Special arrangements for payment of heating bills.

Fire Hazards

Scrap Tire Fires

- B, L, O Policies for regulated disposal and management of scrap tires, and enforcement of regulations related to them (separation of stored scrap tires from other materials; limits on the size of each pile; minimum distances between piles and property lines; covering, chemically treating, or shredding tires to limit mosquito breeding; providing for fire vehicle access to scrap tire piles; training employees in emergency response operations; installation of earthen berms around storage areas; prevention of pools of standing water in the area; control of nearby vegetation; an emergency plan posted on the property; storing only the permitted volume of tires authorized for that site).
- P Proper siting of tire storage and processing facilities (land use planning that recognizes scrap tire sites as a real hazard and environmental threat).
- E, F Local awareness of scrap tire risk, training and preparedness of responders.
- F Law enforcement to prevent illegal dumping of tires at the site.
- B Pest-control measures for mosquitoes and other nuisances around scrap tire yards.

Structural Fires

- L, O Code existence and enforcement.
- B, R Designs that include the use of firewalls and sprinkler systems (especially in tall buildings, dormitories, attached structures, and special facilities).
- C Public education and school programs (especially about the use of stoves, heaters, fireworks, matches/lighters, etc.)
- B, C, O Landlords and families can install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each level of homes (to be tested monthly, with the batteries changed twice each year). Family members and residents should know how to use a fire extinguisher.
- B, C, O Proper installation and maintenance of heating systems (especially those requiring regular cleaning, those using hand-loaded fuels such as wood, or using concentrated fuels such as liquid propane).
- B, C Safe and responsible use of electric and "space" heaters (placed at least 3 feet from objects, with space near hot elements free of combustibles).
- B, E Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, and recreation areas, and other appropriate sites.
- C Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and proper storage of flammable items). Residents should inspect chimneys at least twice a year and clean them at least once a year.
- C Posting of fire emergency telephone numbers in accessible places.
- B, C, O Safe installation, maintenance, and use of electrical outlets and wiring.
- C Education and practice of safe cigarette handling and disposal (also candles, fireworks, campfires, holiday lights)
- L, O, P Measures to reduce urban blight and associated arson (including CPTED?).
- B, F, O Proper workplace procedures, training and exercising, and handling of explosive and flammable materials and substances.
- B, C, O Pre-planned escape routes and fire alert responses.
- E, F Improved and continuing training for emergency responders, and provision of equipment for them.
- B, C, O Defensible space around structures in fire-prone wildland areas.
- F, R Proper maintenance of power lines, and efficient response to fallen power lines.
- B, P, R Transportation planning that provides roads, overpasses, etc. to maximize access and improve emergency response times, and evacuation potential, for all inhabited or developed areas of a community (not just designing for the minimum amount of road capacity to handle normal traffic volumes in the community.) This includes transportation access within developed sites (shopping malls, stadiums, office & commercial parking lots, etc.)
- E, F Control of civil disturbances and criminal activities that could lead to arson.
- B, C, F Enforced fireworks regulations.
- C, F Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
- B, C Condominium-type associations for maintaining safety in attached housing/building units or multi-unit structures.
- B, C, I Obtaining insurance.
- C Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Wildfires

- B, C, O Proper maintenance of property in or near wildland areas (including short grass; thinned trees and removal of low-hanging branches; selection of fire-resistant vegetation; use of fire resistant roofing and building materials; use of functional shutters on windows; keeping flammables such as curtains securely away from windows or using heavy fire-resistant drapes; creating and maintaining a buffer zone (defensible space) between structures and adjacent wild lands; use of the fire department's home safety inspections; sweeping/cleaning dead or dry leaves, needles,

twigs, and combustibles from roofs, decks, eaves, porches, and yards; keeping woodpiles and other combustibles away from structures; use of boxed or enclosed eaves on house; thorough cleaning-up of spilled flammable fluids; and keeping garage areas protected from blowing embers).

