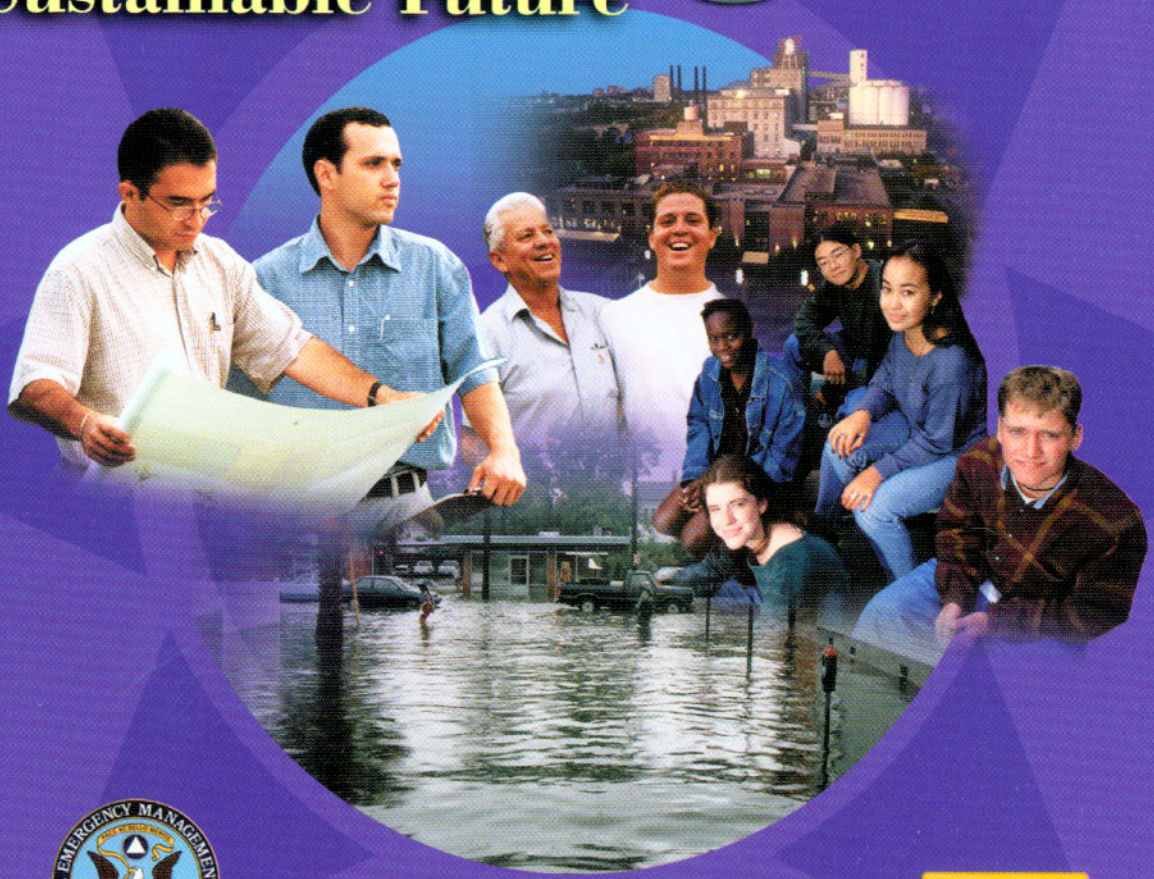
The Link Between Hazard Mitigation and Livability

Planning

for a Sustainable Future



FEDERAL EMERGENCY MANAGEMENT AGENCY

PROJECT IMPACT

A Message From the Director of the Federal Emergency Management Agency

Floods, earthquakes, hurricanes, wildfires, tornadoes, and technological disasters cause billions of dollars of damage annually throughout the United States. The loss of lives, injuries, and damages to homes, businesses, or workplaces cause incalculable hardship and emotional suffering, and tear at the very fabric of our lives and our communities.

While we will never be able to completely prevent disasters from occurring, we do know how to reduce their impacts. Hazard mitigation is the most proactive and successful method for reducing the physical, financial, and emotional losses caused by disasters. "Hazard mitigation" means actions that reduce or eliminate the long-term risk to people and property from the effects of hazards. Hazard mitigation reduces future disaster losses through land use planning, site design, engineering, and retrofitting of homes, structures, schools, public buildings, and businesses.

FEMA, through its *Project Impact: Building Disaster Resistant Communities* initiative, is helping communities across the nation change the way they think about disasters. The challenge of making communities disaster-resistant makes us think about where we live, and how our communities grow. We can make our communities better places to live by protecting their natural, cultural and historical heritage, making them more attractive to business, and better managing sprawl.

This booklet, *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability,* is about hazard mitigation, disaster resistance, sustainable development and livability, and describes the linkages among these concepts. It shows how communities that undertake hazard mitigation planning become more disaster resistant, which can reap further benefits. Hazard

mitigation links disaster resistance to broad community objectives of economic health, social well-being, and environmental protection.

The awareness, energy and resources that communities bring to the task of becoming disaster resistant can serve as a catalyst for important discussion and debate about actions that contribute to the broader objectives of livability and sustainability. We hope that this booklet will motivate your community, be it a small town, growing suburb, or large city, and be a valuable resource to you in encouraging and supporting a dialogue between disaster resistance and livability. FEMA looks forward eagerly to working with the American public and our partners in business, State, and local government; the planning, engineering and design professions; emergency management; academia; and the non-profit sector, to create, throughout our nation, communities that are safer, stronger, and more livable.

James L. Witt

James Lee Witt
Director
Federal Emergency Management Agency

Message from the Associate Director for Mitigation

Think of a community struck by disaster—be it a tornado, flood, hurricane, earthquake, explosion or other event. Recall the scenes of destruction and devastation that have become all too common on the nightly television news. Now imagine a recovered community that is ultimately safer, stronger, and more sustainable than it was before the disaster.

Or consider a community that is fortunate enough to recognize its vulnerability before a disaster occurs, and has the foresight to plan ahead and take action to reduce hazards and suffering.

Both of these communities, and thousands of others like them across our nation, can use their vulnerability to disasters as a catalyst for positive, creative change. This booklet, *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability*, is designed to show you how you can make this happen in your community. You can link the goal of increasing resistance to disasters to other broad goals, such as enhancing community environmental, economic and social health. This linkage, or integration, of the plans and actions that contribute to achieving these goals is critical to the "livability" and sustainability of your community.

"Sustainable development" links policies related to economic development, environmental health, resource protection, and social well-being. Through the efforts of many people and organizations, including the President's Council on Sustainable Development and the White House Task Force on Livable Communities, public awareness of sustainable development has been increasing rapidly. Communities throughout our country (and abroad) have begun to plan for and implement sustainable approaches to growth and development.

Until recently, sustainable development has tended to focus on environmental protection and energy savings, with less emphasis on other planning concerns such as disaster resistance. However, a community that is not disaster-resistant cannot be sustainable. FEMA, through its *Project Impact: Building Disaster Resistant Communities* initiative, is trying to change the way America thinks about disasters. It encourages communities to engage local stakeholders on the issues of hazard risk and vulnerability, and gain consensus and support to implement mitigation measures to reduce losses from future disasters. Through public awareness and education, the American public will want – in fact, demand – disaster-resistant communities. The information and examples in this booklet will point the way.

Although a disaster is something that no community ever wants to experience, it can be an opportunity to re-think where we live, play and work; and to rebuild safer, stronger, and more sustainably. This booklet explains how communities can make the concepts of hazard mitigation and sustainable development part of their recovery, and break the cycle of "disaster-rebuild-disaster."

I sincerely hope that *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability* will motivate you to take action in your community. You will learn, from the examples of other communities, how hazard mitigation, environmental protection, economic prosperity, and social well-being can be woven together to help your community become a safer, stronger, and more sustainable place in which to live.

Michael J. Armstrong
Associate Director for Mitigation
Federal Emergency Management Agency

This booklet, *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability,* is the first of two publications FEMA is preparing to highlight and promote the vital connection between disaster resistance and livability. It focuses on a vision of sustainable communities and shows communities how disaster prevention planning before a disaster strikes and/or a planned recovery process after a disaster can serve as a catalyst for creating more sustainable communities throughout the nation.

Rebuilding for a More Sustainable Future, the second publication, will take the themes covered in *Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability* and develop them into more detailed practical guidance for use during the post-disaster recovery process. This guidebook is intended to be used by FEMA staff and State agencies that will be working directly with communities after a disaster. It is also intended to assist local officials and citizens of affected communities to understand how the decisions they make and the actions they take as part of their recovery can ultimately result in a more sustainable community. *Rebuilding for a More Sustainable Future* will be available in late 2000.

Introduction

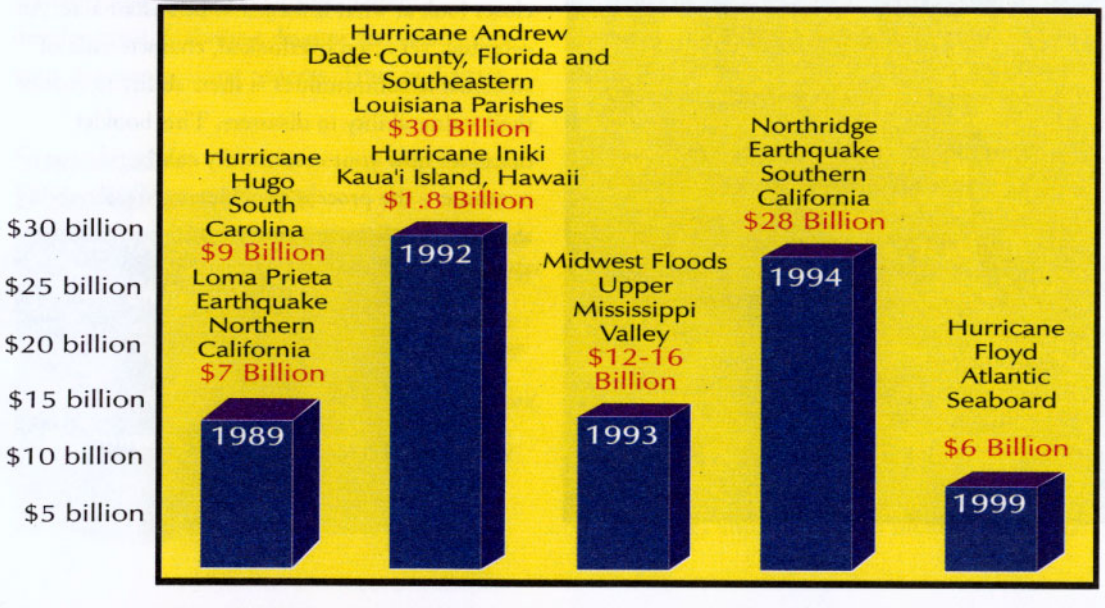
The rising cost of natural disasters over the past decade has led to a renewed interest in identifying effective ways to reduce our nation's vulnerability to disasters. Since 1993, FEMA has spent more than $20 billion in over 5,000 counties on disaster recovery. Growing costs are due in large part to the fact that more development stands in harm's way than ever before. Demographic and large-scale migration trends over the last 30 years have placed an increasing percentage of our population at risk to natural disasters. In 1970, 31 percent of Americans lived in areas subject to hurricane winds, 19 percent faced severe earthquake risk, and 22 percent lived in counties with high landslide risk. By 1990, more than 50 percent of all Americans lived in coastal regions and populations at risk to earthquakes and landslides had increased dramatically as well. In Florida alone, over 80 percent of the State's population lives within 10 miles of the coast. In fact, many of the fastest growing counties in the nation are located in areas of risk along the Atlantic and Gulf coasts.

