National Mitigation Strategy

Partnerships for Building Safer Communities

DECEMBER 6, 1995

Prepared in support of the
INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION

"Mitigation is about lowering the risk and reducing the effects of disasters, and this ambitious venture has the potential to reap great rewards.
To successfully mitigate against disaster will require the combined talents and concerted efforts of all levels of government, academia, professional and voluntary organizations, the corporate sector, and all Americans.

"...the time has come to mount a nationwide effort focused on reducing the impact of disasters as well as reducing their economic consequences. As we continue to work to reach a balanced budget, reduce the deficit, and protect the vital interests of our citizens — Medicare, education, and protecting the environment — the value of mitigation programs is clear."

William J. Clinton
President of the United States
December 6, 1995

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Published in 1998 - The Nat'l Plan is attached as an Annex A

Foreword

Throughout its history, the United States has experienced natural disasters which have resulted in unacceptable loss of life, injury, and property damage. During the past 6 years, the United States has been more seriously impacted by a series of large-scale hurricanes, earthquakes, and floods that have taken an extraordinary toll in human lives and suffering. Public and private resources, which are needed for the advancement of other national priorities and goals, have been diverted for recovery and reconstruction. Virtually every region of the country has been affected.

As more and more Americans have chosen to live along ocean or inland coastlines or in areas of seismic risk, often with little or no attention to the need for sound building practice or land use policy, the risk from natural hazards has grown exponentially. By the year 2010, the number of people residing in the most hurricane-prone counties (now 36 million) will have doubled, as will the number of those living in the most seismically active regions.

Floods have caused a greater loss of life and property, and have disrupted more families and communities, than all other natural hazards combined. In recent decades, over 80 percent of Presidentially declared disasters have been floods that have resulted in billions of dollars of losses. Although the natural phenomenon of flooding cannot be prevented, its impacts – like those of wind and seismic hazards – can be reduced through mitigation.

In response to the unacceptable loss of life and property from recent disasters, and the awesome prospect of even greater, catastrophic loss in the future, the National Mitigation Strategy has been developed to provide a conceptual framework to reduce these losses. Hazard mitigation involves recognizing and adapting to natural forces and is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property. The Strategy is intended to engender a fundamental change in the general public's perception about hazard risk and mitigation of that risk and to demonstrate that mitigation is often the most cost-effective, and environmentally sound, approach to reducing losses. The overall long-term goal of the Strategy is to substantially increase public awareness of natural hazard risk and – within 15 years – to significantly reduce the risk of loss of life, injuries, economic costs, and disruption of families and communities caused by natural hazards.

The foundation of the Strategy is to strengthen partnerships among all levels of government and the private sector to empower all Americans to fulfill their responsibility for ensuring safer communities. Effective implementation of hazard mitigation measures will contribute to the long-term economic and environmental well-being of a community as well as protect the natural and cultural resources of our Nation.

All levels of government must be involved in the mitigation process with both pre- and post-disaster mitigation efforts. "The National Mitigation Strategy – Partnerships for Building Safer Communities," sets forth major initiatives in areas of hazard identification and risk assessment; applied research and technology transfer; public awareness, training, and education; incentives and resources; and leadership and coordination. This strategy must be implemented in partnership with State and local governments and private sector constituents, including, and most especially, the general public.

James L. Witt
Director, Federal Emergency Management Agency

Page 2 of 45

Executive Summary

Natural hazards have been a part of American life since the earliest recordings of human settlement in this hemisphere. Pre-Columbian and colonial histories record numerous conflicts with the natural elements such as hurricanes, floods, earthquakes, and severe winter weather. In this century, the United States has made great progress toward protecting its citizens from the risks posed by natural hazards by:

- Developing fire and building life safety codes for much of the Nation to reduce major urban fires and building failures.
- Establishing under the National Flood Insurance Program a national program of floodplain management with strong mitigation provisions to significantly reduce flood losses.
- Developing a national system of emergency management with a coordinated Federal Response Plan to replace the piecemeal approach to recovery only after disaster strikes.
- Establishing a National Earthquake Hazards Reduction Program to increase the availability of applied seismic research, develop State seismic hazard reduction programs, and provide training and education on methods to reduce the risk of loss of life and property to earthquakes.
- Establishing a National Hurricane Program to minimize loss of life and property from hurricanes through better property protection, warning and evacuation procedures, and training and education.
- Developing a National Inventory of Dams that has identified high-hazard dams and encouraged the development of warning systems and emergency plans for many of these facilities.
- Establishing an effective program of assistance to State and local governments for post-disaster mitigation actions through the Stafford Act's Section 404 Hazard Mitigation Grant Program and, under Section 406, through the mitigation of damage to public facilities.
- Establishing a nationwide program of Federal, Sate, and local preparedness consisting of trained personnel, facilities, equipment, training, and exercises to save lives and protect property through warning, evacuation, shelter, and other pre- and post-disaster actions.

Despite these advances, disasters continue to result in untold suffering, billions of dollars in property losses, and environmental degradation.

The floods, earthquakes, wildfires, hurricanes, and other natural disasters of the last 5 years have been a sobering reminder of work yet to be done to significantly reduce the vulnerability of Americans and their communities to natural hazard events, and to minimize the economic and societal disruption that they cause.

As our society becomes ever more complex, the economic and societal costs of disasters are increasing every year. Projections of demographic trends for the next 15 years suggest that even more Americans will live and work in regions with significant natural hazard risk. The need to encourage timely, cost-effective means to save lives, reduce property damage, and limit disaster costs has never been more apparent. This requires a mitigation program with national leadership and with the goal of natural hazard loss reduction as a national priority. Hazard mitigation is defined as sustained action taken to reduce or eliminate long-term risk to people and their property from hazards and their effects.

Mitigation of natural hazards has been an important focus of programs within numerous Federal and State agencies for some time. While progress has been made to varying degrees in mitigating the impacts of some hazards, a need still exists to improve the framework for the setting of long-term national goals; establishment of intergovernmental coordination and cooperation with the private sector; improvement of technical standards; and evaluation of progress in mitigation.

Consequently, the Federal Emergency Management Agency (FEMA) – under the leadership of Director James L. Witt – has developed a strategy to reduce the loss of life and property damage through eliminating or reducing the impacts of natural hazards.

In designing this strategy, FEMA's partners – other Federal agencies, State and local governments, private for-profit and non-profit institutions and associations, and the natural and technological hazards community at large -- provided significant input through a series of Mitigation Forums and questionnaires in every region of the country. The result of this broad consultation is that the National Mitigation Strategy is not simply a strategy for one agency or for the emergency management community, but a strategy for the Nation.

The cornerstone of this Strategy is the growing acceptance by all Americans of the need to take personal responsibility for making their communities safer. The ultimate goal of the Strategy has two components:

By the year 2010,

(1) To ***substantially increase public awareness*** of natural hazard risk so that the public demands safer communities in which to live and work; and

(2) To ***significantly reduce the risk*** of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural hazards.

The foundation of the Strategy involves strengthening partnerships and creating partnerships where none exist in order to empower all Americans to fulfill their responsibility for building safer communities. These partnerships are needed to address the five major elements of the Strategy:

- **Hazard identification and risk assessment.** We must conduct studies to identify hazards and assess the risks associated with those hazards for communities throughout the Nation.

- **Applied research and technology transfer.** We must encourage applied research that will develop the latest technology in response to natural hazard risks, and promote the transfer of that technology to users –State and local governments, the private sector, and individual citizens – to support the National Mitigation Goal.

- **Public awareness, training, and education.** We must create a broad-based public awareness and understanding of natural hazard risks that leads to public support for actions to mitigate those risks. We must also create mitigation training programs that can be used in schools and communities to support public actions.

- **Incentives and resources.** We must provide incentives to encourage mitigation activities, and we must redirect resources from both the public and private sectors to support all elements in order to achieve the National Mitigation Goal.

- **Leadership and coordination.** We must provide national leadership in the achievement of the National Mitigation Goal, provide coordination among Federal agencies to promote hazard mitigation throughout all Federal programs and policies, and provide coordination with other levels of government and the private sector.