- B, C, L** Safe disposal of yard and house waste rather than through open burning.
- B, F, N** Use of fire spotters, towers, planes.
- C** Keep handy household items that can be used as fire tools; a rake, axe, hand/chainsaw, bucket and shovel. Install and maintain smoke detectors and fire extinguishers. Install a smoke alarm on each floor of buildings and homes. Test monthly and change the batteries two times each year. Teach family members how to use the fire extinguisher.
- C** Post fire emergency telephone numbers.
- C** Organizing neighborhood wildfire safety coalitions (to plan how the neighborhood could work together to prevent a wildfire).
- C** Residents should plan several escape routes away from their homes - by car and by foot.
- B, C** Use of structural fire mitigation systems such as interior and exterior sprinklers, smoke detectors, and fire extinguishers.
- B, C, N** Arson prevention activities, including reduction of blight (cleaning up areas of abandoned or collapsed structures, accumulated junk or debris, and with any history of flammable substances stored, spilled, or dumped on them).
- C** Public education on smoking hazards and recreational fires.
- R** Proper maintenance and separation of power lines. Ask the power company to clear branches from power lines.
- F, R** Efficient response to fallen power lines.
- E, F** Training and exercises for response personnel.
- N, P, R** GIS mapping of vegetative coverage, for use in planning decisions and analyses through comparison with topography, zoning, developments, infrastructure, etc.
- B, C, L** Media broadcasts of fire weather and fire warnings.
- F, L, O** Create and enforce local ordinances that require burn permits and restrict campfires and outdoor burning.
- E, L** Mutual aid pacts with neighboring communities.
- B, N, R** Prescribed burns and fuel management (thinning of flammable vegetation, possibly including selective logging to thin out some areas. Fuels cleared can be given away as firewood or chipped into wood chips for distribution.)
- B, N, P** The creation of fuel breaks (areas where the spread of wildfires will be slowed or stopped due to removal of fuels, or the use of fire-retardant materials/vegetation) in high-risk forest or other areas.
- B, C, O** Keeping roads and driveways accessible to vehicles and fire equipment—driveways should be relatively straight and flat, with at least some open spaces to turn, bridges that can support emergency vehicles, and clearance wide and high enough for two-way traffic and emergency vehicle access (spare keys to gates around property should be provided to the local fire department, and an address should be visible from the road so homes can be located quickly).
- B, C, R** Enclosing the foundations of homes and buildings rather than leaving them open and the underside exposed to blown embers or materials.
- B, C** Safe use and maintenance/cleaning of fireplaces and chimneys (with the use of spark arresters and emphasis on proper storage of flammable items). Residents should be encouraged to inspect chimneys at least twice a year and clean them at least once a year.
- B, C** Proper maintenance and storage of motorized equipment that could catch on fire.
- B, C, O** Proper storage and use of flammables, including the use of flammable substances (such as when fueling machinery). Store gasoline, oily rags and other flammable materials in approved safety cans. Stack firewood at least 100 feet away and uphill from homes.
- B, C, P** Avoid building structures on hilltop locations, where they will be at greater risk from wildfires (in addition, hillsides facing south or west are more vulnerable to increased dryness and heat from sun exposure) and use of proper setbacks from slopes (outside of the "convection cone" of intense heat which would be projected up the slope of the hill as a wildfire "climbs" it).
- F, P, R** Have adequate water supplies for emergency fire fighting (in accordance with NFPA standards). For residents, identify and maintain an adequate outside water source such as a small pond, cistern, well, swimming pool or hydrant; have a garden hose that is long enough to reach any area of the home and other structures on the property; install freeze-proof exterior water outlets on at least two sides of the home and near other structures on the property. Install additional outlets at least 50 feet from the home; consider obtaining a portable gasoline powered pump in case electrical power is cut off.
- B, C, I** Obtaining insurance.
- C, I** Including wildfire safety information in materials provided by insurance companies to area residents.
- C, E, L** When Wildfire threatens, residents should be instructed to carry and listen to battery-operated radios for reports and evacuation information, and follow the instructions given by local officials. Cars should be backed into garages or parked in an open space facing the direction of escape, with doors and windows closed and the key in the ignition. Garage windows and doors should be closed but left unlocked. If residents have time, they can take steps to protect their homes by closing windows, vents, doors, venetian blinds and heavy drapes; removing