Unsustainable development is the root cause underlying the mounting cost of natural disasters. Land development patterns over the past several decades have emphasized sprawling suburban communities and homes constructed with little or no attention paid to protection against high winds, flooding, wildfire, or other natural

Throughout history, communities have been planned to meet a threat. Some were garrisoned to ward off invaders. Others were built along waterways to ensure the availability of natural resources. Today, by planning communities to address the oldest of threats –natural disasters– we can also plan to embrace the newest of opportunities. We can make them more attractive to business… better manage sprawl… and protect their natural heritage.

–James L. Witt,
Director of FEMA

Recovery and Reconstruction Costs of Major Natural Disasters



hazards. Building is often permitted in high hazard areas because it satisfies an economic need or a locational preference. Yet, much of this development is not sustainable in the long run.

Taxpayers spend billions of dollars each year to help others recover from disasters, but recovery costs are not borne equally. We allow some people to build in environmentally sensitive areas susceptible to natural hazards, and then we pay to help them recover when disaster strikes. This is not sound environmental or fiscal policy. In many cases, decisions about where to locate development are made because they appear to save money in the short-term. Ultimately, these decisions cost more because the vulnerability of these sites has never been fully examined.

Achieving livable communities that provide disaster-resistant housing, employment, transportation, and public services means taking a closer look at what it means to be sustainable. An essential, yet often overlooked, characteristic of sustainable communities is their ability to reduce their vulnerability to disasters. This booklet discusses how your community can begin – or continue – the process of achieving sustainability through pre-disaster planning and post-disaster recovery.

Arkadelphia, Arkansas

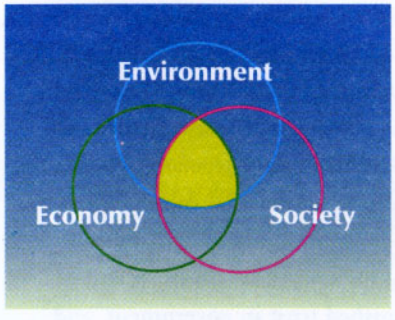
Since a devastating tornado struck in March 1997, zoning regulation changes have guided reconstruction efforts. These changes have resulted in a greater diversity of housing types and compact reconstruction efforts in an older residential neighborhood and the downtown business district. Energy-efficient single-family detached homes and attractive multi-family, low-income townhouse projects have replaced older, single-family homes that were destroyed. The city took advantage of the disaster recovery opportunity to develop a multi-objective recovery plan that will make Arkadelphia more sustainable than it was before the tornado struck.

A Vision of Sustainable Communities

What does "sustainable" really mean? In its broadest context, sustainable development "meets the needs of the present without compromising the ability of future generations to meet their own needs." This was the definition established by the World Commission on Environment and Development (the Brundtland Commission) in 1987. Essentially, sustainability means that decisions made by the present generation will not reduce the options of future generations, but will pass on to them a natural, economic, and social environment that will provide a high quality of life.

The extent to which your community manages to achieve a sustainable future largely depends upon how well you integrate the concepts and principles of sustainable development, including disaster resistance, into your decision-making process. Time and again, community leaders have indicated that the fundamental component of successful recovery efforts is community participation in the process – having people come together to identify a community's needs and work toward collaborative solutions.

Sustainable Development Goal



Sustainable communities work to maximize the overlap among environmental, economic, and social values.

What makes a community sustainable? From experience, we know that sustainable communities make more efficient use of their land. Such land-use decisions tend to emphasize open space planning by promoting greenways, parks, and landscaping. Additionally, the effective use of open space can prevent development from encroaching upon floodplains, active fault zones, and other hazard areas. Sustainable communities also take advantage of underutilized urban areas and encourage infill and "brownfield" development. Energy and resource conservation are high priorities and a greater emphasis is placed on public transit and creating mixed-use environments that are less dependent on autos.

An essential characteristic of a sustainable community is its resilience to disasters. This fact was recognized and promoted as part of recovery efforts following the 1993 Great Midwest Flood. Under the auspices of the President's Council on Sustainable Development, a working group of Federal agency representatives and environmental, planning, and design professionals actively assisted flood-damaged communities and encouraged them to incorporate

Soldiers Grove, Wisconsin

Soldiers Grove, a village of about 600 on the Kickapoo River in southwest Wisconsin, is a pioneer of sustainable redevelopment efforts for flood-prone communities. Heavy timber harvesting and increased agricultural use led to repetitive flooding problems. By the 1970s, the village was experiencing an average of one flood per decade and annual damages of $127,000.

A U.S. Army Corps of Engineers (USACE) levee proposal proved economically infeasible for the small village. Instead, community leaders decided to pursue relocation of the entire community. Funding for relocation became available through a U.S. Department of Housing and Urban Development (HUD) grant after a devastating flood occurred in 1978.

A relocation site close to a major highway was selected so businesses would be more visible to passing traffic. Design guidelines for downtown buildings and landscaping helped block winter winds and channel summer breezes, resulting in lowered energy costs. Since Soldiers Grove has a high percentage of elderly residents, the relocated downtown area was made handicapped accessible and elderly housing was mixed in among retail uses.

The University of Wisconsin, the local utility, and Argonne National Laboratory provided technical assistance and recommended innovative energy systems for the new town. Soldiers Grove wisely rebuilt with a long-term perspective and adopted cost-effective solar energy technology. Stringent energy performance standards were passed and new businesses are required to obtain at least half of their energy needs from solar. The town now keeps most of its energy dollars recycling in a local economy that has grown significantly since relocation.

Numerous town meetings and workshops resulted in a solid community consensus on the overall recovery strategy—one that effectively combined flood mitigation and sustainable development objectives to create a more livable community.

sustainable re-development concepts into their reconstruction efforts. The group recommended practices such as siting and design considerations and the use of energy efficient technologies in the reconstruction process (Wingspread Conference, 1998).

Traditional indicators of a sustainable community are environmental, social, and economic health. The degree to which a community achieves sustainability is directly related to the extent to which the values underlying these indicators are satisfied. However, another fundamental component must now be added: disaster resistance. Disaster resistance focuses community attention on issues related to sustainable development and livability because it is an issue that cuts across social, economic, and environmental lines.

In considering social viability, a community has to balance the competing needs of its citizens. Following a disaster, for example, efforts may focus on citizens who are most likely to live in high hazard zones and may be less able to rebuild following a disaster. In other disasters, community efforts may focus on homeowners who have been allowed to build in environmentally sensitive areas that may not be in the public interest. In either case, housing and access to basic public services and facilities are critical social needs in the aftermath of a disaster. Disasters can have other social consequences that may undermine community sustainability, including loss of security, severe stress and anxiety, diminished trust in government, and

disruption of familiar environments and daily routines.

Economic vitality is essential to sustainability. In economic recovery from a disaster, a community has three key objectives: retain existing businesses, promote continued or new economic development, and ensure that businesses are built back safer, smarter, and stronger. Keeping local businesses and economic infrastructure out of high-risk areas, or disaster-proofing them if there is no practicable alternative for their relocation, is an important approach to promoting a more sustainable economy.

Preserving the integrity of biological and physical systems is the most important environmental indicator of sustainability. This involves limiting degradation of the environment and preserving natural systems – such as wetlands, floodplains, dunes, and active fault or landslide zones – that increase a community's resilience to natural hazards.

The environmental component of sustainability is clearly evident in the recommendations of an Interagency Task Force Congress formed in 1994 to investigate the natural and beneficial functions of floodplains in relation to flood loss reduction. The Task Force's recommendations included the following:

- Encourage a proactive and long-term approach to floodplain management, including the development of pre- and post-disaster plans for flood damage reduction and preservation/restoration of natural and beneficial functions.
- Focus restoration and protection efforts on those floodplains or portions of floodplains identified as having the greatest flood risks and significant natural and beneficial functions.
- Encourage natural, non-structural solutions to reducing flood damages.

This section has provided an overview of the traditional approaches to sustainable development and livability. In addition, it has shown that disaster resistance is also an essential key to sustainability. In the next section, we will take a look at how you can approach disaster prevention to build a more sustainable and livable community.

Sustainable development concepts reflected in illustrative site design for multi-use office park in Crafton, Connecticut. Two and three-story office buildings were sited in a compact, energy-efficient, campus-like setting. Creative recreational uses of the riverfront, such as hiking trails and canoe launches, promote natural greenway buffers and floodplain protection.

Randall Arendt,
Rural by Design

Napa, California

The City of Napa experienced 27 floods between 1862 and 1997. In 1996, residents, businesses, local government, and numerous resource agencies became part of a community coalition to create a flood protection project - widening the river. The project restored over 650 acres of tidal wetlands, protecting 2,700 homes, 350 businesses and over 50 public properties from flood levels at a projected savings of $26 million annually in flood damage costs. In 1998, Napa culminated two years of community planning and partnering with the development of a 20-year Napa Flood Management Plan, and voters approved a 1/2 cent sales tax increase to provide the local funding match for Federal, State, and private sector funds to implement the plan. All up and down the river, the plan has already resulted in new energy and investment, including renovation of a historical structure on the banks of the Napa River as a major tourist center, a non-profit arts and design school for promising arts students, and three planned hotels in the City of Napa. Before the flood management plan, the City could not attract lodging due to investor fear of damages from frequent flooding.

Wilmington, North Carolina

In 1989, devastation from Hurricane Hugo created pressure in North Carolina for more stringent building codes to help buildings withstand high winds. As an example of mitigation, and to bolster itself against future disasters, Wilmington spent $26 million on the Sweeney Water Plant. Funds were used to relocate the facility outside the floodplain, design the new facility to sustain 120 mph winds, and provide two 1,250 kW diesel generators to supply power for 2-3 days to ensure continued operation. The new system performed as expected following both Hurricane Fran in 1996 and Hurricane Floyd in 1999. According to local officials, if the old system had been in place and failed, the results would have been catastrophic, resulting in thousands of people without drinking water and sewage disposal for weeks.

Disaster Prevention: A Catalyst for Change

There are two reasons why disaster preparedness and hazard mitigation planning should be at the top of your community's agenda. First, and most importantly, you will be prepared for the inevitable disaster before it strikes, saving lives, property, time, money, and resources. Second, disaster preparedness and planning can unite constituencies in your community behind a common goal. Citizens are usually willing to support initiatives that save lives and protect property. You can use this effort and goodwill to act as a catalyst for change in confronting other challenges your community may face.

By far, the best time to begin the process of incorporating disaster resistance into your community is *before* disaster strikes. A planning process can be carefully developed that identifies hazards, assesses vulnerabilities, and identifies and prioritizes hazard mitigation actions. In an effort to promote pre-disaster planning and mitigation, FEMA established *Project Impact: Building Disaster Resistant Communities.* This new initiative supports communities with a framework to move towards a more sustainable future. *Project Impact* partnerships include FEMA, but the most

important partners are within the community – local government, community planning and design professionals, businesses, civic and volunteer groups, emergency services, and individual citizens.

Essentially, *Project Impact* is a planning-based approach that challenges and supports communities to become disaster resistant. FEMA encourages your community to participate in the four phases of the Project Impact Initiative.

- **Building Community Partnerships.** This initiative is most effective if it draws upon the experiences, resources, and policies already in place in your community. Identify and recruit Project Impact Partners that reflect all sectors: local government leaders, civic and volunteer organizations, businesses, and individual citizens.
- **Assessing Risks.** Identify hazards to determine which areas of your community are affected by disasters, how likely it is that the disaster may occur, and the magnitude of the disaster. Assess the vulnerability of buildings, utilities, and transportation systems serving the community.
- **Prioritizing Mitigation Efforts.** Identify mitigation priorities and mitigation measures to address these priorities. Determine resources needed to implement these measures and identify potential sources for technical and financial assistance.
- **Communicating Success.** Use the print, radio, and television media to build support for the *Project Impact* initiative and to bring the message of the benefits of mitigation to all residents and businesses in the community.