The Strategy sets forth a series of strategic objectives by which to measure the Nation's success in achieving the National Mitigation

Goal and offers the basis for establishing priorities for the use of limited resources in fulfilling the major elements. Most important in this regard is the "Mitigation Action Plan" or MAP, which highlights actions Americans and their governments must take to successfully launch the National Mitigation Strategy.

The MAP proposes that:

- Federal agencies apply the best mitigation practices to their own facilities; complete a national natural hazards risk assessment; develop partnerships to advance research, standards development, and cost-effectiveness measures; provide incentives; and spearhead a national public awareness campaign.

- State and local governments develop sustained administrative structures and resources for mitigation programs, adopt and enforce building codes and land use measures, and conduct ongoing public information campaigns on natural hazard awareness and mitigation.

- Private industries accept responsibility for being aware of the natural hazards that threaten their facilities and investments and for reducing their vulnerability.

- Individual citizens accept responsibility for becoming aware of the natural hazards that affect them and their communities and for reducing their degree of vulnerability.

Finally, the Strategy includes provisions for evaluation, not just of the achievement of strategic objectives, but of mitigation itself by providing a methodology and an implementation plan to develop a body of clear evidence that mitigation works. It will require that the justification for each program or project affirmatively answer the question "Is the work performed reducing future damages and hardship in a reasonable amount of time and in a cost-effective manner?" The Strategy calls for the central collection of these evaluations and the dissemination of the results to policy makers and the public.

The Federal government, in partnership with State and local governments, must provide leadership, coordination, research support, incentives, and resources to encourage communities, businesses, and individuals to undertake mitigation to minimize potential disasters and to employ mitigation in the recovery following disasters. All Americans must be helped to understand that mitigation reduces injuries and deaths and property loss, it enables a quicker lifesaving response and economic recovery because community infrastructure and critical facilities remain intact, and it reduces the societal impacts of disaster because it results in less disruption of the social environment.

The fundamental premise of the Strategy is that current dollars spent on mitigation will save a significantly greater amount of future dollars by loss reduction. The Strategy offers a framework for converting future losses from natural disasters into present mitigation investments, and it demonstrates why this makes sense from economic, environmental, and social points of view.

By reducing the impacts of natural disasters, the implementation of mitigation will expand opportunity and reward the assumption of responsibility by individuals, businesses, and communities. The Strategy identifies opportunities to reduce the impacts of disasters through investing in a safer future. Finally, the Strategy supports moving toward a new approach by government: building new Federal-State-local partnerships and public-private partnerships as the most effective means of implementing measures to eliminate or reduce the impacts of hazards.

Table of Contents

Introduction

Between 1989 and 1994, the United States suffered an unprecedented number of large-scale natural disasters, including flooding in the Midwest, Georgia, and Texas; a massive winter storm on the east coast; earthquakes in California; hurricanes in North and South Carolina, Florida, Louisiana, Hawaii, and the Virgin Islands; wildfires in California; and volcanic eruptions in Alaska and Hawaii. During this period, the President of the United States declared a total of 291 disasters, thereby making Federal assistance available to stricken individuals and communities, at a cost to the U.S. Treasury of over $34 billion. Seven of these disasters, among the 10 most costly in American history, caused over 370 deaths and losses of over $85 billion *(see table on page 2).*

Natural disasters will continue to occur and, as the population increases, so will the risk to lives and property.

- *According to the U.S. Geological Survey, there is a 90-percent probability that at least one major earthquake will strike an urban area in California in the next 30 years.*

- *Since 1965, there has been a lull in the number of intense hurricanes along the Atlantic and Gulf coasts – Hurricanes Hugo and Andrew being notable exceptions. As a result, the perception of these areas as hazardous lessened and coastal development proceeded at an increased pace, putting more lives and property at risk. From 1980 to 1993, the value of insurable property on the Atlantic and gulf coasts increased 179 percent, to $3.15 trillion.*

- *A major population shift from urban to suburban living has greatly expanded what is now called the wildland/urban interface. In these conditions, wildfires do not have to be large to generate catastrophic losses; the 1991 Oakland/Berkeley Hills fire killed 25 people and burned nearly 3,000 homes on just 1,610 acres, approximately 2.5 square miles.*

- *Population growth continues to increase development pressures that in turn lead to more residential, commercial, and industrial construction in floodplains. The resulting potential for social, economic, and environmental devastation has been demonstrated time and again – for example, in floods in the Midwest in 1993 and in Georgia and Texas in 1994.*

The results of natural disasters, both large and small, are tragic – lives lost, families torn apart, homes destroyed, and jobs lost. Businesses fail, and communities are in chaos for weeks. Too often, taxpayers must shoulder the cost of governmental disaster relief because of decisions by developers and builders, governments, the insurance and banking industries, and the disaster victims themselves – decisions that have the effect of increasing the vulnerability of both the built and natural environments to natural hazards.

But society is far from helpless in the face of these prospects. When individuals and organizations accept the responsibility, cost-effective actions can be taken to reduce the loss of lives and property, damage to the environment, and economic and social disruption caused by natural disasters. These actions are broadly characterized as hazard mitigation.

Recent Natural Disasters in the United States

Type/Location			Affected Population/Losses
Hurricanes	1989	Hugo-South Carolina and Virgin Islands	49 deaths; $9 billion damage
	1992	Andrew-Florida and Louisiana	15 deaths; $30 billion damage
	1992	Iniki-Hawaii	6 deaths; $2 billion damage
Wildfires	1990	Santa Barbara, California	0 deaths; $235 million damage
	1991	Oakland/Berkeley Hills, California	25 deaths; $1.5 billion damage
	1993	Southern California	3 deaths; $1 billion damage
Earthquakes	1989	Loma Prieta, California	63 deaths; $8 billion damage
	1994	Northridge, California	57 (est.) deaths; $20 billion (est.) damage
Floods	1993	Midwest (Mississippi Valley)	50 deaths; $15-20 billion damage
Volcanoes	1989	Redoubt, Alaska	1 death; less than $100 million damage
	1992	Spurr, Alaska	0 deaths; $100 million damage
Landslides	—		25 deaths; $1.5-2.5 billion damage (annual average)
Tornadoes	—		100 deaths; $1 billion damage (annual average)
Drought	—		$6-8 billion damage (annual average)
Winter Storm	1993		130 (est.) deaths

Source: National Research Council, Facing the Challenge, 1994.

Hazard Mitigation

Hazard mitigation is defined as sustained action 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 preparedness for, immediate response to, and short-term recovery from a specific event, recognizing that the boundaries are not absolute. The intent is to focus on actions that produce repetitive benefits over time, not on those actions that might be considered emergency planning or emergency services. The primary purpose of hazard mitigation is to ensure that fewer Americans and their communities are victims of natural disasters. However, another important benefit is that current dollars spent on mitigation will significantly reduce human suffering and the demand for large amounts of future dollars when natural disasters strike. Current mitigation expenditures will also reduce the economic disaster which often accompanies the natural hazard event through destruction of property, loss or interruption of jobs, and closing or disabling of businesses.

Hazard Mitigation in Practice

We know a great deal about hazard mitigation technology and practices, and we have established national programs to mitigate the impacts of a number of natural hazards. However, these programs often have been hazard-specific and not coordinated with one another. This section describes the Nation's current approach to mitigating the impacts of the more significant natural hazards and identifies a number of trends and issues that must be addressed.

The catastrophic disasters of the last several years have led to a general rethinking of how the Nation responds to natural disasters and a new emphasis on mitigation. Appendix A lists a number of studies and reports that have contributed to this rethinking. The National Mitigation Strategy builds on and incorporates many of their ideas and recommendations. These studies and reports should be referred to for more in-depth discussions of and insights into mitigation approaches for individual hazards and general issues applicable to all hazards, such as disaster assistance, all-hazards insurance, and research needs.

Floods

Floods can occur in most communities in the United States. Flooding can result from the overflow of major rivers and their smaller tributaries, storm surge from hurricanes and other coastal storms, or inadequate local drainage. Historically, floods have been a factor in over 80 percent of all Presidentially declared disasters. The Nation's strategy for reducing flood damages has evolved from a reliance almost solely on structural flood control projects to a more comprehensive approach that emphasizes non-structural measures such as local land use planning and zoning, building codes, and acquisition or relocation of floodprone buildings.