lightweight curtains; shutting off gas at the meter; turning off pilot lights; opening fireplace damper; closing fireplace screens; moving flammable furniture into the center of the home away from windows and sliding-glass doors; and turning on a light in each room to increase the visibility of homes in heavy smoke. Outside, residents can seal attic and ground vents with pre-cut plywood or commercial seals, turn off propane tanks, place combustible patio furniture inside, connect the garden hose to outside taps, set up a portable gasoline-powered pump, place lawn sprinklers on the roof and near above-ground fuel tanks, wet the roof, wet or remove shrubs within 15 feet of the home, and gather fire tools.

- C, E, L** Residents should be instructed on proper evacuation procedures, such as wearing protective clothing (sturdy shoes, cotton or woolen clothing, long pants, a long-sleeved shirt, gloves and a handkerchief to protect the face); taking a Disaster Supplies Kit; and choosing a route away from fire hazards.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Flooding Hazards

Dam Failures

- B, E, R** Ensuring consistency of dam Emergency Action Plan (EAP) with the local Emergency Operations Plan (EOP).
- C, E, L** Garnering community support for removal or repair of dams in disrepair.
- B, P, R** Regulate development in the dam's hydraulic shadow (where flooding would occur if there was a severe dam failure).
- B, E, N** Public awareness and warning systems.
- B, C, I** Obtaining insurance.
- E, N, O** Greater local support for/assistance with dam inspections and enforcement of the Dam Safety Program (Part 315 of the Natural Resources and Environmental Protection Act) requirements and goals.
- B, C, E** Increased coverage and use of NOAA Weather Radio
- B, E, N** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- B, P, R** Constructing emergency access roads to dams.
- B, N, R** Pump and flood gate installation/automation.
- B, I, L** Real estate disclosure laws that identify a home's location within a dam's hydraulic shadow.
- E, F** Trained, equipped, and prepared search and rescue teams.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Riverine and Urban Flooding

- N, P, R** Accurate identification and mapping of flood-prone areas.
- L, P, R** Flood plain management – planning acceptable uses for areas prone to flooding (through comprehensive planning, code enforcement, zoning, open space requirements, subdivision regulations, land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
- P, R** Acceptable land use densities, coverage and planning for particular soil types and topography (decreasing amount of impermeable ground coverage in upland and drainage areas, zoning and open space requirements suited to the capacity of soils and drainage systems to absorb rainwater runoff, appropriate land use and capital improvements planning) and involving drain commissioners, hydrologic studies, etc. in these analyses and decisions.
- B, C, R** Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
- B, C, R** Wet floodproofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
- B, C, R** Elevation of flood-prone structures above the 100-year flood level.
- P, R** Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
- E, N, O** Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
- B, C, O** Public awareness of the need for permits (MDEQ Part 31) for building in floodplain areas.
- C** Inclusion of safety strategies for flooded areas in driver education classes and materials.
- N, P, R** Employing techniques of erosion control within the watershed area (proper bank stabilization, techniques such as planting of vegetation on slopes, creation of terraces on hillsides, use of riprap boulders and geotextile fabric, etc.).
- N, R** Dredging and clearance of sediment and debris from drainage channels.
- N, P, R** Protection (or restoration) of wetlands and natural water retention areas.
- L, O** Enforcement of basic building code requirements related to flood mitigation.
- L, P, R** Formation of a watershed council.
- B, E, R** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- B, C, I** Obtaining insurance.
- E, L, P** Joining the National Flood Insurance Program (NFIP; see Appendix C). **VERY IMPORTANT!**
- E, L, P** Participating in the Community Rating System (CRS).