Hazard Mitigation: The Key to Disaster Resistance

Hazard mitigation is the cornerstone of FEMA's approach to reducing our nation's vulnerability to disasters. But what does it mean when disaster recovery experts use the phrase "hazard mitigation?" Hazard mitigation is defined as the actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. This definition distinguishes actions that have a long-term impact from those that are more closely associated with immediate preparedness, response, and recovery activities. Hazard mitigation is the only phase of emergency management specifically dedicated to breaking the cycle of damage, reconstruction, and repeated damage.

Hazard mitigation focuses attention and resources on actions that produce successive benefits over time. Additionally, the money your community spends today on mitigation can substantially reduce human suffering and the demand for even more money after future disasters.

Cost-effective mitigation measures are key to reducing disaster losses in your community. If your community is willing to

A large portion of Albany State College in Georgia, flooded in 1994, has been relocated to higher ground using Federal funding.

Tulsa, Oklahoma

From its earliest years, Tulsa has experienced repetitive, dangerous floods. The city's response was always the same: emergency response and recovery, reconstruction as quickly as possible, and denial that floods would recur.

In 1974, after suffering through three major floods in a single year, Tulsa's citizens initiated a public debate about floodplain management. In 1976, Tulsa experienced another disastrous flooding event that left 3 people dead, and 3,000 buildings damaged at a loss of $40 million. Citizens demanded action and the city responded. It enacted a floodplain building moratorium and hired its first hydrologist. Comprehensive floodplain management regulations were developed and stormwater detention for new development was required. The city instituted an alert and warning system and began drainage planning for major watersheds.

However, when the 1984 Memorial Day Flood struck, 14 people were killed, 7,000 buildings were damaged or destroyed, and losses exceeded $80 million. The city placed an even greater emphasis on mitigation and flood-loss reduction following this disaster. In 1986, Tulsa passed an ordinance to ensure that a stable source of funds, through stormwater utility fees, would be available for floodplain management planning, construction, and maintenance of flood control and stormwater facilities. Over the last 15 years, Tulsa has cleared more than 900 buildings from its floodplains and constructed many small flood control and storm water management projects throughout the city.

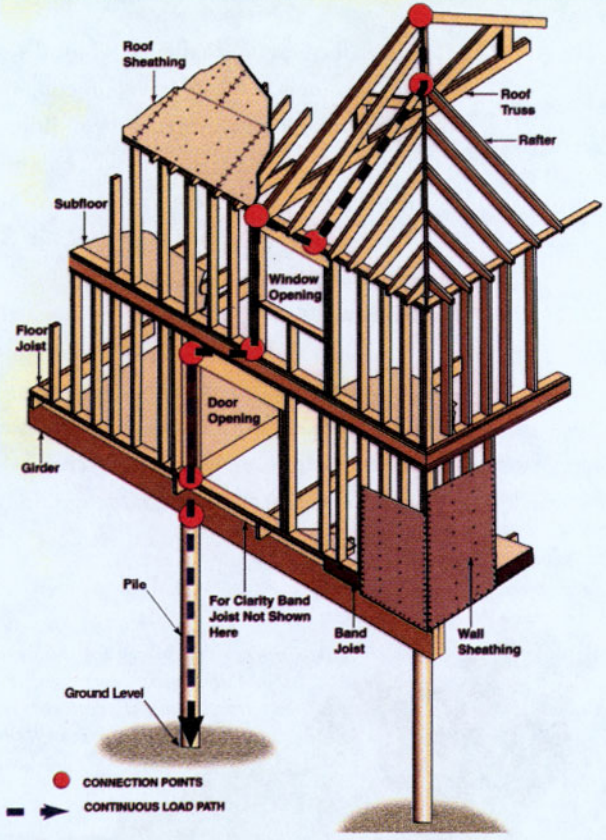
Since floodplain management regulations were first enacted in 1977, none of the structures built in compliance with these regulations has been damaged. Tulsa has also achieved FEMA's highest CRS rating, earning for its citizens the lowest insurance rates in the country. Continuing its disaster prevention efforts, Tulsa became a *Project Impact* community in 1998.

Tulsa's successful flood mitigation program is attributed to several factors:

- The city realized it had to accept responsibility and not expect Federal and State government to solve all of its problems.
- Localized storm drainage projects were integrated into a comprehensive watershed management plan.
- The city required watershed development to take into account design elements based upon the ultimate full development of the watershed.
- Multiple objectives, such as recreation and environmental quality, were included in the city's recovery plan.
- Since the city learned that rebuilding to pre-disaster conditions only set the stage for more losses from future disasters, mitigation and flood-loss reduction became the central focus of flood recovery.

mitigate, opportunities can be found. Ideally, mitigation actions are implemented before disasters occur. However, the availability of post-disaster financial assistance is often what makes it possible to take these actions. An effective planning process takes advantage of mitigation opportunities that follow a disaster, when hazard awareness is high. Attention to your mitigation opportunities will result in a more disaster-resistant and sustainable community.

Mitigation measures depend upon the unique characteristics associated with specific hazards. Hazard mitigation planning for floods can involve strengthening floodplain management regulations, identifying future opportunities for acquisition of floodprone properties, and prioritizing flood reduction mitigation measures. Mitigation measures for coastal areas at risk from hurricanes include steering development away from storm surge zones as well as improvements to and enforcement of building code requirements to strengthen buildings against high wind damage. For earthquake hazards, mitigation measures include structural design standards to allow buildings to withstand ground shaking and soil liquefaction or refined engineering standards to reduce landslide potential. In areas where suburban development encroaches upon areas susceptible to wildfires, mitigation measures can include development setbacks, adequate transportation access, water supply, and vegetation management.



Building code revisions can strengthen the ability of structures to withstand high winds, as illustrated in this elevated, two-story wood-frame building.

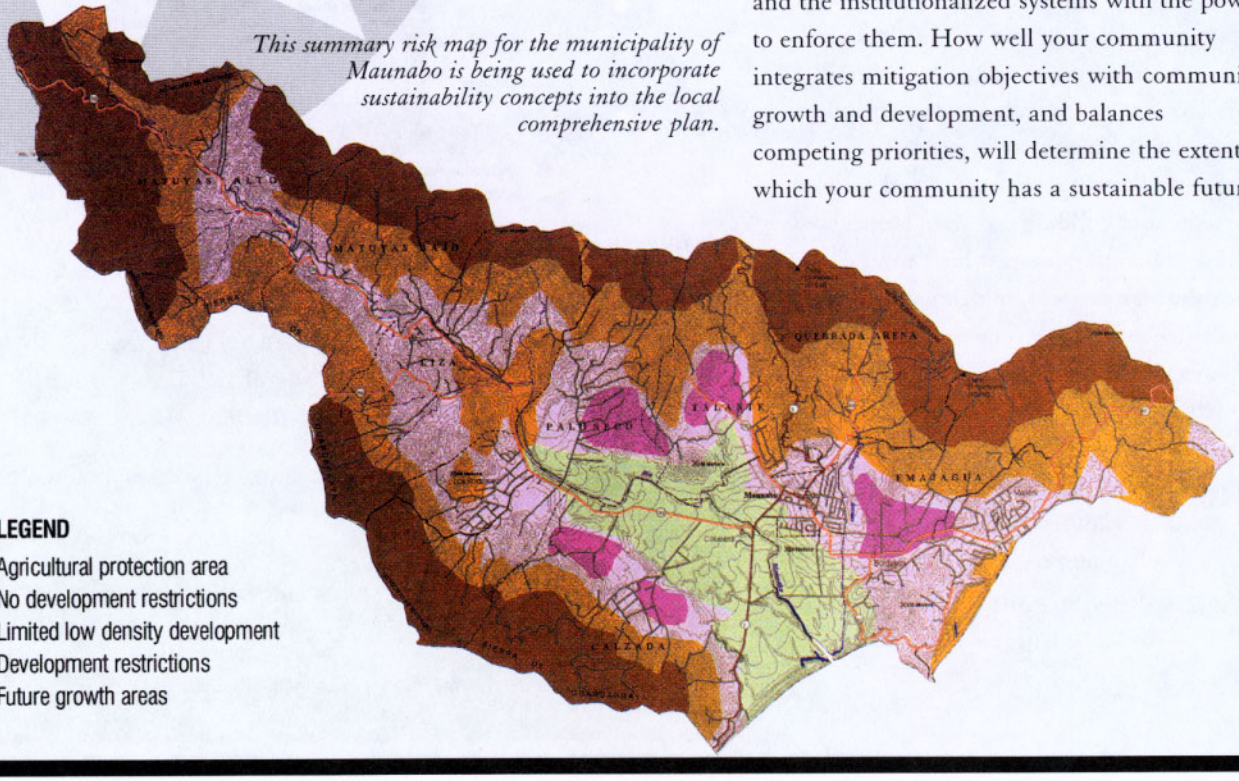
American Planning Association (APA) and FEMA Partner on Prevention Planning

In 1998, FEMA and the American Planning Association (APA) published *Planning for Post-Disaster Recovery and Reconstruction.* Complete with case studies, this report describes an approach for integrating mitigation planning and the concept of disaster resistance into on-going community planning and development activities. The report contains planning and administrative tools, including aids for conducting damage assessments and detailed descriptions of a full range of emergency planning, zoning, design, and financial management tools. A model recovery and reconstruction ordinance is also included. This report, APA's PAS Report No. 483/484, is available from FEMA at (800) 480-2520.

An emerging challenge for local governments and planners is to address competing mitigation needs in regions threatened by multiple hazards. In early 1999, FEMA initiated a community-level planning effort for seven rural municipalities in Puerto Rico devastated by Hurricane Georges. The effort involved developing a multi-risk assessment methodology that evaluated flooding, landslides, hurricane winds, and earthquake hazards. The risk assessment was then incorporated into a land suitability analysis that identified future growth areas, areas where specific engineering standards should be applied, and areas where new, intensive development should be discouraged (see Map of Maunabo). This information will allow these communities to incorporate mitigation considerations into their daily operations.

Local governments have a variety of techniques available to influence the location, type, intensity, design, quality, and timing of development. Many of these tools can be used to mitigate natural hazards and enhance your community's resilience and ability to recover from hazards. Eliminating development in severe hazard risk areas or influencing the type and density of development in hazard-prone areas can be used. Any and all selected mitigation measures, however, must be joined with the political will and the institutionalized systems with the power to enforce them. How well your community integrates mitigation objectives with community growth and development, and balances competing priorities, will determine the extent to which your community has a sustainable future.

This summary risk map for the municipality of Maunabo is being used to incorporate sustainability concepts into the local comprehensive plan.



Oakland Firestorms

In October 1991, a major fire ravaged the hills of Oakland, California. Over the span of 4 days, more than 1,800 acres of land and 3,000 residential units were destroyed. The fire burned through residential neighborhoods, wooded and grassland hillsides. After immediate danger from the fire had passed concerns arose about the potential for erosion and mudslides on the burned slopes. The fire left soils unprotected from wind and rainfall. The slopes were steep, as much as 60 degrees, and California's rainy season was about to begin.

Oakland asked for assistance in developing an emergency short-term action plan for erosion and drainage control of the 1,800-acre burned area. The city assessed the damaged areas and met with numerous State and Federal agencies assisting with restoration and cleanup. Together, an action plan was developed and implemented that focused on slope treatments, including detailed installation guidelines, quantities of materials required, and cost estimates. Emergency erosion control implementation included aerial seeding by helicopter of the entire burn area, hydro mulching, construction of silt fences and debris dams, installation of trash racks, and protection of storm drain inlets.