The National Flood Insurance Program (NFIP), has played a critical role in fostering and accelerating this change. The NFIP was established by the National Flood Insurance Act of 1968, which makes federally backed flood insurance available in those States and communities that agree to adopt and enforce floodplain management measures that meet or exceed minimum Federal criteria. The NFIP was broadened and modified by the Flood Disaster Protection Act of 1973, which requires the purchase of flood insurance as a condition of receiving any form of Federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions. The NFIP has mapped floodplains in over 20,000 communities, and over 18,400 communities now participate in the program. The National Flood Insurance Reform Act, signed into law in 1994, strengthened the NFIP by providing for mitigation insurance and establishing a grant program for State and community flood mitigation planning and projects. Many States and communities have established floodplain management programs and adopted floodplain management statutes and regulations that go beyond NFIP requirements.

The National Flood Insurance Act of 1968 also requires that the President develop a Unified National Program for Floodplain Management. In 1994, the report on this program was updated by the Federal Interagency Floodplain Management Task Force. The update includes a set of national goals for floodplain management to focus the efforts of all levels of government as well as the private sector. Executive Order 11988, Floodplain Management, issued in 1977, requires that Federal agencies undertake a planning process prior to taking actions in, or that impact on, floodplains. The Midwest Floods of 1993 resulted in a further evolution in Federal flood policy. There is a new emphasis on the acquisition or relocation of flood-damaged properties using funding from a number of Federal programs and from State and local governments and the private sector. These floods also led to a reexamination of Federal floodplain management policies and programs by the Administration.

Hurricanes

On average, five hurricanes strike the United States every 3 years. Eighteen States along the east and gulf coasts, Hawaii, the U.S. Virgin Islands, the Territories of Guam and American Samoa, and the Commonwealths of Puerto Rico and the Northern Mariana Islands are all affected by hurricanes. More than 50 million people reside along hurricane-prone coastlines. Inland communities are not without risk. Hurricane Hugo battered Charlotte, North Carolina, (175 miles inland) with gusts of 100 mph, downing trees and power lines and causing massive disruption. Powerful wind is only one of the dangerous forces associated with a hurricane. Storm surges, storm tides, and heavy rains may lead to flooding, and tornadoes are also possible.

A recently expanded National Hurricane Program involves a wide range of participants, including State and local emergency managers, volunteer organizations, and floodplain managers. Together, they are addressing issues of State and local mitigation, preparedness, training and exercises, and public awareness and education. At the Federal level, the Federal Emergency Management Agency (FEMA), the National Weather Service, and the U.S. Army Corps of Engineers assist State and local governments in developing inundation models to help in emergency planning.

Damages due to flooding from storm surge and the rainfall accompanying a hurricane are mitigated through the NFIP floodplain management ordinances adopted by nearly all coastal communities and through State coastal zone management programs. Wind damages may be reduced through the adoption and enforcement of performance standards in State and local building codes.

Additional efforts are needed by States and communities to reduce the risk to lives and the impact of hurricanes on the built environment, including critical facilities and infrastructure. More attention is needed to the performance of buildings and building components such as roofs and window and door protection systems to provide a basis for improved building standards.

Wind

Wind is a major source of fatalities and property losses in the United States. From 1981 to 1990, insured losses from wind damage totaled $23 billion. Two principal sources of wind-related loss of life and property damage are tornadoes and hurricanes. Tornadoes, which affect almost every State, are more frequent and result in greater property damage in the central United States. Winds associated with hurricanes affect most coastal States and territories.

Massive damages resulting from Hurricane Andrew focused public and media attention on the adequacy of building codes and their enforcement. In the wake of this attention, major initiatives have been undertaken by the model code organizations, standard-writing organizations (such as the American Society of Civil Engineers), and government units responsible for code adoption and enforcement to improve the wind resistance of new and improved construction. The model code organizations are continuing their training and education activities to increase understanding of the codes and the application of their specific provisions.

The National Science Foundation, the Nation's primary agency supporting science and engineering research, can provide only limited funding for wind-engineering mitigation research. The research performed to date has significantly improved the understanding of how structures perform during wind events and has led to changes in the national standard for wind design, also known as the ASCE-7 "Minimum Design Loads for Buildings and Other Structures." Other developmental activities in wind mitigation and related research are primarily application-oriented, in connection with multi-hazard approaches to the design and construction of buildings. Further research is needed to fully understand the performance of structural and nonstructural components of buildings.

Earthquakes

Earthquakes pose a significant risk in at least 39 States. There are major earthquake risk zones in the West, the central Mississippi Valley, New England, South Carolina, Hawaii, Puerto Rico, and the Virgin Islands. The two most recent major U.S. earthquakes – Loma Prieta and Northridge – caused over 100 deaths and damage in the $30-billion range. The scientific basis for understanding the causes and effects of earthquakes has improved markedly in recent years, but detailed knowledge varies widely among geographic areas. Each succeeding earthquake serves as a laboratory – validating some theories and practices and calling others into question.

To speed the translation of scientific understanding into mitigation practice, Congress created the National Earthquake Hazards Reduction Program (NEHRP) in 1977. At the Federal level, this program involves four agencies – FEMA, the U.S. Geological Survey, the National Science Foundation, and the National Institute of Standards and Technology – but it also draws heavily on the experience and talents of individuals in State and local governments and in the academic and private sectors. NEHRP has fostered the development and implementation of seismic design and construction standards and techniques, technical assistance materials, education and risk reduction programs, several active consortia and centers addressing aspects of the earthquake problem, and systems to disseminate earthquake information. While this activity has increased the public's awareness of the earthquake hazard, substantial earthquake mitigation remains to be done.

In earthquake hazard mitigation, as in flood hazard mitigation, the Federal government seeks to lead by example. Two Executive Orders address seismic safety. Executive Order 12699 directs Federal agencies to incorporate cost-effective seismic safety measures in all new buildings that are constructed, leased, assisted, or regulated by the Federal government. Executive Order 12941 promulgates minimum standards to be used by Federal agencies in assessing the seismic safety of their existing buildings and in mitigating unacceptable seismic risk.

Further efforts are required to refine the understanding of the causes and costs of earthquakes and to present these causes and costs in a way that is meaningful to decision makers and the affected public, to develop improved standards and practices for seismic design and construction based on the desired performance of a structure in an earthquake, and to encourage the adoption and enforcement of seismic codes for both new and existing facilities.

Urban/Wildland Fires

Large areas of the United States contain high-value developed properties intermingled with highly combustible native vegetation. Fire is a natural part of wildland areas. As more people move into these areas, the challenges will increase. Since 1985, approximately 9,000 homes have been lost to urban/wildland interface fires across the United States. The problems and solutions associated with saving structures and lives in these interface areas are well known and have been documented since early in the century. The mitigation efforts following the major recent urban/wildland fires in the past 5 years have focused on leadership, financial assistance, and technical assistance.

In 1974, Congress passed the Federal Fire Prevention and Control Act, which established

the United States Fire Administration (USFA) and the fire research program at the National Institute of Standards and Technology (NIST). NIST performs and supports research on all aspects of fire with the aim of providing scientific and technical knowledge applicable to the prevention and control of fires. The USFA serves as the national focus on reducing fire deaths, injuries, and property losses. The USFA works to involve the public and private sector to reduce losses through public education, arson detection and control, technology and research, fire data collection and analysis, and fire service training and education.

Additional efforts must be made to assist local communities and jurisdictions in developing standards and model codes that address the issues of defensible space, construction materials, vegetation management, adequate water supplies, and evacuation planning.

Dam Failures

There are 74,053 dams listed in the National Inventory of Dams, only 4 percent of which are owned and/or regulated by the Federal government. The balance are the regulatory responsibility of the States. The Inventory classifies 10,400 dams as "high-hazard," which does not reflect the condition of the dam, but denotes the potential for the loss of life should the structure fail. Another 13,300 dams are classified as "significant-hazard," indicating the certain destruction of property or infrastructure in the event of failure.