- N, P, R** Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).
- R** Higher engineering standards for drain and sewer capacity.
- L, P, R** Drainage easements (allowing the planned and regulated public use of privately owned land for temporary water retention and drainage).
- L, P, R** Installing (or re-routing or increasing the capacity of) storm drainage systems, including the separation of storm and sanitary sewage systems.
- L, N, P** Farmland and open space preservation.
- B, C, O** Elevating mechanical and utility devices above expected flood levels.
- N, P, R** Improved/updated floodplain mapping.
- L, O, P** Real estate disclosure laws.
- C, E, R** Public education and flood warning systems.
- E, N, R** Monitoring of water levels with stream gauges and trained monitors.
- C, E, L** Increased coverage and use of NOAA Weather Radio.
- E, L, O** Training for local officials on flood fighting, floodplain management, floodproofing, etc.
- B, C, O** Anchoring of manufactured homes to a permanent foundation, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas.
- F** Road closures and traffic control in flooded areas.
- E, F** Trained, equipped, and prepared search and rescue teams.
- B, C, O** Control and securing of debris, yard items, or stored objects (including oil, gasoline, and propane tanks, and paint and chemical barrels) in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.
- B, R** Back-up generators for pumping and lift stations in sanitary sewer systems, and other measures (alarms, meters, remote controls, switchgear upgrades) to ensure that drainage infrastructure is not impeded.
- L, N, O** Detection and prevention/discouragement of illegal discharges into storm-water sewer systems, from home footing drains, downspouts and sump pumps.
- N, P, R** Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
- P, R** Increasing functioning and capacity of sewage lift stations and treatment plants (installation, expansion, and maintenance), including possible separation of combined storm/sanitary sewer systems, if appropriate.
- N, P** Purchase or transfer of development rights – to discourage development in floodplain areas.
- L, R** Stormwater management ordinances or amendments.
- N, P, R** Wetlands protection regulations and policies.
- L, N, P** Regional/watershed cooperation.
- B, C, R** Use of check valves, sump pumps and backflow preventers in homes and buildings.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Shoreline Flooding and Erosion

- N, P, R** Accurate identification and mapping of flood-prone areas.
- N, P, R** Floodplain/coastal zone management – planning acceptable uses for areas prone to flooding (comprehensive planning, zoning, open space requirements, subdivision regulations, land use and capital improvements planning).
- B, C, R** Dry floodproofing of structures within known flood areas (strengthening walls, sealing openings, use of waterproof compounds or plastic sheeting on walls).
- B, C, R** Wet floodproofing of structures (controlled flooding of structures to balance water forces and discourage structural collapse during floods).
- B, C, R** Elevation of flood-prone structures above the 100-year flood level.
- P, R** Construction of elevated or alternative roads that are unaffected by flooding, or making roads more flood-resistant through better drainage and/or stabilization/armoring of vulnerable shoulders and embankments.
- E, N, O** Government acquisition, relocation, or condemnation of structures within floodplain or floodway areas.
- N, P, R** Employing techniques of erosion control in the area (bank stabilization, planting of vegetation on slopes, creation of terraces on hillsides).
- L, O** Enforcement of basic building code requirements related to flood mitigation.
- B, C, I** Obtaining insurance.
- E, L, P** Joining the National Flood Insurance Program (NFIP; see Appendix C). **VERY IMPORTANT!**
- E, L, P** Participating in the Community Rating System (CRS).
- N, P, R** Structural projects to channel water away from people and property (dikes, levees, floodwalls) or to increase drainage or absorption capacities (spillways, water detention and retention basins, relief drains, drain widening/dredging or rerouting, debris detention basins, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, wetlands protection and restoration).
- B, C, O** Elevating mechanical and utility devices above expected flood levels.