The city also studied and evaluated potential landslide risks in the firestorm area. The study was used to identify public and private properties with relatively high, medium, and low levels of landslide risk. Study results were also used to develop appropriate policies for redevelopment that protected public safety while not placing an unnecessary burden on the homeowners affected.

Oakland implemented the action plan throughout the winter of 1991-1992 and site monitoring and maintenance continued through the winter months. Implementation of this plan had a significant impact on reducing the damage caused by flooding, debris and sediment flows, slides, blowing ash, and erosion on property and water bodies.

As a result of the firestorm, the city also implemented new development regulations that seek to deter future firestorms in Fire Hazard Areas. New development codes require roofing materials that prevent fires from spreading rooftop to rooftop. New windows preventing radiant heat explosions, non-combustible siding, less flammable vegetation, and the creation of defensible spaces are now required to prevent the spread of fire.

A 1999 development ordinance addressed density issues in Fire Hazard Areas. Before additional structures can be built on property located in Fire Hazard Areas, the city must evaluate their plans, thereby preventing development conditions that can lead to increased fire risk.

Oakland has also increased access in and out of high fire hazard areas. In the 1991 firestorms, several people were left stranded behind the fireline because smoke prevented them from exiting through the only access road available.

Oakland's 1991 experiences have improved the commitment of the city and its citizens not only to understanding the threat wildfires pose, but also how to prevent them in the future.

Hazard Mitigation Tools

- **Building standards** specify how buildings are constructed. In addition to traditional building codes, building standards can include flood-proofing requirements, seismic design standards, and wind-bracing and anchoring requirements for new construction and similar requirements for retrofitting existing buildings.
- **Development regulations**, which may include separate zoning and subdivision ordinances, regulate the location, type, and intensity of new development. Development regulations can include flood-zone regulations; setbacks from faults, steep slopes, and coastal erosion areas; and overlay zoning districts that apply additional development standards for sensitive lands, such as wetlands, dunes, and hillsides.
- **Capital improvement programs** can be an effective way to implement mitigation throughout a community. Local public policies supporting hazard mitigation should be incorporated into these programs. Locating schools, fire stations, and other public buildings, streets, storm sewers, and other utilities outside of high hazard areas is an obvious policy. When siting public facilities in hazardous locations is necessary, communities can incorporate hazard reduction measures into the design or require retrofits where economically feasible. Public facility siting is a key determinant of the location of new privately financed growth in a community. As such, facilities, particularly roads and utilities, should not be sited where they have the potential to encourage growth in high hazard zones.
- **Land and property acquisition** means purchasing properties in hazard-prone areas with public funds, and restricting development to uses that are less vulnerable to disaster-related damages. This can be accomplished through acquisition of undeveloped lands, acquisition of development rights, transfer of development rights to lower-risk areas, relocation of buildings, and acquisition of damaged buildings.
- **Taxation and fiscal policies** can be used to distribute the public costs of private development of high hazard areas more equitably, specifically shifting more of the cost burden directly onto owners of such properties. Employing impact taxes to cover the public costs of development in areas of high hazards or providing tax breaks for reducing land use intensities in hazardous areas are two options.
- **Public awareness** through information dissemination on natural hazards, and providing educational materials to the construction industry, homeowners, tenants, and businesses are also important. Included in this category are hazard disclosure requirements for the real estate industry and public information campaigns to increase awareness in all sectors of the community.

Building Blocks for a Multi-Hazard Approach to Mitigation

Congress has provided FEMA with a broad legislative mandate that consists of programs to address floods, earthquakes, dam safety, and other hazards. FEMA links these programs together in a multi-objective approach that when used to their full advantage can help communities build a foundation for disaster resistance. These programs are briefly described below.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act

When a disaster is imminent, or has occurred, local governments take immediate steps to warn and evacuate the public, alleviate suffering, and protect life and property. If they need additional help to respond to the situation, communities may call upon the emergency assistance authorities of their State. When the magnitude of a disaster is beyond state and local capabilities, the President may declare an "emergency" or a "major disaster." The Stafford Act is the Federal authority for the President's disaster relief program, and authorizes a range of assistance programs. While all of the assistance provided under the Act contributes ultimately to the sustainability of affected communities, the following two programs are especially helpful links between hazard mitigation and sustainability.

Hazard Mitigation Planning. As a condition of receiving any Federal disaster grant or loan funds under the Stafford Act, States are required to evaluate the impact of natural hazards within the area affected by the disaster, and to take appropriate action to mitigate such hazards. To fulfill this intent of the Act, FEMA requires States to prepare and implement a hazard mitigation plan. FEMA encourages all States and local governments, however, to have a hazard mitigation plan in place before the occurrence of a disaster, so that hazard management capabilities and programs become a part of normal governmental functions. While the Stafford Act currently does not explicitly require local governments to have an approved mitigation plan before receiving disaster assistance, some States do require local mitigation plans. FEMA strongly believes that because mitigation fundamentally occurs at the community level, it is in the best interest of local governments to have such a plan. FEMA and your State government can provide technical assistance to your community – whether or not you have suffered a disaster – when you are ready to develop a mitigation plan.

Hazard Mitigation Grant Program (HMGP). The HMGP is a powerful resource in the combined effort of Federal, State, and local government – as well as the private sector – to end the cycle of repetitive disaster damage. HMGP funds provide States and local governments with the incentive and capability to implement cost-effective, environmentally sound long-term mitigation measures that previously may not have been feasible. A key purpose of the program is to ensure that the opportunity to take critical mitigation measures to protect life and property from future disasters is not lost during the recovery and reconstruction following a disaster. Communities apply for HMGP funding through their State, which assists in the preparation and prioritizing of the applications, and the management of approved projects. FEMA can fund up to 75 percent of the eligible costs of approved projects.

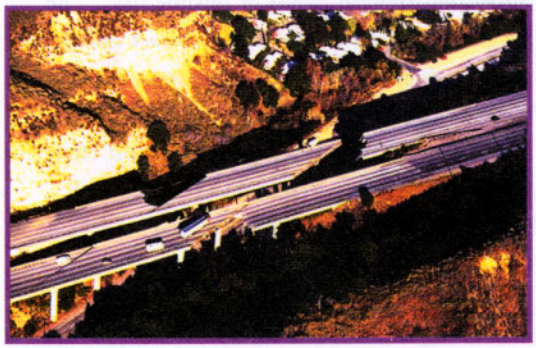
National Flood Insurance Program (NFIP)

Communities participating in the NFIP agree to enforce floodplain management regulations in identified flood hazard areas. In return, citizens in these communities are eligible to purchase flood insurance that is not normally available through private insurance companies. Flood insurance may be purchased to cover structures (e.g., homes and businesses) as well as the contents of these buildings. Nationwide, only one in five homeowners living in flood hazard areas participates in the NFIP, so encouraging greater participation in the program is an excellent way for your community to facilitate recovery following floods. FEMA initiated a Community Rating System (CRS) to reward communities that exceed the NFIP's minimum floodplain management requirements. Under CRS, communities that have implemented flood loss reduction activities can apply for a classification that gives residents lower flood insurance premiums.

Flood Mitigation Assistance Program (FMA). Under the NFIP, grants are provided to State and local governments for planning assistance and projects that reduce the risk of future flood damages, including elevating homes, conversion of property to open space, and minor drainage improvements. Funds also can be used to undertake comprehensive watershed management planning to identify land use changes and prioritize recommendations to reduce impacts of future flooding.

National Earthquake Hazards Reduction Program (NEHRP)

Earthquakes represent the largest single potential for casualties and damage from a natural hazard facing this country—all but seven States are at some level of risk to earthquake damage. The NEHRP is the Federal Government's approach to addressing earthquake risks, involving the closely coordinated efforts of four Federal agencies - FEMA, the United States Geological Survey (USGS), the National Science Foundation (NSF), and the National Institute of Standards and Technology (NIST). The NEHRP's premise is that while earthquakes may be inevitable, earthquake-related damages are not. Activities of the program include basic and applied research; technology development and transfer; and training, education, and advocacy for seismic risk reduction measures. FEMA administers a program of grants and technical assistance to States to increase awareness of earthquake hazards, foster plans, and implement mitigation actions to reduce seismic vulnerability.



Some regions have not been subject to any recent earthquakes, yet have substantial seismic risk.

National Dam Safety Program (NDSP)

The more than 75,000 dams in the United States form a critical part of our national infrastructure. From the Hoover Dam in Nevada to a small earthen dam in Virginia, dams store water for crop irrigation and public water supplies. They generate inexpensive and safe hydroelectric power, create recreational opportunities, and provide flood control. However, dams can also pose a significant risk if they are not maintained properly. Potential costs to local communities can be significant. When a dam fails, the potential energy of the water stored behind it – even for a small dam – can cause extensive property damage and loss of life downstream.

The NDSP provides a grant assistance program to States to improve their dam safety programs. The NDSP offers funds for research and training, and its National Dam Safety Review Board monitors the State assistance program. The NDSP also funds the National Inventory of Dams that is conducted by USACE.

Project Impact: Building Disaster Resistant Communities Initiative

The *Project Impact* initiative is an excellent delivery mechanism that your community can use to move towards a more sustainable future and take full advantage of the FEMA programs described in this section. Whether your community has recently experienced a major disaster or if your community is concerned about the natural hazards you may face in the future, *Project Impact* can help your community reduce the personal and economic costs of disasters. To date, over 200 communities have been designated as *Project Impact* communities. FEMA has provided technical assistance and seed money to help implement this initiative, however, the success of this initiative is due to the concerted efforts of the *Project Impact* communities and the local partnerships they have created. Contact your State office of emergency management for more information.

Your community does not need to be formally designated as a *Project Impact* community to adopt this approach. FEMA can provide you with more information about how to become a disaster resistant community. *The Project Impact Guidebook and Community Tool Kit*, described in the Resources Section, provides direction on the initial steps to implement this initiative in your community. Other resources include a *Project Impact* video to build support in your community, prevention and preparedness brochures, and technical assistance from *Project Impact* Coordinators located in each of the ten FEMA Regional Offices.

Project Impact communities across the nation have targeted a wide range of hazard mitigation initiatives; from strengthening building codes to address natural hazards, enacting land use and zoning measures to discourage building in floodplains or other high risk areas, and retrofitting structures to better withstand hurricane-strength winds or seismic risk. The range and variety of the *Project Impact* initiatives are as varied as the participating communities. This success reflects FEMA's belief that implementing hazard mitigation is most effective when it is locally driven and conducted with broad community participation.

Shelby County, Tennessee

Shelby County is located within the New Madrid Seismic Zone. The water supply system that provides water to the area is owned by Memphis Light, Gas, and Water. The company has initiated a seismic retrofit project to protect its pumping station and enhance the survivability of the connections between the water distribution lines. Retrofit plans include reinforcement and anchorage of masonry walls; strengthening of steel frames; improved connection of concrete wall and roof, secured anchorage of pipes and valves, and bracing of pipelines; bracing of treatment and control equipment; and protection of an overhead crane. The estimated cost to replace the pumping station in the event of a large earthquake exceeds $17 million. Each day the station is not in service costs an additional $1.4 million. Total projected savings are expected to be $112 million with a total project cost of $968,800.