While dam failures are not routine, the results can be devastating. Two such incidents in the Johnstown, Pennsylvania, area took over 2,200 lives in 1889 and 77 lives in 1977. More recently, the failure of more than 100 dams in Georgia during Tropical Storm Alberto in July 1994 exacerbated downstream flood losses.

The objectives of the National Dam Safety Program are aimed at reducing the risk of dam failures by fostering sound engineering practices in dam design, construction, operation, and maintenance. FEMA dam safety mitigation efforts focus on leadership, technical assistance, and public awareness. Guidelines have been developed by the Federal, State, and private sectors to assist dam owners in developing Emergency Action Plans. The Federal Energy Regulatory Commission has taken the lead and has been very successful in training hydropower dam owners to develop and exercise these plans. This approach has increased the number of States with adequate dam safety programs from 22 to 38 in the past 10 years. High-quality training for dam inspectors increases the chances that weaknesses in dams will be identified and corrected before they cause failures.

Technological Hazards

A host of Federal, State, and local laws and ordinances, as well as private sector standards, have been adopted over the past 20 years, including the Environmental Protection Act, the Clean Water Act, the Clean Air Act, SARA Title III, and others which, collectively, have mitigated the effects of technological hazards. Additionally, the landmark report "America Burning," issued in 1973, has served as a road map, guiding the fire service and the Federal fire programs toward the goal of improving fire safety in the United States, and establishing a mitigation strategy for fire hazards in the built environment.

Natural hazard events have often triggered technological hazards such as ruptured pipelines and building fires, clearly linking the natural and technological risks. Accordingly, the National Mitigation Strategy, as an all-hazards strategy, will build upon existing programs that mitigate technological hazards, and focus on the critical importance of coordination among efforts to mitigate hazards, regardless of the source of the risk.

Why a National Mitigation Strategy?

We have the knowledge and capability as a Nation to design and implement mitigation measures. But disasters continue to take lives, inflict injuries, cause billions of dollars in property losses, and degrade the environment.

A Congressional task force found that the Federal role in responding to disasters has increased steadily since 1950, when the first permanent disaster relief legislation was enacted. This increased role has generated erroneous expectations, with negative side effects:

> ...if homeowners mistakenly believe that the Federal Government will rebuild their homes after a natural disaster, they have less incentive to buy all-hazard insurance...If state and local governments believe that the Federal Government will meet their needs in every disaster, they have less incentive to spend scarce state and local resources on disaster preparedness, mitigation, response and recovery. This not only raises the cost of disasters to the federal tax payers, but also to society as a whole, as people are encouraged to take risks they think they will not have to pay for.[1]

Disaster victims are not the only ones who pay the consequences of living in areas of hazard risk. Major disasters affect all Americans by diverting resources from other important public and private programs and by reducing the productivity of the national economy. A coordinated effort involving government at all levels, the business and academic communities, and individual citizens can reduce the impact of natural hazard events on all levels of society. This need not require significant increases in expenditures, but rather a wiser use of resources by investing in loss reduction now rather than paying increasingly higher costs for responding to and recovering from future disasters.

Natural hazards do not recognize political boundaries and often affect more than one community or State, or they can be of such magnitude or variable frequency that most State or local jurisdictions do not have the resources to develop cost-effective mitigation plans and programs. Increasingly, it may be said that no disaster of substantial magnitude has only local or regional impact. The flooding in the Houston area in 1994 that affected national pipeline systems and gasoline prices is a recent example. Although mitigation occurs at local and State levels, effective programs require research, the translation of the results of this research into cost-effective approaches, and the dissemination of this information to those who can act.

Inevitably, the occurrence of natural catastrophes raises public awareness of the hazards we face, the costs they exact, and actions we might take to reduce their impact. Just as inevitably, attention shifts rapidly to other concerns. The press of day-to-day issues dissipates time for and interest in dealing with strategic planning and actions to mitigate potential future threats. The magnitude of the deficit in natural hazard public awareness and information requires a nationally based awareness effort supplemented by State and local programs designed around the particular hazards faced by the affected individuals.

This is an appropriate time to launch a national effort:

- The economic and social costs of recent large-scale disasters are still fresh in our minds.
- Significant technical know-how is finding its way into practical application.
- Mitigation is being recognized as an integral component of sustainable development.
- There is growing acceptance of the need to develop all-hazards approaches to mitigation.
- The ongoing dialog about the appropriate roles of Federal and State governments must include discussion of responsibilities for reducing the impacts of natural hazard events.

The wisdom of a national focus for hazard mitigation is underscored by designation of the 1990's as the International Decade for Natural Disaster Reduction. This concept, first proposed in 1984 by Dr. Frank Press, then Chairman of the National Academy of Sciences, was accepted by the United Nations in 1987

[1] *Source: Report of the House Task Force on Disasters, December 14, 1994*

and formally adopted by Congress in 1989. Its purpose is to heighten awareness of national governments to the financial and societal costs of natural hazards and to opportunities to reduce their impact.

In the United States, a significant, sustained, long-term commitment to mitigation as the means to building safer communities requires a national dialog among all levels of government and the private sector that seeks to establish priorities and allocate burdens. Such a program, however, does not relieve Americans from their individual and collective responsibility to bear an appropriate share of the cost of decisions they make that increase their vulnerability to natural hazards. Thus, the National Mitigation Strategy is national, but not exclusively Federal, or even exclusively governmental. Mitigation is everyone's business, but it needs to be focused on the attainment of a national goal through the achievement of specific objectives.

Designing the Strategy

The reinvention of FEMA, which established mitigation as the cornerstone of the Nation's system of emergency management, marked a fundamental shift in disaster policy away from just reactive response and toward proactive pre- and post-event mitigation as well. As this new policy emerged, the need for a national focus to guide its implementation became apparent.

During the spring and summer of 1994, meetings were held with Members of Congress and their staffs and with representatives of associations and interest groups to outline a proposed strategy. In fall 1994 and spring 1995, FEMA sponsored 11 Mitigation Forums across the Nation to get the views of interested parties on ways to advance the cause of mitigation on a national basis (see Appendix B). In total, over 1,800 people attended, including State and local elected officials; emergency management, environmental, public works, utility, and planning and zoning officials; representatives of the building, banking, real estate, and insurance industries; representatives of volunteer organizations and public interest groups; and academicians and private citizens.

Before the forums were held, notification letters and questionnaires were distributed to over 15,000 prospective attendees. The purpose of the questionnaires was to obtain opinions and other information about public awareness of hazards and mitigation, the goals of the Strategy, effective mitigation measures and methods of implementing them, and incentives and funding mechanisms. The principles, the goal, and the objectives of the National Mitigation Strategy are consistent not only with the information provided in response to the questionnaires and in the discussions that took place at the forums, but also with the comments of expert reviewers, including both individuals and organizations with expertise in hazard mitigation and related disciplines. A partial list of organizations that contributed to the development of the Strategy is presented in Appendix C.

BASIC PRINCIPLES OF THE NATIONAL MITIGATION STRATEGY

This section describes the principles that are fundamental to the National Mitigation Strategy. They were derived from a review of past mitigation efforts and lessons learned from them, as well as from ideas expressed by participants in the Mitigation Forum process.

Lessons Learned...

Principle: **Risk reduction measures ensure long-term economic success for the community as a whole rather than short-term benefits for special interests.**

Mitigation supports the building (or rebuilding) of communities as models of sustainable development so that we are likely to recover more quickly from the economic impacts of natural disasters and our people are disaster survivors, not disaster victims.

Principle: **Risk reduction measures for one natural hazard must be compatible with risk reduction measures for other natural hazards.**

A national mitigation strategy must proceed on an "all-hazards" basis to make the most efficient use of limited resources. Therefore, hazard reduction techniques must account for the potential impacts of all the major hazards to which an area is vulnerable. For example, certain techniques for elevating floodprone structures may make a structure more susceptible to damage from an earthquake. Similarly, retrofitting a building to reduce earthquake damage may be a poor investment if the building is floodprone. On the other hand, tying down manufactured homes can be an effective technique for mitigating wind, flood, and seismic hazards.