- C, E, R Public education and flood warning systems.
- E, N, R Monitoring of water levels with stream gauges and trained monitors.
- B, C, O Anchoring of manufactured homes to a permanent foundation in flood areas, but preferably these structures would be readily movable if necessary or else permanently relocated outside of flood-prone areas and erosion areas.
- E, F Trained, equipped, and prepared search and rescue teams.
- B, C, O Control and securing of debris, yard items, or stored objects in floodplains that may be swept away, damaged, or pose a hazard when flooding occurs.
- L, O, P Real estate disclosure laws.
- C, E, L Increased coverage and use of NOAA Weather Radio.
- F Road closures and traffic control in flooded areas.
- C Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Hazardous Material Incidents

Fixed Site Hazardous Material Incidents (including explosions and industrial accidents)

- E, L, R Maintaining an active and viable Local Emergency Planning Committee (LEPC).
- B, E, F Developing and exercising site emergency plans and community response plans as required under SARA Title III.
- B, E, N Development of Risk Management Plans for sites that manufacture, store, or handle hazardous materials, to comply with EPA regulations. (For guidance, see the EPA's CEPPPO web site at <http://www.epa.gov/swercepp/acc-pre.html> .)
- B, E, O Training in and compliance with all safety procedures and systems related to the manufacture, storage, transport, use, and disposal of hazardous materials.
- B, L, N Policies stressing the importance of safety above other considerations.
- E, F, N Trained, equipped, and prepared site and local hazardous material emergency response teams.
- B, N, O Compliance with/enforcement of Resource Conservation and Recovery Act (RCRA) standards.
- C, F Elimination of clandestine methamphetamine laboratories through law enforcement and public education.
- B, C, O Hazardous material public awareness and worker education programs.
- B, E, F Facility and community training and exercise programs.
- B, N, R Brownfield cleanup activities.
- B, N, R Identification of radioactive soils and high-radon areas
- O, P Proper separation and buffering between industrial areas and other land uses.
- B, P Location of industrial areas away from schools, nursing homes, etc.
- C, E, F Evacuation plans and community awareness of them.
- B, E Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- B, E, F Public warning systems and networks for hazardous material releases.
- C, E, L Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
- F Road closures and traffic control in accident areas.
- E, F, R Trained, equipped, and prepared search and rescue teams.
- B, N, O Compliance with all industrial, fire, and safety regulations.
- B, C, I Insurance coverage.
- B, C, F Enhanced security and anti-terrorist/sabotage/civil disturbance measures.
- C Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Hazardous Material Transportation Incidents

- B, P, R Improvements in driver education, traffic law enforcement, and transportation planning that balance the needs of hazardous material transporters with the safety of the general public.
- P, R Improved design, routing, and traffic control at problem roadway areas.
- P, R Long-term planning that provides more connector roads for reduced congestion of arterial roads.
- O, P Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).
- P, R Proper planning, design, maintenance of, and enhancements to designated truck routes.
- B, O Enforcement of weight and travel restrictions for truck traffic.
- E, F, N Training, planning, and preparedness for hazardous material incidents along roadways and railways (in addition to fixed site emergencies).
- C, E, F Public warning systems and networks.
- C, E, L Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including large scale hazardous material incidents).
- P, R Use of ITS (intelligent transportation systems) technology.
- B, F, O Compliance with and enforcement of USDOT and MDOT regulations regarding hazardous materials transport.