The Planning Process: The Foundation of Disaster Resistance

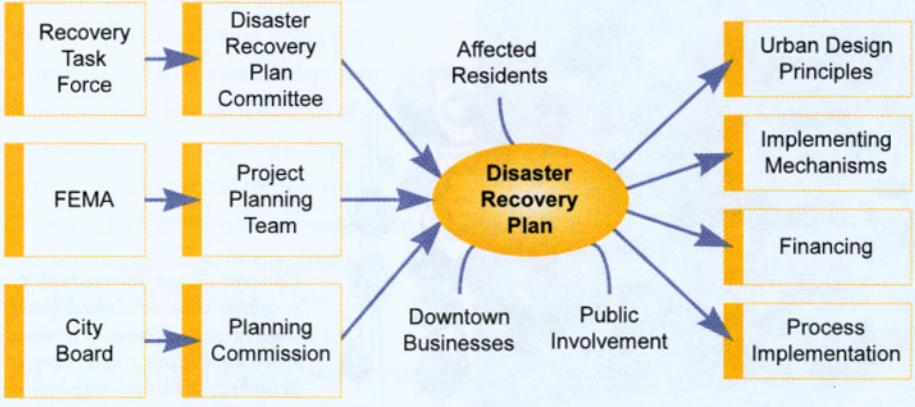
An effective hazard mitigation planning process is the critical first step in making your community more disaster resistant. The programs described previously can serve as the building blocks for this process by providing technical and sometimes financial planning assistance to communities. Through the planning process, you can identify the hazards that threaten your community, assess your vulnerability to them, and build consensus on approaches to mitigating them. This process leads to the identification of cost-effective, environmentally sound mitigation measures. In fact, the planning process is so critical to implementation of effective mitigation measures that some of the programs, described previously, that are intended to fund mitigation measures, require a mitigation plan as a condition of such funding.

The planning process is as important as the plan itself. Your community can follow a general 10-step process that incorporates the classic planning approach of gathering information, setting goals, reviewing alternatives, and deciding upon which actions to take. The steps are:

1. **Organize to prepare the plan.** Selecting the right person to lead the planning effort is important.
2. **Involve the public.** Emphasize participation of key stakeholders,

Creating a better future depends, in part, on the knowledge and involvement of citizens and on a decision-making process that embraces and encourages differing perspectives of those affected by governmental policy. Steps toward a more sustainable future include developing community-driven strategic planning and collaborative regional planning; improving community and building design; decreasing sprawl; and creating strong, diversified local economies while increasing jobs and other economic opportunities.

–Wingspread II Conference, Communities in Harm's Way

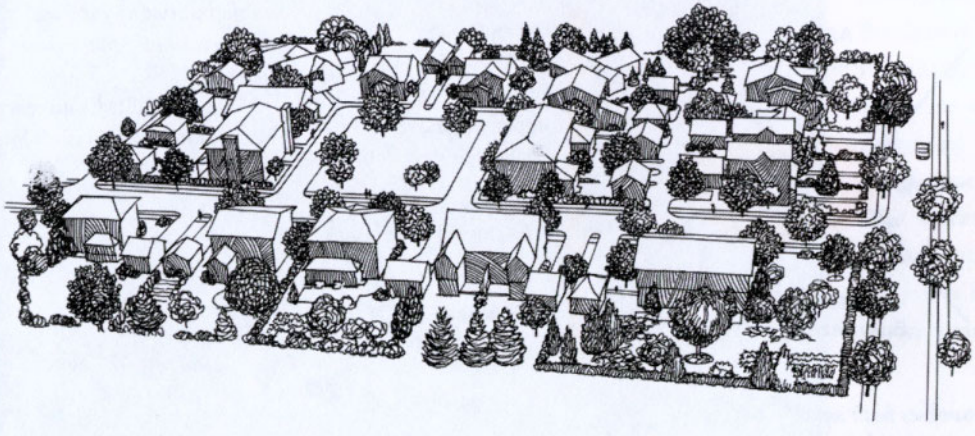


A recovery planning process that involves both small focused workshops and public informational meetings.

The world we have created today as a result of our thinking thus far has problems which cannot be solved by thinking the way we thought when we created them.
–Albert Einstein

including at-risk homeowners, business owners, managers of critical facilities, and technical staff.

3. **Coordinate with other agencies and organizations.** They can provide technical assistance and inform the community of relevant activities and programs that can support your efforts.
4. **Assess the hazard.** Identify the particular hazards affecting your community and the risks they pose to your community's critical infrastructure.
5. **Evaluate the problem.** Getting participants to agree on a problem statement is the first step in reaching consensus on solutions to the problem.
6. **Set goals.** Establish goals as positive and achievable statements that people can work towards.
7. **Review possible strategies and measures.** Include a range of hazard mitigation measures for consideration. While some measures may be quickly eliminated, others should be evaluated carefully to determine how they work as well as their costs and benefits.
8. **Draft an action plan.** Keep it brief. Include sections on how the plan was prepared, recommended mitigation actions, and a budget and schedule.
9. **Formally adopt the plan.** Gaining public acceptance is vital to reducing conflicts, building support for the recommendations, and getting the plan formally adopted. Keep the public informed and educated so they will readily accept the plan.
10. **Implement, evaluate, and revise the plan.** Develop procedures to measure progress, assess strengths and weaknesses, and decide on necessary changes.



Concept design for redevelopment of a neighborhood in Arkadelphia, illustrating a diversity of housing types, including single-family detached, attached single-family and multi-family units.

Wetlands provide an important flood storage function in many watersheds.

Overcoming Barriers to Hazard Mitigation

Communities face a number of barriers to implementing hazard reduction measures. Two major obstacles are the public's misunderstanding of risk and the fact that most people do not want to believe that their community will ever experience a disaster, much less experience another if they've already been through one. The best way to deal with these issues is to educate your community and build a consensus about its vulnerability to natural hazards. Get all of your community's key interests (business, industry, organizations, and neighborhood groups) involved. This encourages a sense of ownership of the problem and, sometimes, of the difficult choices that may have to be made. Your community will have to balance individual property rights against the need to protect public health, safety, and welfare. Short-term advantages

Oregon's Statewide Land-Use Planning Effort

In 1996, FEMA estimated that Oregon saves about $10 million a year in flood losses averted because of strong land-use planning. How did they do it? Twenty-five years ago, Oregon created 19 statewide land-use planning goals. Goal 7 calls for local plans to include inventories, policies, and ordinances to guide development in hazard areas, thereby reducing losses from flooding, landslides, earthquakes, and wildfires. Specifically, the goal states, "Developments subject to damage or that could result in loss of life shall not be planned nor located in known areas of natural disasters and hazards without appropriate safeguards." Implementing this goal into all land-use developments in the last 25 years has made Oregon's rate of community participation in the NFIP the highest in the nation. Furthermore, many Oregon jurisdictions have instituted floodplain management standards that exceed NFIP minimum requirements. Oregon also has 14 communities participating in the CRS, making the State particularly resistant to flood damages.

But it isn't just Goal 7 that makes Oregon's land-use planning process successful. Other goals outline the importance of protecting farmland. Oregon communities are typically more densely populated, creating less urban sprawl, which in turn means more rural areas. More rural, unpopulated areas create more open space that can be left for floodwaters. Other goals adopted protect forests, helping to prevent over-developed mountain slopes that could lead to landslide damages. Coastal areas have instituted building codes to address seismic concerns, and no critical facilities can be built in mapped tsunami wash zones.

Independently, none of these goals explains Oregon's extraordinary success at avoiding disaster damages. But together, they have created a natural co-existence between disastrous events and man-made development.

must also be balanced against long-term benefits. Some points to consider in this effort:

- Emphasize the public safety aspects of hazard reduction measures.
- Be aware of recent court decisions that have upheld laws restricting use of private property subject to severe hazard risks as well as court decisions that have overturned other laws – and understand the difference between them.
- Have a vision of the future that includes how the community will look and function 10 or 20 years down the road.
- Make the case for disaster prevention measures to the public through the media and presentations to clubs, organizations, and other special interest groups.

Land use planning to reduce natural hazards is ultimately and fundamentally about promoting a more sustainable human settlement pattern and living more lightly and sensibly on the earth.
–Timothy Beatley

The best argument for communities to proactively plan for disasters is the fact that disasters will occur; the only question is, "When?" From 1980 - 1999, there were 504 presidentially declared flood, earthquake, and hurricane-related disasters. This number does not include numerous local and State declarations that did not require Federal assistance. Communities that aggressively address their vulnerability to natural hazards will minimize future property damages, economic disruption, and possible loss of life.

Communities that have overcome the hazard awareness problem and have initiated a hazard mitigation planning process should look to FEMA and State emergency management agencies for technical assistance. FEMA mitigation staff can provide guidance on preparing a hazard mitigation plan and information on assessing natural hazards. By identifying the hazards and risks in your community now, anticipating disaster-related issues, and incorporating hazard mitigation elements into local plans, you can minimize the conflicts inherent in the post-disaster recovery process.

Del Rio, Texas

A flash flood in August 1998 totally destroyed an historic neighborhood along San Felipe Creek. The town's recovery efforts are an excellent example of multi-objective planning: acquiring flood-damaged homes; providing increased recreational opportunities along the Creek; restoration of a natural floodplain habitat; and protection of a federally threatened species – the Devils River Minnow. The lack of affordable housing opportunities for displaced residents was addressed by a publicly funded subdivision that incorporates many sustainability concepts, including mixed-use development, a range of housing types, open space, and an emphasis on the use of adobe, an environmentally friendly or "green" construction technique for the Southwest.

Disaster Recovery: A Window of Opportunity

Although no community wants to be faced with the daunting task of disaster recovery, the fact remains that many disasters are followed by the largest infusion of Federal, State, and local development capital that most communities will ever see at one time. Communities with up-to-date mitigation plans can clearly and quickly identify and articulate their needs to State and Federal officials. These communities will have a competitive edge when post-disaster funding and technical assistance become available. Communities that invest this capital thoughtfully can become safer and more disaster resistant, with stronger economies and a higher quality of life. Full recovery does not come easily, however, and effective leadership is necessary to create a more resilient, livable community in the wake of a natural disaster.

In Arkadelphia, USDA Rural Development Administration funds were used to build attractive low-income, multi-family units.

In Arkadelphia, HUD funds were used in an innovative equity buy-down program to finance single-family home construction.

Critical policy issues that emerge following disasters require local governments to make difficult decisions about how best to rebuild. Time is by far the most compelling factor in determining local recovery decisions and outcomes. Disaster victims have an inherent desire to rebuild rapidly and return to normal – to the way things were before the disaster. Communities, however, must balance this need against the objective of building back better and stronger and use the opportunity of the disaster to improve their resistance to future disasters. Pressure to restore normalcy can be so strong that safety, hazard mitigation, and community improvement goals can be compromised or abandoned. Communities have, therefore, a very short period of time to introduce, and gain

Steps for Successful Recovery Planning

- **Take advantage of the window of opportunity to develop an overall recovery strategy.** The outside funding and technical assistance that becomes available after a disaster can help your community make progress on its long-term goals.
- **Establish community goals and objectives.** Take the time and effort to unite the community behind agreed-upon goals and objectives.
- **Consider the planning process as well as the plan itself.** Structure the planning process so that it is open and participatory, but also quickly leads to agreement on a broad framework for recovery.
- **Employ multi-objective planning.** Look for opportunities to reap multiple benefits when incorporating hazard mitigation and sustainable redevelopment concepts into your recovery efforts.
- **Be flexible.** The recovery process evolves rapidly and flexibility is mandatory. Keep your options open and take advantage of unexpected opportunities.
- **All sources of funding are fair game.** Don't overlook non-disaster related grant programs. If expertise is not locally available, seek experienced grant writing assistance from other sources, such as regional or State agencies and the private sector.
- **Maximize community stakeholder involvement.** Recruit local corporations, foundations, and nonprofit or civic organizations to participate in the planning process.
- **Maximize the use of non-traditional partners.** Marshal local nonprofit groups and organizations to supplement Federal and State agency support.
- **Stay out of the weeds.** The recovery plan should be brief. Prioritize immediate, short-term, and long-term recovery actions; detailed design, architectural, and engineering plans can follow later.

acceptance of, new approaches to reconstruction. Throughout this section you will find some practical tools and resources that will enable your community to take advantage of this "window of opportunity" to become more disaster resistant and sustainable.