Principle: **Risk reduction measures must be evaluated to achieve the best mix for a given location.**

Mitigation measures must be evaluated in the context of myriad constraints: time, resources, geography, the level and nature of development and vulnerability, and the attitudes and desires of the affected communities and property owners, to name a few. Choices must be realistic and attainable when these constraints are taken into account. For example, flood hazard mitigation measures used on coastal barrier islands, such as pile construction, would not be accepted in cold climates where energy efficiency is a paramount concern.

Principle: **Risk reduction measures for natural hazards must be compatible with risk reduction measures for technological hazards and vice versa.**

When hazard mitigation options are considered, care must be taken to avoid solutions that may increase the risk of technological events, such as elevating chemical storage facilities to mitigate flood hazard without addressing seismic risk. Additionally, technological hazards should be minimized through mitigation for natural hazards, such as using flexible pipes in seismic areas or protecting submerged pipes from flood scour.

Principle: **All mitigation is local.**

At all levels, governments and constituencies play critical roles in advancing mitigation by articulating the vision and developing the programs and incentives that encourage and support community-based implementation. They also advance the cause by adopting and holding themselves to the land use, construction, and enforcement standards they advocate for others. Success or failure depends, however, on decisions made by individuals. Mitigation takes place when a business or a homeowner decides to take action to reduce the risk of damage to the structure from wind, water, fire, or earthquake; a community develops a pre-disaster plan for undertaking a broad range of mitigation activities; a city council votes to upgrade the professional qualifications required of its building inspectors; a county removes floodprone land from development potential and creates a recreation area; a State legislature adopts a building code that is binding on all the political subdivisions.

Principle: **Disaster costs and the impacts of natural hazards can be reduced by emphasizing pro-active mitigation before emergency response; both pre-disaster (preventive) and post-disaster (corrective) mitigation is needed.**

Reducing the Nation's potential losses due to natural hazards requires a balanced approach that applies mitigation measures to both new buildings and infrastructure and the existing built environment. While it is generally more economic and effective to apply mitigation measures to new buildings than to retrofit existing buildings, the average turnover in the Nation's building stock is only 1 to 2 percent a year. There must also be a comprehensive effort to retrofit the existing built environment and, in particular, to take full advantage of post-disaster mitigation opportunities.

Principle: **Hazard identification and risk assessment are the cornerstones of mitigation.**

Experience has taught us generally which geographic areas are subject to natural hazards. However, a clear understanding of the type and extent of risk and of the potential impacts of hazards on communities and States is critical to making decisions about which mitigation actions should be undertaken. This activity must take place on a scale that is meaningful to those who must act.

Principle: **Building new Federal-State-local partnerships and public-private partnerships is the most effective means of implementing measures to reduce the impacts of natural hazards.**

Government in the next century must rely more on partnerships among various elements of the community and various levels of government rather than mandate new rules upon others in society. Progress in reducing the impact of natural hazards will occur more rapidly when all, or at least several, segments of the community can understand the advantages (to each) of working toward common goals that benefit society as a whole. Building safer communities is to everyone's benefit.

Principle: **Those who knowingly choose to assume greater risk must accept responsibility for that choice.**

The financial impact of natural hazards has been increasingly transferred to the public at large through disaster assistance, insurance subsidies, tax deductions, extraordinary government expenditures for flood control efforts, and disaster response and recovery assistance. People look more and more frequently to government to hold them harmless from the consequences of their risk-taking. The resulting cost to society in terms of death and injury, and property and economic loss, is simply too high.

Principle: **Risk reduction measures for natural hazards must be compatible with the protection of natural and cultural resources.**

Both our ability to alter our environment and tailor it to our needs and, over the last few decades, our sensitivity to the costs of environmental degradation have grown. When hazard mitigation options are considered, care must be taken to avoid harming natural resources or processes as much as possible. Mitigation activities that degrade the environment are not viable long-term solutions to hazard problems. Fortunately, the exploration of hazard mitigation options frequently also presents opportunities to conserve resources and to enhance the quality of the environment.

A Vision for Safer Communities in the Future

The U.S. Census Bureau estimates that before the year 2020, the total population of the United States will be 322 million. This is an increase of 23 percent over the next 25 years. The fastest growing regions will be the coastal areas, the West, and the Southwest. This growth will bring the development of new communities and the building of homes and infrastructure. As the availability of developable land decreases, the pressure to use hazard-prone areas will increase.

If we take action now...

This situation, if unabated, is a prescription for increased losses, human suffering, and environmental degradation as a result of natural hazards. Taking action now to mitigate the impacts of natural hazards can transform a problematic future into one that is both manageable and promising. By the year 2010, with ongoing implementation of the National Mitigation Strategy:

- Society will choose the appropriate uses for hazard-prone areas as a routine matter, using the results of comprehensive hazard identification and risk assessment processes.
- The United States will be a model for balancing economic development with efforts to preserve natural and cultural resources.
- The United States will have the technology and resources to provide public awareness, early warning, and preparation for natural hazards for all people, including special populations like the elderly and the disabled.
- The existence of funding sources and effective incentives will ensure the continued development and application of hazard mitigation programs and techniques.
- Mitigation considerations will be incorporated into all Federal actions, grants, and loan programs, and each State will have an administrative process to achieve similar results at State and local levels of government.
- All new structures, including critical facilities and infrastructure, will be built to national multi-hazard standards incorporated into building codes that have been adopted and enforced by municipalities, counties, and States.
- Programs to upgrade or retrofit structures at risk from natural hazards will have been implemented.
- The United States will have the ability to recover from natural disasters with reduced disruption to individuals, communities, and the regional and national economy.

The National Mitigation Goal

The National Mitigation Goal has two components:

By the year 2010,

(1) To *substantially increase public awareness* of natural hazard risk so that the public demands safer communities in which to live and work; and

(2) To *significantly reduce the risk* of loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural hazards.

Increasing Public Awareness

Society must be fully aware of its vulnerability to natural hazards and aware of means to reduce their impacts before it will insist upon and support actions to mitigate the impacts and take the individual steps necessary to protect lives and property. Generating this level of awareness is perhaps the most challenging task. The public must view hazard mitigation as a basic component of civic responsibility. Much is already known about the potential for and impacts of natural hazards and the preventive actions that can be taken to mitigate those impacts. Techniques for articulating this knowledge in a way that impels action by individuals, private sector organizations, and governments must be developed, refined, and put into practice.

Our destination in the Year 2010...

Reducing Loss of Life and Injuries

The table on page 2 indicates a total of over 1,100 deaths resulting from the selected natural hazards events between 1989 and 1994. The potential for much larger numbers of deaths has been reduced in some instances through the determined efforts of society and in other instances by sheer good fortune. Advances in weather observation and warning systems have significantly reduced the death toll from hurricanes and tornadoes. However, the location and timing of recent large U.S. earthquakes resulted in far fewer deaths than might have occurred under different circumstances.

Reducing Economic Costs

Significantly reducing the potential economic costs that result from natural disasters is an ambitious goal that will require enhancements in our national mitigation efforts. Economic costs take many forms, including costs to repair public infrastructure and privately owned buildings, loss of revenue and agricultural and industrial productivity, disruption of local communities, and tax dollars spent on disaster response and recovery. National mitigation efforts must not only be a priority for the repair, reconstruction, and rehabilitation of developed areas, but must become a prerequisite for growth in areas that have not been developed.

Significantly reducing potential damages to the built environment will require not only that all new buildings and facilities be reasonably well-protected from loss, but also that increased protection be provided to existing buildings

and facilities through retrofitting or other actions. While 1 to 2 percent of the existing building stock will be replaced each year, most of today's buildings will still be in use by the year 2010.

A complicating factor is that there will always be residual losses from extreme events above and beyond those for which mitigation is cost-effective. It may not be economical to protect buildings and infrastructure other than critical facilities from these more extreme events since the increased cost of construction can far exceed the damage prevented.

To significantly reduce potential flood losses, States and communities must enforce floodplain management requirements for new and substantially improved buildings. In addition, increasing the NFIP policy base will help reduce disaster assistance costs and provide incentives for mitigation in the affected communities. Significantly reducing potential earthquake damages will require voluntary decisions by business and home owners to invest in mitigation measures and the adoption and enforcement by States and communities of building codes that go beyond basic life safety considerations by incorporating broader structural damage reduction practices, where this can be economically achieved. Significantly reducing potential wind damages will require further advances in our understanding of wind hazards and application of that understanding to the built environment. Significantly reducing losses from fire will require the adoption and enforcement by States and communities of building codes that require the use of fire-resistant materials, and the provision of incentives for installing residential sprinkler systems. Cost-effective retrofitting of buildings and facilities will have to be aggressively implemented for all hazards. Finally, a baseline will have to be established against which to measure progress toward achieving the goal.