- B, P** Locating schools, nursing homes, and other special facilities away from major hazardous material transportation routes.
- F** Road closures and traffic control in accident areas.
- B, E, F** Trained, equipped and prepared local hazardous materials emergency response teams.
- E, F** Trained, equipped, and prepared search and rescue teams.
- C, E, F** Evacuation plans and community awareness of them.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Infrastructure Failures

- P, R** Proper location, design, and maintenance of water and sewer systems (to include insulation of critical components to prevent damage from ground freeze).
- B, R** Burying electrical and phone lines, where possible, to resist damage from severe winds, lightning, ice, and other hazards.
- B, R** Redundancies in utility and communications systems, especially "lifeline" systems.
- E, F, N** Mutual aid assistance for failures in utility and communications systems (including 9-1-1).
- E, F, N** Alternative 9-1-1 access through radio operators whose homes are identified through special markings.
- C, E, N** Programs/networks for contacting elderly or homebound persons during periods of infrastructure failure, to assess whether they have unmet needs.
- P, R** Separation and/or expansion of sewer system to handle anticipated stormwater volumes.
- B, N, R** Use of generators for backup power at critical facilities.
- B, R** Regular maintenance and equipment checks.
- B, R** "Rolling blackouts" in electrical systems that will otherwise fail completely due to overloading.
- B, R** Replacement or renovation of aging structures and equipment (to be made as hazard-resistant as economically possible).
- B, R** Protecting electrical and communications systems from lightning strikes.
- B, R** Tree-trimming programs to protect utility wires from falling branches. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
- B, C** Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (1-800-482-7171).
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Attack

- C, E** Community awareness of designated fallout shelters and attack warning systems.
- E, L, P** Developing and promoting workable population protection plans (evacuation and in-place sheltering plans, as appropriate).
- B, L, P** Construction of concrete safe rooms (or shelters) in houses, trailer parks, community facilities, and business districts.
- B, R** Using laminated glass, metal shutters, structural bracing, and other hazard-resistant, durable construction techniques in public buildings (especially schools) and critical facilities.
- B, E, R** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- C, E, L** Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including enemy attack).
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Nuclear Power Plant Accidents

- C, E, R** Proper awareness of, training on, and implementation of radiological emergency procedures (to include both primary and secondary Emergency Planning Zones, as appropriate).
- C, E** Community awareness of designated shelters and accident warning systems.
- C, E, L** Increased coverage and use of NOAA Weather Radio (which can provide notification to the community during any period of emergency, including plant accidents).
- B, E, R** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Oil and Natural Gas Well Accidents

- B, O, N** Community and operator compliance with industry safety regulations and standards.

- B, C** Awareness of hydrogen sulfide gas dangers and personal protection actions for these dangers.
- P, R** Using buffer strips to segregate wells, storage tanks, and other production facilities from transportation routes and adjacent land uses, in accordance with state regulations, and consistent with the level of risk.
- B, E** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- B, O** Contingency plans for worker and public protection, including the inclusion of rescue and evacuation procedures for well hazard areas in the local emergency operations plan.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Pipeline Accidents (Petroleum and Natural Gas)

- B, P, R** Locating pipelines away from dense development, critical facilities, special needs populations, and environmentally vulnerable areas whenever possible.
- B, C, N** Increasing public awareness of pipeline locations and appropriate emergency procedures.
- B, E** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- B, C, N** Increasing public awareness and widespread use of the "MISS DIG" utility damage prevention service (800-482-7171).
- B, R** Proper pipeline design, construction, maintenance and inspection.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Public Health Emergencies

- C, N** Encouraging residents to receive immunizations against communicable diseases.
- B, N, R** Improving ventilation techniques in areas/facilities prone to crowding, or that may involve exposure to contagion or noxious atmospheres.
- C, N, R** Increasing public awareness of radon dangers and the prevention efforts that can be taken to reduce concentrations of radon in homes and buildings.
- B, N, R** Maintaining community water and sewer infrastructure at acceptable operating standards.
- B, N, R** Providing back-up generators for water and wastewater treatment facilities to maintain acceptable operating levels during power failures.
- B, O, P** Demolition and clearance of vacant condemned structures to prevent rodent infestations.
- N, O, R** Maintaining a community public health system with sufficient disease monitoring and surveillance capabilities to adequately protect the population from large-scale outbreaks.
- C, N** Increasing public awareness of the causes, symptoms, and protective actions for disease outbreaks and other potential public health emergencies.
- B, N** Community support of free or reduced-expense clinics and school health services.
- C, E, F** Preventing public contact with contaminated sites or waters (including floodwaters).
- B, O, P** Brownfield and urban blight clean-up activities.
- B, N, O** Pollution control, enforcement, and cleanup; proper disposal of chemicals and scrap materials.
- B, O, P** Proper location, installation, cleaning, monitoring, and maintenance of septic tanks.
- P, R** Separation of storm and sanitary sewer systems.