Planning for Recovery

The initial period following a disaster can be chaotic. So many issues demand attention that any thoughts of long-term recovery planning are crowded out by immediate recovery efforts. Critical life and safety issues come first: search and rescue operations, treating the injured, re-establishing vital public services, and providing emergency shelter. But once the task of clearing debris is underway, community decision-makers need to shift their attention to long-term recovery. Ideally, planning for recovery occurred before the disaster. If not, now is the time to engage the community's attention to develop a recovery strategy.

The long-term goal of recovery planning is for your community to take advantage of the recovery and reconstruction opportunity to become more disaster resistant and, ultimately, more sustainable. Implementing hazard mitigation actions will help to make your community more disaster resistant. Whether it is called a Recovery Plan, a Strategy for Recovery, or an Action Plan, your community should create a concise plan outlining its framework for long-term recovery. How you structure community involvement in developing this recovery strategy depends upon the size of your community, the capabilities of local officials and staff to support a

planning initiative, and the amount of involvement your citizen review boards and associations have in setting community goals and policies.

Creating a recovery task force of community leaders, representatives of the local government, and interested citizens is a common approach for structuring long-term recovery planning. An existing community-wide task force can assume this responsibility or a task force can be created to focus exclusively on long-term recovery needs. Standing committees can be formed to address specific recovery issues such as housing, economic development, infrastructure, and hazard mitigation.

Another possible approach is a large open community conference or workshop format, broken into smaller task groups that report back to the entire group. While public hearings and meetings are useful for disseminating information and explaining the findings of smaller working groups, they are not useful for forging a recovery strategy. Far greater success can be achieved with small committees that reflect the wide range of community views and interests. Public meetings can then be held to review the findings of the smaller working groups and gain acceptance from the broader community.

If appropriate, larger communities can utilize capabilities already existing within their agencies and departments. A team of representatives from the planning, permitting, public works, and emergency management departments, among others, can be brought together to develop a strategy. A coordinator who has the necessary authority or clear access to the community's chief executive should be designated. As always, public participation should be part of these efforts.

In some instances, local government capabilities are so severely strained following a disaster that it may be best to seek outside technical planning assistance to work closely with a small group of community leaders to develop a recovery plan. As part of its post-disaster mitigation assistance, over the past few years FEMA has provided technical assistance for long-term recovery planning to local communities facing significant rebuilding challenges. Information on how to request technical assistance from FEMA can be found in the Resources Section of this booklet.

In Arkadelphia, Arkansas, technical planning assistance was used successfully in 1997 after a tornado destroyed a large part of the downtown business district and surrounding residential areas. A FEMA-funded recovery planning team, including a planner, architect, economist, and engineer, worked daily with a local Disaster Recovery Committee to develop a set of reconstruction goals that contained specific implementation recommendations. These goals evolved into the city's recovery plan, which the City Council adopted within months. In addition to serving as the conceptual framework for the city's recovery efforts, the plan also attempted to remedy some of the community's long-standing planning and development issues.

Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it's the only thing that ever has.
–Margaret Mead

Economic Sustainability: An Essential Component of Successful Recovery

The Great Midwest Flood of 1993 affected more than 250 businesses – about 76 percent of the local businesses – in Chesterfield, Missouri. Only 65 existing businesses were able to re-open after the disaster. While not every community will suffer such extreme business losses following a disaster, many small to mid-sized businesses will not have the financial reserves to survive an extended disaster recovery process. Businesses, particularly those that lease rather than own their facilities, generally do not have adequate insurance to cover the repair costs or coverage for equipment, inventory, and revenue disruptions. In order for your community to be sustainable, you must have a disaster-resistant economic base that includes jobs that will still be there after the next disaster strikes. Helping businesses to plan for and recover from disasters is a vital aspect of creating more sustainable communities.

FEMA has asked the Economic Development Administration (EDA) of the U.S. Department of Commerce to assess the economic impacts of several recent disasters. The results of their assessments indicate that when businesses fail, the whole community struggles to recover. There is a reduction in goods and services that residents have come to depend upon, a loss of jobs, and substantial reductions in the local tax base. Clearly, this undermines the economic viability—and hence the livability—of the community.

Communities should include input from its business community to establish and achieve recovery goals. To assist your community's recovery efforts, consider the following:

- **Integrate mitigation and economic recovery planning.** Connect business recovery operations with disaster mitigation concepts early in the recovery process. Encourage new business development in ways that make it more disaster resistant.
- **Designate a single point of contact.** Select someone to be responsible for assisting the business community with economic recovery activities.
- **Establish temporary business sites.** Create a location for businesses affected by the disaster to operate until they can reopen in permanent locations.

East Grand Forks, Minnesota

East Grand Forks experienced a devastating flood of the Red River on April 18, 1997. All but 7 of the city's 2,301 residential properties were flooded and the entire downtown business district was severely damaged. Several commercial establishments were damaged beyond repair and had to be demolished.

The extensive damage made it apparent that the city needed to initiate a recovery planning process that included the entire community's ideas, opinions, and suggestions. Community volunteers formed a Citizens Advisory Rebuilding Team (CART) and identified key stakeholders in retail/business, health care, housing, education, nonprofit services, arts, parks/recreation, and the religious sector. An intense two-day workshop attended by approximately 450 individuals was held to gather input. Encouraging a vibrant economy became the highest ranked priority of the recovery effort. The city realigned a protective dike and built an "invisible" floodwall to protect existing businesses. The floodwall is below water level most of the time. When weather conditions indicate potential flooding conditions, however, USACE raises the floodwall to protect the downtown business district. The city chose this type of flood protection over other possibilities because it was flexible enough to allow the community to enjoy the riverfront during normal conditions while still providing the necessary protection when flooding is predicted.

Growth and commercial activity in East Grand Fork's central business district was fairly static before the flood. After 27 businesses were severely damaged or destroyed by the flood, the city purchased an unused mall and established a business incubator there. Using EDA funds, the city rehabilitated the building and worked with retailers to get them back into business as quickly as possible. The business incubator was a great success. After post-disaster recovery and mitigation efforts were complete, some businesses relocated into the old business district and new businesses filled the spaces left empty in the business incubator. Currently, the building is completely leased. More than 500 jobs in the downtown central business district were created or retained as a result of the recruitment of new businesses and the restoration of existing retail services. With few exceptions, all of the previous businesses are up and running. Many pre-flood businesses have expanded in their original location or relocated to the city's northeast business sector. Cabela's, an outdoors and sporting goods retailer, decided to invest in East Grand Forks because of the unique circumstances the flood recovery created. In all, 13 new businesses have moved into the area.

University of California

The Hayward Fault runs directly through the campus of the University of California (UC) at Berkeley. Since the 1970s, UC has spent more than $250 million on seismic retrofit projects, but an estimated $1.2 billion in retrofit work is still needed. The University recently became part of FEMA's *Disaster Resistant Universities Initiative*. Similar to FEMA's *Project Impact*, this nationwide initiative encourages protection of public investment in research universities. As part of this initiative, the University undertook a campus study to determine possible structural and nonstructural losses that would occur if a magnitude 7 earthquake were to strike the area. University Administrators had some unique concerns, including:

- Laboratories harboring rare life forms;
- Expensive research equipment;
- Archeological collections, worth over $270 million, housed below the women's gym and swimming pool;
- Laboratories containing hazardous and biological materials that would be dangerous if released into the surrounding community; and
- Cancer research animals used in long-term research projects.

The study's results were distressing: 27 percent of all usable space was rated seismically poor or very poor, meaning that in the event of a major earthquake these buildings would likely sustain significant or extensive structural damage and possibly collapse – endangering the lives of students, faculty, and staff. After all on- and off-campus buildings were surveyed, 95 were deemed in need of corrective action.

The University also analyzed the economic impacts of a major earthquake on the campus and the effect it would have on surrounding counties. Losses could range from a decline in rental income in the surrounding area to the loss of valuable research grants. UC discovered, for example, that 25 percent of its research grants were concentrated in only two campus buildings. The study has provided the University with clear guidance on where to place limited funds for retrofit projects.

- **Get information out to the public.** Find effective ways to communicate with the public. Publish weekly newsletters, provide daily reports on local radio stations, or establish a website that provides notice when businesses reopen.
- **Increase risk awareness and encourage adequate business insurance.** Help businesses assess the real costs of disaster damage and business disruption, and encourage them to carry adequate insurance.

Salt Lake, Utah

The City of Salt Lake acquired land along a known earthquake fault to prevent intense at-risk development. A low intensity recreational area, Faultline Park, was developed on this land.

Looking to the Future

While we will never be able to completely prevent floods, tornadoes, earthquakes, hurricanes, and other disasters from threatening our communities, we can, however, reduce – or even avoid – the devastating impacts and rising costs of disasters. We can do this by planning for and implementing effective hazard mitigation measures before disaster strikes, and by making sure that post-disaster recovery efforts include appropriate hazard mitigation measures.

We can go further, however. We can change the way we think about disasters, and also change the way we think about our communities. We can convert both disaster prevention and disaster recovery into opportunities for community-wide planning that can address the long-term challenges that communities face. We can go beyond creating disaster-resistant communities by having the vision to create truly sustainable ones.

Sustainable development encompasses the full range of activities that define the places we live and work, and there is much more to read and learn about it than can be covered in this booklet. The following Resources section provides a significant starting point, with materials on hazard mitigation, disaster resistance, and sustainable development. We encourage you to consult these additional sources of information.

We also hope we have motivated you to begin to take some specific actions now. By identifying the hazards and risks in your community, anticipating disaster-related issues, and incorporating hazard mitigation elements into your local comprehensive planning process, you will have taken a significant step toward making your community more disaster resistant and sustainable.

Louisburg, North Carolina

The Town of Louisburg's Tar River Water Reclamation Facility has been recognized nationally for its mitigation efforts. As a part of the post-Hurricane Fran recovery effort, the facility received more than $550,000 in EDA grants to increase capacity and mitigation. Although Hurricane Floyd's floodwaters encircled the town, the facility continued operation and was able to provide water and waste treatment to two nearby communities. Mitigation efforts also prevented the possible release of contaminants into the community.

Resources

The Project Impact Guidebook provides an overall description of the *Project Impact: Building Disaster Resistant Communities* initiative and directions on how to take the first steps toward building a disaster-resistant community, including forming partnerships, assessing risk, prioritizing needs, and communicating success to your community. *The Community Tool Kit* provides detailed information on how to achieve the four main steps described above and includes helpful implementation tips, checklists, and suggestions on how to achieve community goals.

The Emergency Management Guide for Business and Industry, FEMA, 1993, provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that companies can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a company's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions.

HAZUS - FEMA's Standardized Risk Assessment Methodology. FEMA has established a standardized risk assessment methodology, HAZUS, which is used to estimate potential losses from earthquakes. Flood and wind hazard modules are under development. FEMA will provide HAZUS software and additional resource documents at no cost. Minimum user requirements are MapInfo or ArcView GIS software.

Seismic Considerations for Communities at Risk (FEMA Publication 83). This publication provides interested individuals and community decision makers with information for assessing seismic risk and making informed decisions about seismic safety in their communities and in determining what should be done to mitigate the risk. Also included are considerations when deciding whether and how to take action and suggestions for stimulating community action.