Reducing Destruction of Natural and Cultural Resources

The Nation's natural and cultural resources, unfortunately, are often degraded either by natural hazards themselves, or by our attempts to prevent future hazard-related damage to public or private property. For example, many thousands of acres of valuable riparian and wetland habitat have been lost through the construction of flood control projects. Some irreplaceable historic sites like those in Charleston, South Carolina, and San Francisco, California, are subject to earthquake hazards.

Fortunately, some mitigation measures can achieve multiple objectives – preventing damages to buildings or facilities while protecting critical habitat, providing opportunities for recreation, providing flood storage, or enhancing other natural and cultural resources. Examples of these mitigation actions are the acquisition and relocation of floodprone buildings and properties and the preservation of steep slopes subject to mudslides or landslides.

Major Elements and Strategic Objectives of the National Mitigation Strategy

Reaching the Goal...

The Vision for Safer Communities in the Future describes a society that is fully aware of natural hazards and routinely takes action to reduce both the risks and costs associated with those hazards. For the Vision to become a reality and the National Mitigation Goal to be reached, specific objectives must be accomplished to implement the major elements of Hazard Identification and Risk Assessment; Applied Research and Technology Transfer; Public Awareness, Training, and Education; Incentives and Resources; and Leadership and Coordination. Responsibility for accomplishing these objectives is shared by all levels of government and the private sector. Some of the objectives consist of a single, discrete action; others encompass a series of interdependent actions to be taken over the next 15 years. The objectives presented in this section are summarized in Appendix D.

Hazard Identification and Risk Assessment

"Basic Principles of the National Mitigation Strategy" identifies Hazard Identification and Risk Assessment as the cornerstones of mitigation; they establish both a common point of departure and the bounds within which plans and alternatives can be formulated, debated, and decided on.

Significant effort has been devoted to hazard identification. The NFIP has been identifying and mapping flood hazard areas since 1969, storm surge and wind decay models have been developed to characterize the impact of hurricanes, and efforts to produce increasingly more accurate maps depicting earthquake hazards are ongoing. Risk assessment is a more complex undertaking. It involves assumptions and calculations about magnitude, return frequency, and the potential physical and economic impact of natural hazard events in specific geographic settings, and the presentation of the results in terms that are useful to decision makers.

Achieving the following objectives will provide the basis for public awareness and preparedness and for decisions on the appropriate uses for hazard-prone areas, both of which are integral to the Vision for Safer Communities.

- Within 1 year, complete a report outlining known hazard and risk information nationwide.
- Within 1 year, develop a plan for creating an inventory of existing structures in identified hazard areas to provide a basis for mitigation plans and priorities. Within 5 years, complete the inventory.
- Within 1 year, complete development of an earthquake loss estimation methodology, complete a pilot test in one urban center, initiate a second pilot test, and begin transfer of the methodology to State and local governments. Within 5 years, refine the methodology to facilitate the estimation of losses from wind and water hazards as well.

- Within 1 year, establish standards for digital hazard and risk data to facilitate collection and analysis.

- Within 1 year, complete an evaluation of emerging technologies for rapid, cost-effective collection of digital topographic data to be included in hazard identification and risk assessment models.

- Within 1 year, initiate a program to accelerate conversion of Flood Insurance Rate Maps to digital format. Within 5 years, achieve 80-percent conversion.

- Within 5 years, complete, in concert with State and local governments, risk assessments in all 54 states and territories, including estimates of the types and extent of economic losses and the loss of natural and cultural resources that may result from natural hazard events.

- Within 10 years, provide for the transfer of natural hazards data and maps depicting this information to State and local governments and other interested parties by electronic means.

Ongoing hazard identification and risk assessment activities include continuing to refine hazard, risk, and vulnerability identification and loss estimation methodologies, and improving integration of the results of these efforts with mitigation technology development and application.

Applied Research and Technology Transfer

Research has provided the knowledge to develop a broad spectrum of mitigation techniques and tools that can reduce the impact of natural disasters on the built environment. These techniques and tools include, land use planning and management, engineering, building standards, codes, and practices, and insurance.

Building standards for all hazards continue to be developed, refined, and converted into language that is adopted into the model building codes. Most State and local governments adopt one of the three model national codes. This process is effective in transferring the results of research into direct application through the design and construction of buildings.

Greater coordination is needed in the development of research priorities and in the transfer of mitigation technologies for application by both the public and private sectors. The objectives provide for a multi-year coordinated private and public effort to accomplish this element of the National Mitigation Goal.

- Within 1 year, evaluate state-of-the-art technologies for the dissemination of research results to the user community .

- Within 1 year, develop public-private partnerships for undertaking all-hazards research.

- Within 1 year, formulate and publish a multi-year plan for private and public collaboration in the further development of building standards for all hazards. Within 5 years develop all-hazards design standards for Federally owned and leased buildings and review and refine the multi-year plan for the development of all-hazards building standards. Within 10 years, complete the development of performance-based consensus design standards for all natural hazards and complete the development of all-hazards retrofitting guidelines and standards for existing buildings.

- Within 2 years, complete a national survey of design standards for critical facilities and infrastructure.

- Within 2 years, complete a national inventory of ongoing all-hazards mitigation research to provide the basis for a needs assessment. Within 5 years, complete a national assessment of all-hazards mitigation research needs and develop a national agenda for mitigation research and a multi-year implementation plan. Within 10 years, and every 5 years thereafter, review the national agenda and revise it as necessary.

- Within 2 years, complete an evaluation of the impediments to community building code compliance and identify approaches for removing those impediments.

- Within 5 years, with consensus standards organizations, develop recommended performance guidelines to ensure continued operation of essential public facilities following a natural hazards event.

- Within 5 years, develop and implement a consistent methodology for assessing the effectiveness of mitigation measures in post-event settings.

- Within 5 years, develop a clearinghouse for the collection, storage, and dissemination of natural hazards research data.

- Within 5 years, develop and implement a systematic approach to the review, examination, and testing of new mitigation technologies.

- Within 10 years, complete the development of all-hazards design standards for critical facilities and infrastructure.

Ongoing applied research and technology transfer activities include developing public-private partnerships for undertaking all-hazards research, collaborating with national organizations in the development of national consensus building standards and guidelines, and collaborating with national model building code organizations in the development of all-hazards building codes.

Public Awareness, Training, and Education

Before individuals can reduce their risk from natural hazards, they need to know the nature of the threat, its potential impact on them and their community, their options for reducing the risk or impact, and how to carry out specific mitigation measures. Achieving widespread public awareness of natural hazards in a community will enable citizens to make informed decisions on where to live, purchase property, or locate a business. Local decision makers will know where to locate and appropriately construct residences, businesses, and critical facilities to reduce potential damage from natural hazards.

Many States support a natural hazard public awareness campaign for school children or the general public through the State emergency services organizations or local fire or emergency management departments. The majority of these campaigns focus on "getting ready" and preparedness safety tips rather than on mitigation. There is a need for more information focusing on mitigation for the general public and other more specific audiences. There is also a need to determine the most effective method and message by which this information is to be transmitted to the intended audience.

The following objectives will contribute to achieving the basic changes in public attitude needed to reach the National Mitigation Goal and the Vision for Safer Communities.

- Within 1 year, develop a strategic all-hazards awareness, training, and education plan and an evaluation of the most effective methods and messages, involving hazard-resistant planning and design, natural hazard curriculums, natural hazard safety programs, and community risk reduction. Within 2 years, implement the priority items identified in the strategic plan. Within 5 years, and every 5 years thereafter, complete an assessment of the plan and modify it as necessary.

- Within 2 years, complete an assessment of the most effective use of information technologies such as the Internet and other media to disseminate information on natural hazards and mitigation (subsequent to the Applied Research and Technology Transfer 1-year objective to evaluate state-of-the-art technologies).