Sabotage/Terrorism/Weapons of Mass Destruction (WMD)

- E, F, P** Development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for a sabotage/terrorism/WMD attack.
- E, F, R** Alertness, awareness, and monitoring of organizations and activities that may threaten the community.
- C, F, N** Implementing school safety and violence prevention programs.
- B, L, N** Providing legitimate channels of political and public expression.
- B, F, R** Heightening security at public gatherings, special events, and critical community facilities and industries.
- B, N, R** Using laminated glass and other hazard-resistant, durable construction techniques in public buildings and critical facilities.
- B, N, R** Greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings.
- E, F** Training, planning, and preparedness by local law enforcement and other responders for terrorist/sabotage/WMD attacks.
- B, E, R** The development and testing of internal emergency plans and procedures by businesses and organizations.
- B, E** Developing site emergency plans for schools, factories, office buildings, shopping malls, hospitals, correctional facilities, stadiums, recreation areas, and other appropriate sites.
- F, L, N** Establishing avenues of reporting (and rewards) for information preventing terrorist incidents and sabotage.
- B, N, R** Consistent use of computer data back-up systems and anti-virus software.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

- E, P** Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, etc. that would get in the way or be left over following an attack or incident. The area may simultaneously need to be treated as a crime scene, site of urban search and rescue, area of hazardous materials, and/or a public health threat.)

Subsidence

- N, P, R** Identification, mapping, and preventing or limiting development in old mining areas or geologically unstable terrain.
- B, N, R** Filling or buttressing subterranean open spaces (such as abandoned mines) to discourage their collapse.
- N, R** Hydrological monitoring of groundwater levels in subsidence-prone areas.
- B, C, I** Insurance coverage for subsidence hazards.
- B, L, O** Real estate disclosure laws.
- B, C, P** Community awareness of subsidence risks and effects.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.

Thunderstorm Hazards

- C, E, L** Increased coverage and use of NOAA Weather Radio.
- C** Producing and distributing family emergency preparedness information relating to thunderstorm hazards.
- C** Public education and awareness of thunderstorm dangers.
- C, E, N** Training and increased use of weather spotters.
- C, E, L** Public early warning systems and networks.
- B, N, R** Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
- B, R** Buried/protected power and utility lines.
- B, C, N** Inclusion of safety strategies for severe weather events in driver education classes and materials.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
- E, P** Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds.)

Hail

- B, C, O** Using structural bracing, window shutters, laminated glass in window panes, and hail-resistant roof shingles to minimize damage to public and private structures.
- E, P** Pre-planning for debris management staging and storage areas. (Debris is usually vegetation such as tree branches that have fallen under the impact of hail, or broken power or phone lines that had frozen or been weighted down by ice or fallen branches.)

Lightning

- B, C, N** Using surge protectors on critical electronic equipment.
- B, N, R** Installing lightning protection devices on the community's communications infrastructure.