Economic Impact Assessments. As a result of Hurricane Floyd in September 1999, economic impact assessments were prepared for FEMA by the Economic Development Administration for the states of Virginia, North Carolina, and New Jersey. The objective of these economic impact assessments was to provide recommendations in the recovery process to aid in making decisions and contribute to long-range mitigation initiatives and strategic planning.

Long-Term Recovery Action Plans. Long-term recovery action plans were prepared due to flooding and the effects of past flood mitigation measures in Georgia, Alabama, and Florida. These plans emphasize mitigation opportunities as the core to recovery efforts.

In addition, long-term recovery action plans were prepared for Puerto Rico on needs resulting from Hurricane Georges and the effects of past flood and hurricane mitigation measures.

A Guide to Federal Aid in Disasters, FEMA 262, June 1997. When disasters exceed the capabilities of State and local governments, the President's disaster assistance program (administered by FEMA) is the primary source of Federal assistance. This handbook discusses the procedures and process for obtaining this assistance, and provides a brief overview of each of the various programs of assistance that may be available.

Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments, FEMA, DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation, and shows State and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.

Order any of these publications, and many others, from FEMA at 1.800.480.2520. In addition, some publications may be down-loaded directly from FEMA's website – fema.gov/library.

Websites

The following are important websites that provide focused access to valuable planning resources for communities interested in sustainable initiatives.

http://fema.gov – website for the ***Federal Emergency Management Agency*** includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.

http://planning.org – website of the ***American Planning Association***, a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.

http://ibhs.org – website of the ***Institute for Business & Home Safety***, an initiative of the insurance industry to reduce deaths, injuries and property damage, economic losses and human suffering caused by natural disaster. Online resources provide information on natural hazards, community land use and ways you can protect your property from damage. You can also call the information center at 617.292.2003.

http://livablecommunities.gov – website of the ***Livable Communities Initiative and the White House Task Force on Livable Communities***. Their goal is to assist Federal agencies' efforts to help communities grow in ways that ensure a high quality of life and strong, sustainable economic growth.

http://sustainable.doe.gov/freshstart - website for ***Operation Fresh Start*** describes resources available to help individuals and communities incorporate sustainable redevelopment principles and environmental technologies into their recovery planning process.

http://usmayors.org/uscm/sustainable/, is the website for the ***Joint Center for Sustainable Communities***, a collaborative effort between the U.S. Conference of Mayors (USCM) and the National Association of Counties (NACo). Its mission is to provide a forum for cities and counties to work together to develop long-term policies and programs that will lead to job growth, environmental stewardship, and social equity – the three pillars of sustainable communities. The Joint Center provides local elected officials technical assistance, training, sustainable development literature and materials, and funding toward collaborative planning.

A wide range of additional funding and technical assistance programs to help communities move toward sustainability can be accessed via the Internet. References for many of these programs can be found in the next section, Federal Technical Assistance and Funding. These websites are an invaluable resource for finding helpful advice, and a starting point in gathering information about sustainability.

Federal Technical Assistance and Funding

The Federal Government offers a wide range of funding and technical assistance programs to help make communities more sustainable and livable. Many of these are included in the Federal Technical Assistance and Funding Matrix listed below. Programs with potential effectiveness in the construction or reconstruction of housing and businesses, public infrastructure (transportation, utilities, water, and sewer), and supporting overall hazard mitigation and community planning objectives are emphasized in the matrix. Some programs are disaster-specific, activated by a presidential declaration of a major disaster or emergency under the provisions of the Stafford Act. Also included are many programs or grants that are not specifically disaster related.

Grant Name	Agency	Purpose	Sustainability and Hazard Mitigation Application	Contact
Emergency Management and Hazard Mitigation				
Emergency Management Performance Grants (EMPG)	Federal Emergency Management Agency (FEMA)	To encourage the development of comprehensive emergency management, including for terrorism consequence management, at the State and local level and to improve emergency management planning, preparedness, mitigation, response, and recovery capabilities.	Funding provided to States, which can be used to educate people and protect lives and structures from natural and technological hazards.	Office of Financial Management, FEMA, 500 C Street, S.W., Washington, DC 20472 Telephone: 202.646.7057. http://www.fema.gov
Flood Mitigation Assistance Program	Federal Emergency Management Agency (FEMA)	To help States and communities plan and carry out activities designed to reduce the risk of flood damage to structures insurable under the NFIP.	The program provides planning and grants for projects that include mitigation activities that are technically feasible and cost-effective.	Director, Program Support Division, Mitigation Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472. Telephone: 202.646.4621 http://www.fema.gov/mit/fldmitast.htm# fludmit
Hazard Mitigation Grant Program (HMGP)	Federal Emergency Management Agency (FEMA)	To prevent future losses of lives and property due to disasters; to implement State or local hazard mitigation plans; to enable mitigation measures to be implemented during immediate recovery from a disaster; and to provide funding for previously identified mitigation measures to benefit the disaster area.	Project grants can be funded for such activities as acquisition, relocation, elevation, and improvements to facilities and properties to withstand future disasters.	Director, Program Support Division, Mitigation Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472. Telephone: 202.646.4621. http://www.fema.gov/mit/grant.htm

Grant Name	Agency	Purpose	Sustainability and Hazard Mitigation Application	Contact
Housing				
Community Development Block Grant (CDBG)	Department of Housing and Urban Development (HUD)	To develop viable urban communites by providing decent housing and a suitable living environment. Principally for low-to moderate-income individuals.	Community Development activities that meet long-term needs. These activities can include acquisition, rehabilitation, reconstruction of properties and facilities damaged by a disaster, and redevelopment of disaster affected areas.	State and Small Cities Division, Office of Block Grant Assistance, CPD, HUD, 451 7th Street, S.W., Washington, DC 20410-7000. Telephone: 202.708.3587. http://www.hud.gov/bdfy2000/summary/cpd/cdbg.html
Economic Development and Adjustment Program, Sudden and Severe Economic Dislocation (Title IX)	Deparment of Commerce, Economic Development Administration (EDA)	To help States and localities to develop and/or implement strategies that address adjustment problems resulting from sudden and severe economic dislocation.	Project grants can be funded in response to natural disasters including improvements and reconstruction of public facilities.	Disaster Recovery Coordinatior, Economic Adjustment Division, EDA, DOC, Herbert C. Hoover Building, Washington, DC 20230. Telephone: 800.345.1222 or 202.482.6225. http://www.doc.gov/eda/html/prgtitle.htm
Disaster Housing Program	Federal Emergency Management Agency (FEMA)	To provide assistance to enable households to address disaster-related housing needs.	Program assistance may include 1) Short-term Lodging; 2) Home Repair Assistance to restore the home to a livable condition; 3) Rental Assistance; 4) Mortgage and Rental Assistance;. 5) Small minimization grants to incorporate hazard mitigation in home repair.	Human Services Division, Response and Recovery Directorate, FEMA, 500 C Street, SW, Washington, DC 20472. Telephone: 202.646.3642. http://www.fema.gov/r-n-r/types.htm
Infrastructure				
Sustainable Development Assistance	Department of Energy (DOE), Community Services Team	The Team works with communities to help them define and implement sustainable development strategies as part of their comprehensive community planning efforts.	The Team provides technical assistance to disaster-affected communities as they plan for long-term recovery by introducing a wide array of environmental technologies and sustainable redevelopment planning practices.	DOE, Office of Energy Efficiency and Renewable Energy, Denver Regional Support Office, 1617 Cole Blvd, Golden, CO 80401. Telephone: 303.275.4801 http://www.sustainable.doe. gov/
Flood Control Works/Emergency Rehabilitation	Department of Defense, US Army Corps of Engineers (USACE)	To assist in the repair and restoration of public works damaged by flood, extraordinary wind, wave, or water action.	The Corps provides public works and engineering support to supplement State and local efforts toward the effective and immediate response to a natural disaster.	Program Manager PL 84-99 USACE, 20 Massachusetts Ave, N.W. Washington, DC 20314 Telephone: 202.761.0001. http://www.spd.usace.army.mil/h-qpam.html

Grant Name	Agency	Purpose	Sustainability and Hazard Mitigation Application	Contact
Infrastructure (continued)				
Public Assistance Program	Federal Emergency Management Agency (FEMA)	To provide supplemental assistance to States, local governments, and certain private nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President.	These grants allow State and local units of government to respond to disasters, recover from their impact and mitigate impact from future disasters.	Infrastructure Support Division, Response and Recovery Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472. Telephone: 202.646.3026. http://www.fema.gov/r-n-r/pa
Transportation: Emergency Relief Program	Department of Transportation, Federal Highway Administration (FHWA)	To provide aid for repair of Federal-aid roads.	The funds can be used to repair federal-aid roads by using new technologies that improve the quality and lifespan of the roads.	Director, Office of Engineering, FHWA, DOT, 400 7th Street, S.W., Washington, DC 20590. Telephone: 202.366.4655. http://www.fhwa.dot.gov//////// infrastructure/progadmin/ erelief.html
Water Pollution Control	Environmental Protection Agency, Office of Water	To help establish and maintain adequate measures for prevention and control of surface water and groundwater pollution.	Protecting the quality of ground and surface water today will insure the safety of water sources for future generations.	Office of Water, EPA, Washington, DC 20460. Telephone: 202.260.6742. http://www.epa.gov/owm/ finan.htm# sec106
Water and Waste Disposal Loans and Grants	Department of Agriculture, Rural Utilities Service (RUS)	To develop, replace, or repair water and waste disposal (including storm drainage) systems in rural areas and towns with a population of 10,000 or less.	Use energy-efficient pumps and incorporate mitigation measures when restoring or replacing damaged water and sewer systems.	Assistant Administrator, Water and Waste, RUS, USDA, Washington, DC 20250-3200. Telephone: 202.720.9583. http://www.usda.gov/rus/ water/programs.htm
National Dam Safety Program (NDSP)	Federal Emergency Management Agency (FEMA)	To provide financial assistance incentives to States so they can strengthen their dam safety program.	Funds may be used to enhance an exsiting dam safety program and provide training, annual maintenance and dam inspections.	Director, National Dam Safety Program FEMA, 500 C Street, S.W., Washington, DC 20472. Telphone: 202.646.2704. http://www.fema.gov

Grant Name	Agency	Purpose	Sustainability and Hazard Mitigation Application	Contact
Historic Preservation				
Repair and Restoration of Disaster-Damaged Historic Properties	Federal Emergency Management Agency (FEMA)	To evaluate the effects of repairs to, restoration of, or mitigating hazards to disaster-damaged historic structures working in concert with the requirements of the Stafford Act.	Preservation of historic structures is an important link to our past. By providing assistance in mitigating future damages, historic structures can be saved for future generations to enjoy.	Infrastructure Support Division, Response and Recovery Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472. Telephone: 202.646.3026. http://www.fema.gov/ nwz99/fldhisthm.htm
Historic Preservation Fund Grants-in-Aid	Department of the Interior, National Park Service (NPS)	To provide matching grants to States to expand the National Register of Historic Places, the nation's listing of districts, sites, buildings, structures, and objects significant in American history, architecture, archaelology, engineering, and culture.	Grants-in-Aid are provided for the identification, evaluation, and protection of historic properties by such means as survey, planning, technical assistance, acquisition, development, and certain tax incentives available for historic properties.	Associate Director, Cultural Resources, NPS, DOI, Washington, DC 20240. Telephone: 202.343.9509. http://www.cr.nps.gov/ helpyou.htm# grants
Land Management				
Emergency Watershed Protection	Department of Agriculture, Natural Resource Conservation Services (NRCS)	To provide emergency technical and financial assistance to install or repair structures that reduce runoff and prevent soil erosion to safeguard life and property.	In preventing substantial run-off and erosion, the program helps prevent future property loss and preserves soil resources.	Deputy Chief for Natural Resource Programs, NRCS, USDA, PO Box 2890, Washington, DC, 20013. Telephone: 202.720.3527. http://www.ftw.nrcs.usda. gov/pl566/EWP/ewp.htm
Coastal Zone Management Administration Awards	Department of Commerce, National Oceanic and Atmospheric Administration (NOAA)	To assist States in implementing and enhancing coastal zone management programs that have been approved by the Secretary of Commerce	The program aids in the protection and preservation of sensitive coastal zones and provides the added benefit of reducing development in high coastal hazard areas.	Chief, Coastal Programs Division, Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA, DOC, 1305 East-West Highway, Silver Spring, MD 20910. Telephone: 301.713.3102. http://www.ocrm.nos.noaa. gov/
Coastal Wetlands Planning, Protection, and Restoration Act	Department of the Interior, US Fish and Wildlife Service (USF&WS)	To grant funds to coastal States for restoration, enhancement, and management of coastal wetlands ecosystems.	The program aids in the protection and preservation of sensitive coastal zones.	FWS, DOI 4401 N. Fairfax Drive, Suite 140 Arlington, VA 22203 Telephone: 703.358.2156. http://www.cfda.gov/public/ viewprog.asp?progid= 448