- Within 2 years, develop a program targeted at State and local elected and appointed officials to encourage the development of legislation and administrative policies that support natural hazard mitigation.

- Within 2 years, develop a program to encourage public-private partnerships for businesses to educate their employees and customers about mitigation.

Ongoing public awareness, training, and education activities include communicating the achievements, progress, and successes of the National Mitigation Strategy; evaluating and updating tools (documents, plans, training courses, and other mitigation guidance materials) to reflect state-of-the-art technology and engineering practices; and continuing to implement the strategic all-hazards awareness, training, and education plan.

Incentives and Resources

The continued development and application of hazard mitigation measures will depend largely on the existence of stable funding sources and effective incentives that encourage mitigation in both the public and private sectors. Mitigation must become a primary consideration in all Federal and State actions, grants, and loan programs. Currently, funds to support mitigation are available through a number of Federal programs, primarily in a post-disaster context. More emphasis is needed on pre-event planning and action and on the development of State funding mechanisms. The following objectives will help meet these needs.

- Within 1 year, conduct a review of the current incentives and disincentives for undertaking both pre- and post-disaster mitigation actions and determine what additional incentives and disincentives are required.

- Within 1 year, provide Federal funding for a hazard mitigation officer in each State to help support State mitigation efforts and increase State capabilities.

- Within 1 year, subject to available premiums, establish mitigation assistance grants for States and communities as authorized by the National Flood Insurance Reform Act of 1994.

- Within 1 year, apply existing mitigation authorities to the Empowerment Zone/Enterprise Community (EZ/EC) initiative being administered by the Departments of Agriculture and Housing and Urban Development.

- Within 1 year, encourage states to establish disaster funds to provide funding for the States' share of disaster assistance and for cost-effective mitigation actions by States and communities.

- Within 2 years, provide additional flood insurance coverage for compliance with State and local land use and control measures as authorized by the National Flood Insurance Reform Act of 1994.

- Within 2 years, develop and implement mechanisms to provide technical assistance to State and local governments in developing mitigation strategies to meet their unique needs and resources.

- Within 2 years, determine the feasibility and cost-benefit of a mitigation tax credit to encourage developers and owners to make a commitment to mitigation in new construction and in the retrofitting of existing buildings.

- Within 5 years, determine the most effective means for providing increased resources for pre-disaster mitigation, such as a national mitigation trust fund, and implement the most feasible solution.

- Within 5 years, develop and apply models to determine the social and economic benefits and costs of alternative mitigation measures for all hazards.

- Within 5 years, require as a condition of direct Federal assistance to a community or its citizens for building or infrastructure construction, acquisition, or substantial renovation, that the community adopt and enforce consensus-based building codes that include life safety standards for wind, fire, and seismic risk and that the community adopt and enforce life-cycle maintenance plans for community-owned buildings and infrastructure.

Ongoing incentives and resources activities include developing mechanisms to provide stable sources of funding for mitigation activities at all levels of government; providing resources for Federal, State, and local governments to ensure adequate levels of coordination and the effective implementation of mitigation activities; encouraging the formation of partnerships among private industry, academia, and the Federal, State, and local governments to maximize resources for mitigation activities; conducting ongoing evaluations and assessments of mitigation activities to ensure they are cost-effective; and supporting efforts by the insurance industry to establish community rating systems that recognize adoption and enforcement by communities of building codes that contain all-hazards building standards.

Leadership and Coordination

Local, State, and Federal governments, private sector organizations, businesses, and individuals each have important roles to play in mitigating the impacts of natural hazards. The Federal government must support and encourage mitigation actions at the State and local levels by providing leadership and coordination. It must lead by example, adopting and practicing the best mitigation techniques for all actions affecting its facilities and employees. Federal programs that influence where and how development occurs or that can be used to increase awareness of natural hazards must take full advantage of mitigation opportunities.

Since most mitigation occurs at the local level, partnerships must be formed among all levels of government and the private sector to develop consensus on mitigation issues. Federal mitigation programs must be sensitive to local concerns and flexible enough to fully support local mitigation initiatives. The following objectives will provide leadership and coordination in meeting the National Mitigation Goal.

- Within 1 year, incorporate mitigation into every Presidentially declared disaster recovery effort.
- Within 1 year, require that mitigation considerations be integrated into the management and operation of all Federal programs that affect the built environment.
- Within 1 year, convene the first biennial National Mitigation Conference to provide a forum for further discussion and the exchange of information among representatives of Federal, State, and local governments and the private sector, to encourage all parties to maintain their involvement, and to facilitate updating the National Mitigation Strategy in response to future needs and evolving Federal policies and mitigation technologies.
- Within 1 year, implement the National Flood Insurance Reform Act of 1994.
- Within 1 year, complete and issue to Federal agencies guidance concerning implementation of Executive Order 12941, "Seismic Safety of Existing Federally Owned or Leased Buildings."
- Within 1 year, convene a Federal Interagency Mitigation Task Force to more closely coordinate Federal mitigation authorities, to explore the further use of existing authorities to achieve mitigation, to support implementation of the Federal portions of the National Mitigation Strategy, and to develop a Federal Mitigation Action Plan.
- Within 1 year, designate a Federal focal point for collaborative international mitigation activities.
- Within 2 years, establish a National Multi-Hazard Mitigation Council to serve as a coordinating body across the public and private sectors, the individual hazards communities, and the various hazard reduction disciplines.
- Within 2 years, expand the responsibility of Local Emergency Planning Committees to include planning for reduction of natural hazard risks.
- Within 2 years, in collaboration with the private sector, develop and implement a

standard format for documenting the impacts and consequences of natural hazard events.

- Within 2 years, establish a Lifeline Seismic Safety Executive Board to support the development and adoption of national voluntary consensus standards for new and existing critical facilities and infrastructure seismic design.

- Within 2 years, ensure that support for and implementation of mitigation practices are included as an integral part of emergency management plans at the State and local levels.

- Within 5 years, complete a national assessment of the relationship between natural and technological hazards, and identify activities and resources that may be applied to mitigate both types of hazards.

- Within 5 years, develop a coordinated national approach to wind hazard mitigation.

- Within 5 years, in collaboration with professional organizations and State and local licensing bodies, establish national standards for professional competence in hazard mitigation for the planning and design professions.

- Within 10 years, achieve adoption and enforcement by all municipalities, counties, and States of all-hazards building codes for all new construction.

- Within 10 years, develop a comprehensive all-hazards safety program for all Federal buildings and implement the program for those buildings in the areas of highest risk. Within 15 years, implement the all-hazards safety program for all other Federal buildings.

- Within 15 years, complete a comprehensive assessment of progress toward accomplishing the goal and objectives of the National Mitigation Strategy to be presented at a proposed White House Conference in 2009 (in conjunction with the Public Awareness, Training, and Education 1-year objective to develop an all-hazards awareness, training, and education plan).

EVALUATION

Evaluating alternatives...

The following criteria are proposed to aid in selecting among alternative approaches to achieve national mitigation objectives:

- **For Hazard Identification and Risk Assessment.** Does the mitigation effort identify all relevant hazards, address the vulnerability of people and the built and natural environment, and determine the degree of risk? Does it use the latest effective technology to assist policymakers and the public to set mitigation priorities?

- **For Applied Research and Technology Transfer.** Does the mitigation effort effectively transfer ideas or technology to messages or products that can be readily understood and applied by users to identify, assess, and mitigate natural hazards risks?

- **For Public Awareness, Training, and Education.** Does the mitigation effort appeal to, or attempt to reach, the widest possible audience, and does it convey the mitigation message in unique or thought-provoking ways?

- **For Incentives and Resources.** Does the mitigation effort demonstrate cost-effective use of limited resources, provide new or re-programmed resources, or employ a method that better uses resources to promote or serve the goal of natural hazard mitigation?

- **For Leadership and Coordination.** Does the mitigation effort serve as a positive example of the benefits of natural hazards mitigation and encourage mitigation actions on the part of others? Does it build coalitions or partnerships to maximize benefits or enhance resources, and does it encourage individual, family, or private sector participation and involvement?