Severe Winds and Tornadoes

- B, O, R** Using appropriate wind engineering measures and construction techniques (e.g. structural bracing, straps and clips, anchor bolts, laminated or impact-resistant glass, reinforced entry and garage doors, window shutters, waterproof adhesive sealing strips, and interlocking roof shingles) to strengthen public and private structures against severe wind damage.
- B, C, O** Proper anchoring of manufactured homes and exterior structures such as carports and porches.
- E, P** Establishing safe and appropriate locations for temporary debris disposal sites.
- B, C, O** Securing loose materials, yard, and patio items indoors or where winds cannot blow them about.
- B, N, R** Construction of concrete safe rooms in homes and shelter areas in mobile home parks, fairgrounds, shopping malls, or other vulnerable public areas.
- E, P** Pre-planning for debris management staging and storage areas. (Debris could be rubble, vehicles, objects from destroyed/damaged structures, vegetation or other items knocked down or blown by winds, or broken power or phone lines that had frozen or been weighted down by fallen branches and trees.)

Transportation Accidents

- C, P, R** Improvements in driver education, traffic law enforcement, and transportation planning that balance needs of public transportation conveyers with the safety of the general public.
- B, P, R** Improved design, routing, and traffic control at problem roadway areas.
- O, P, R** Railroad inspections and improved designs at problem railway/roadway intersections (at grade crossings, rural signs/signals for RR crossing).

- B, P, R** Long-term planning that provides more connector roads for reduced congestion of arterial roads.
- B, C, F** Use of designated truck routes.
- B, F, O** Enforcement of weight and travel restrictions.
- P, R** Use of ITS (intelligent transportation systems) technology.
- B, F, R** Airport maintenance, security, and safety programs.
- B, C, O** Marine safety and general boater awareness programs.
- B, C** Commercial operator training and skill enhancement programs.
- B, O, R** Training, planning, and preparedness for mass-casualty incidents involving all modes of public transportation.
- E, F, N** Trained, equipped, and prepared search and rescue teams.

Winter Weather Hazards

- C, E, N** Increased coverage and use of NOAA Weather Radio.
- C, E, F** Producing and distributing family emergency preparedness information relating to severe winter weather hazards.
- C** Including safety strategies for severe weather events in driver education classes and materials.
- B, N, R** Tree trimming and maintenance to prevent limb breakage and safeguard nearby utility lines. (Ideal: Establishment of a community forestry program with a main goal of creating and maintaining a disaster-resistant landscape in public rights-of-way.)
- B, R** Buried/protected power and utility lines.
- B, N** Establishing heating centers/shelters for vulnerable populations.
- B, N** Organizing outreach to isolated, vulnerable, or special-needs populations.
- C** Encourage residents to develop a Family Disaster Plan which includes the preparation of a Disaster Supplies Kit.
- E, P** Pre-planning for debris management staging and storage areas. (Debris is usually the snow and ice itself, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. Some storage areas will definitely be needed for snow removal during blizzards.)

Ice and Sleet Storms

- B, C, N** Home and public building maintenance to prevent roof and wall damage from "ice dams."
- E, P** Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow.)

Snowstorms

- B, O, R** Proper building/site design and code enforcement relating to snow loads, roof slope, snow removal and storage, etc.
- B** Farmer preparedness to address livestock needs/problems.
- B, N, R** Pre-arranging for shelters for stranded motorists/travelers, and others.
- R** Maintaining adequate road and debris clearing capabilities.
- B, P, R** Using snow fences or "living snow fences" (rows of trees or vegetation) to limit blowing and drifting of snow over critical roadway segments.
- E, P** Pre-planning for debris management staging and storage areas. (Debris is usually the sleet and ice itself being cleared from roads and roofs, or vegetation such as tree branches that have fallen under the impact of winds or the weight of ice. Broken power or phone lines that had frozen or been weighted down by ice or fallen branches could be part of the problem. In some cases, roofs may collapse under the weight of ice and snow. Some storage areas will definitely be needed for snow removal during blizzards.)





Summary

This section has provided information to assist in developing specific alternative solutions to identified community hazard-related problems. The alternatives should be developed using input from the public as well as community planners, subject matter experts from appropriate governmental agencies, relevant business and trade associations, and other appropriate community-based entities. Public involvement provides the best available information and ideas for solving problems.

The identified range of solutions should be consistent with and work toward implementation of the community's stated goals and objectives.