Grant Name	Agency	Purpose	Sustainability and Hazard Mitigation Application	Contact
Land Management (continued)				
Land and Water Conservation Fund Grants	Department of the Interior, National Park Service (NPS)	To acquire and develop outdoor recreation areas and facilities for the general public, to meet current and future needs.	Project grants may be used for a wide range of outdoor recreation projects, such as picnic areas, campgrounds, tennis courts, boat launching ramps, bicycle trails, and support facilities .	Chief, Recreation Grants Division, NPS, DOI, PO Box 37127, Washington, DC 20013-7127. Telephone: 202.565.1200 http://www.ncrc.nps.gov/ lwcf/
Park and Recreation Recovery Program	Department of the Interior, National Park Service (NPS)	To provide for the rehabilitation of recreation areas and facilities, demonstration of innovative approaches to improve park system management and recreation opportunities, and development of improved recreation planning.	The program allows jurisdictions to provide recreational facilities in areas prone to natural disasters.	Chief, Recreation Grants Division, NPS, DOI, PO Box 37127, Washington, DC 20013-7127. Telephone: 202.565.1200 http://www.ncrc.nps.gov/uparr/
River Basin Program	Department of Agriculture, Natural Resource Conservation Services (NRCS)	To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resource programs.	Priority is given to projects designed to solve problems of upstream rural community flooding; water quality improvement that comes from agricultural nonpoint sources; wetland preservation; and drought management for agricultural and rural communities.	Deputy Chief for Natural Resource Programs, NRCS, USDA, PO Box 2890, Washington, DC, 20013. Telephone: 202.690.4575
Watershed Protection and Flood Prevention	Department of Agriculture, Natural Resource Conservation Services (NRCS)	To provide technical and financial assistance in planning and executing works of improvement to protect, develop, and use land and water resources in small watersheds.	Protecting watersheds enables future generations to enjoy those watershed land resources in the future.	Deputy Chief for Natural Resource Programs, NRCS, USDA, PO Box 2890, Washington, DC, 20013. Telephone: 202.720.4527 http://www.ftw.nrcs.usda.gov/ pl566/pl566.html

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Schwab, et al. Planning for Post Disaster Recovery and Reconstruction. American Planning Association and FEMA. PAS Report No 483/484. 1998.

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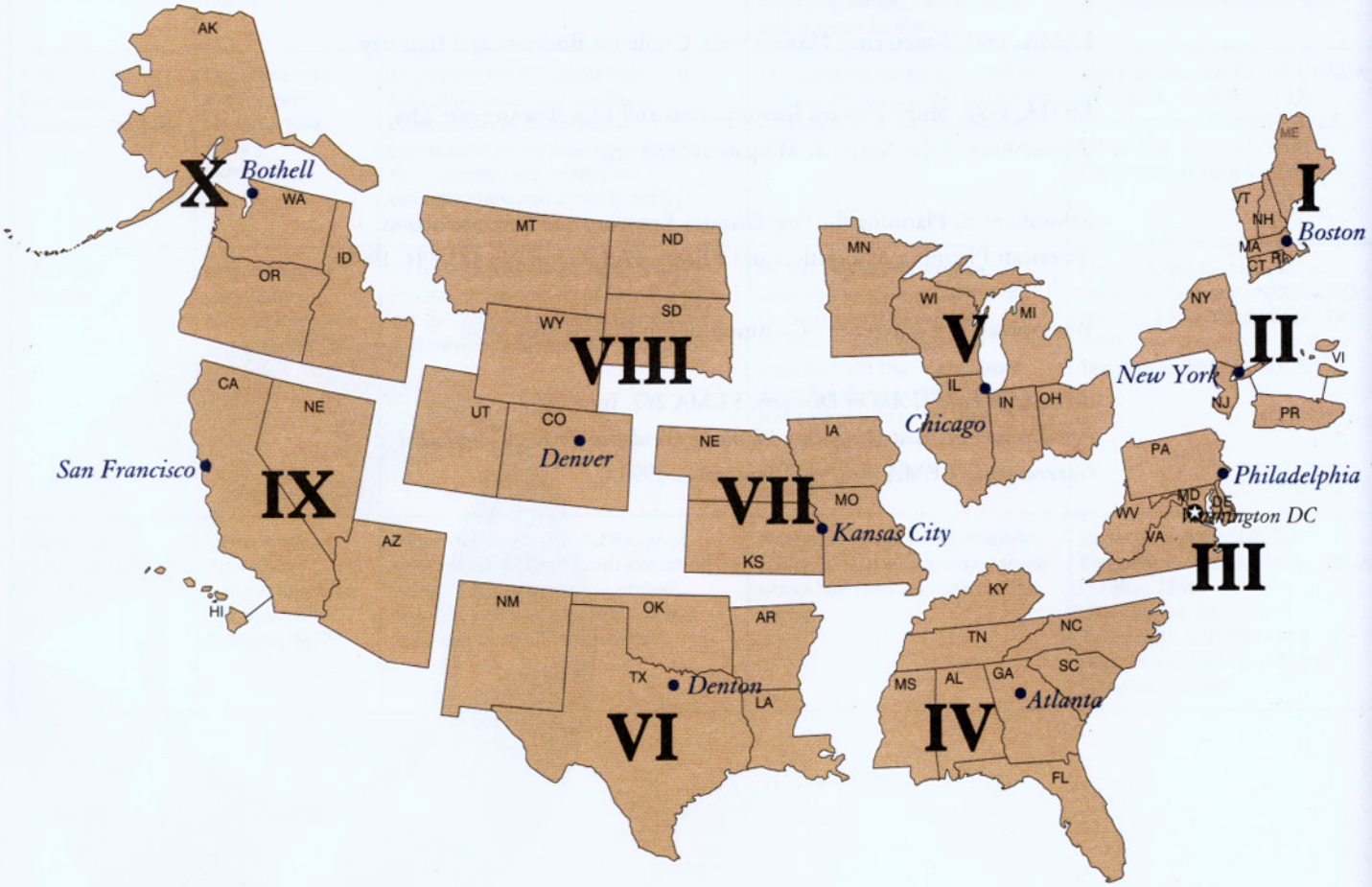
A Guide to Federal Aid in Disasters, FEMA 262, June 1997.
Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments, FEMA, DAP-12, September 1990.

Federal Emergency Management Agency Regional Boundaries

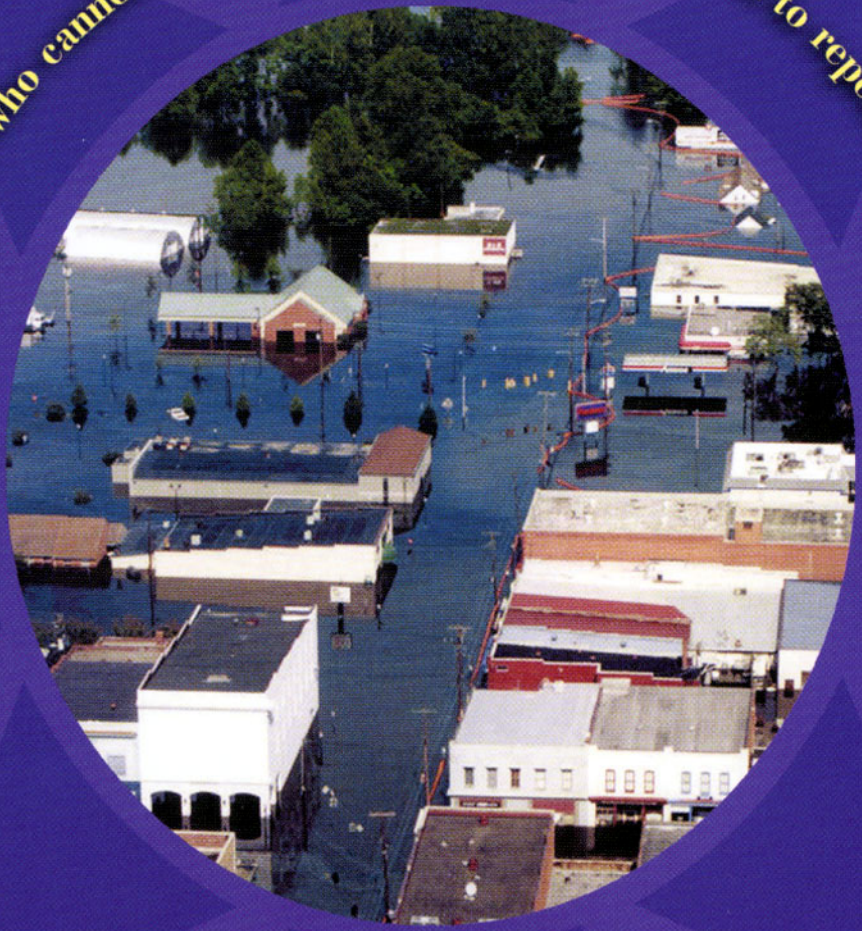


Federal Emergency Management Agency Offices

Headquarters	Federal Center Plaza, 500 C Street, SW, Washington, DC 20472, (202) 566-1600
Region I	(Boston): 442 J.W. McCormack POCH, Boston, MA 02109-4595, (617) 223-9540
Region II	(New York): 26 Federal Plaza, Rm. 1338, New York, NY 10278-0002, (212) 225-7209
Region III	(Philadelphia): Liberty Sq. Bldg. 2nd Floor, 105 S. Seventh St., Philadelphia, PA 19106-3316, (215) 931-5500
Region IV	(Atlanta): 3003 Chamblee-Tucker Rd., Atlanta, GA 30309-3108, (770) 220-5200
Region V	(Chicago): 175 W. Jackson, 4th Floor, Chicago, IL 60604-2698, (312) 408-5500
Region VI	(Denton): Federal Regional Center, Rm. 206, 800 North Loop 288, Denton, TX 76201-3698, (940) 898-5104
Region VII	(Kansas City): 2323 Grand Boulevard, Suite 900, Kansas City, MO 64108-2670, (816) 283-7061
Region VIII	(Denver): Denver Federal Ctr., Bldg. 710, Box 25267, Denver, CO 80225-0267, (303) 235-4811
Region IX	(San Francisco): Presidio of San Francisco, Bldg. 105, San Francisco, CA 94129-1250, (415) 923-7100
Region X	(Bothell): Federal Regional Ctr., 130 228th St., SW, Bothell, WA 98021-9796, (425) 487-4604

Those who cannot remember the past are condemned to repeat it

George Santayana



FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA 364, SEPTEMBER 2000