The proposed objectives are not static; they are subject to alteration and redefinition over time based on structured assessments of their utility and their contribution to achieving the National Mitigation Goal. Such assessments will assist policymakers and the public to learn whether mitigation activities or policies are reducing future damages and hardship in a reasonable time and whether such benefits match or exceed the costs. Evaluation mechanisms will include:

- Periodic surveys of the customers of mitigation programs, through survey instruments and through sessions similar to the National Mitigation Forums;

- Formal, structured assessments of progress in implementing the Strategy, similar to the assessment currently being conducted for mitigation research; and,

- Convening the biennial National Mitigation Conference as a White House Conference in 1999 and 2009 to focus national attention on the results of the decennial assessments of mitigation and to lead to national consensus for the action agenda for the ensuing decade.

MITIGATION ACTION PLAN

Fulfilling our responsibilities...

A National Mitigation Action Plan (MAP) is needed to launch actions designed to achieve the National Mitigation Goal. The MAP serves as both a call to action and a point of departure for discussions among the mitigation partners. As these discussions proceed, the proposed objectives may be modified and others may be added. In this process, it will be critical to select those policies, programs, and projects with the greatest potential for advancing one or more of the objectives. Efforts that promise to help the most people and that make the most effective use of resources must be given the highest priority. This approach suggests an early focus on critical facilities, such as hospitals, fire and police stations, buildings designated as emergency shelters, and other buildings where large numbers of people congregate, such as schools.

Acceptance of responsibilities for the programs, projects, policies, and other efforts described in the Strategy is an important first step in the mitigation process. The ongoing role of the Federal government will be significant, but limited. Success of the Strategy depends on individuals, government at all levels, and the private sector acknowledging their vulnerability and accepting their responsibility for reducing their exposure to risk from natural hazards. The following actions are proposed:

FEMA should:

- Challenge all executive departments and agencies to accept responsibility for implementing at least one specific objective to support one or more of the five elements of the National Mitigation Goal.
- Make mitigation the highest priority in recovery efforts following all disasters.
- Provide technical assistance to other Federal agencies and State and local governments regarding mitigation actions..
- Facilitate development of implementation plans among Federal, State, and local government agencies and business and industry partners for the actions outlined in the National Mitigation Strategy.
- Coordinate mitigation activities among Federal, State, and local government agencies and business and industry partners.
- Communicate mitigation successes to decision makers, government agencies, business and industry, and private citizens.

All Federal agencies should:

- Complete and publish a national natural hazard risk assessment.
- Collaborate with academia, national standards and code-writing groups, and the private sector to speed the development and application of mitigation technologies.
- Apply the best mitigation practices to their own facilities.
- Support applied research on priority mitigation issues.

- Collaborate with all interested parties to develop processes and conventions for characterizing the impacts of natural hazards and for assessing the costs and benefits of alternative mitigation measures.

- Spearhead a national public awareness campaign for hazard reduction.

State and local governments should:

- Develop strategic mitigation plans and identify funding sources to support them.

- Adopt and enforce all-hazards building codes.

- Adopt incentives and disincentives to encourage mitigation.

- Develop administrative structures to support implementation of mitigation programs and priorities.

- Incorporate mitigation of natural hazards into their land use management plans and programs.

- Develop, support, and conduct ongoing public information campaigns on natural hazard mitigation.

The private sector should:

- Develop business interruption plans and implement mitigation to minimize loss of jobs and business activity.

- Develop incentives for mitigation with insurance and banking institutions.

- Promote awareness of hazard risk and mitigation solutions among customers and the public.

Individual citizens should:

- Become aware of the natural hazards that may affect them and their communities.

- Support adoption and enforcement of measures designed to reduce their vulnerability.

- Take other appropriate actions to protect their lives and property against the impacts of natural hazards.

As a Nation, we must protect our people and our built and natural environments from the risks posed by natural hazard events. We must support new and ongoing efforts that are effective in reducing damage and injury from these events and that allow our communities to recover from their impacts as quickly as possible. The National Mitigation Goal describes our destination; the National Mitigation Strategy points the way.

Recent Studies and Reports

Appendix A

The following are recent major studies and reports that helped develop a foundation for the National Mitigation Strategy. In their own right, these reports offer many suggestions that advance hazard mitigation and that will be addressed further as the Strategy is implemented.

A Safer Future, Reducing the Impacts of Natural Disasters, U.S. National Committee for the Decade for Natural Disaster Reduction, Commission on Geosciences, Environment, and Resources, National Research Council, National Academy Press, Washington, DC, 1991.

A Unified National Program for Floodplain Management, Federal Interagency Floodplain Management Task Force, Federal Emergency Management Agency, FEMA 248, Washington, DC, June 1994.

Coastal Exposure and Community Protection, Hurricane Andrew's Legacy, Insurance Institute for Property Loss Reduction and Insurance Research Council, Inc., April 1995.

Creating a Government that Works Better and Costs Less, Federal Emergency Management Agency, Accompanying Report of the National Performance Review, Washington, DC, May 31, 1994.

Earthquake Risk Reduction in the United States, An Assessment of Selected User Needs and Recommendations for the National Earthquake Hazards Reduction Program, Volume II, Full Report, Federal Emergency Management Agency, Washington, DC, December 31, 1994.

The East Bay Hills Fire, Oakland-Berkeley, California (October 19-22, 1991), Federal Emergency Management Agency, U.S. Fire Administration, National Fire Data Center, Emmitsburg, MD.

Facing the Challenge, The U.S. National Report to the IDNDR World Conference on Natural Disaster Reduction, Yokohama, Japan, May 1994, National Research Council, National Academy Press, Washington, DC, 1994.

Federal Disaster Assistance, Information for the Bipartisan Task Force on Funding Disaster Relief, U.S. Senate, November 1994.

Floodplain Management in the United States: An Assessment Report, Volume 1, Summary Report, prepared for the Federal Interagency Floodplain Management Task Force, Federal Emergency Management Agency, FIA-17, Washington, DC, May 1992.

Improving Earthquake Mitigation, Report to Congress, Federal Emergency Management Agency, Office of Earthquakes and Natural Hazards, Washington, DC, January 1993.

Preparing for the Future Through Science and Technology, An Agenda for Environment and Natural Resources Research, National Science & Technology Council, The Committee on Environment & Natural Resources, Washington, DC, February 1995.

Preserving Resources Through Earthquake Mitigation, The National Earthquake Hazards Reduction Program. Fiscal Years 1993-1994, Washington, DC, December 1994.

Reducing the Impacts of Natural Hazards, A Report by the Committee on Earth and Environmental Sciences, Subcommittee on Natural Disaster Reduction, May 1992.

Report of the Advisory Committee of the National Earthquake Hazards Reduction Program (NEHRP), Federal Emergency Management Agency, Office of Earthquakes and Natural Hazards, Washington, DC, January 1993.

Report of the Bipartisan Task Force on Disasters, U.S. House of Representatives, December 14, 1994.

Sharing the Challenge: Floodplain Management Into the 21st Century, Report of the Interagency Floodplain Management Review Committee to the Administration Floodplain Management Task Force, Washington, DC, June 1994.

Storms over the Urban Forest: Planning, Responding, and Regreening – A Community Guide to Natural Disaster Relief, Lisa Burban, USDA Forest Service, and John W. Andresen, University of Illinois, Department of Forestry, Second Edition, 1994.

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THE NATIONAL MITIGATION FORUMS AND QUESTIONNAIRE

Appendix B

In April 1993, the Federal Emergency Management Agency (FEMA) adopted a new mission to reduce the loss of life and property and protect the Nation's institutions from all hazards by leading and supporting the Nation in a comprehensive, risk-based emergency management program. The core of this mission is the creation of an emergency management system built on a partnership of local, State, and Federal governments, voluntary agencies, business and industry, and individual citizens. In support of the mission, FEMA, with its partners, has initiated the development of a National Mitigation Strategy which could affect every community in the country.

The Mitigation Forums

The success of the National Mitigation Strategy will depend on the active participation of all levels of government – especially the municipal and county levels – and the private sector. Therefore, involving these groups in the development of the Strategy was and will continue to be essential. To obtain guidance and comments from public and private sector entities who are knowledgeable of, involved in, or affected by hazard mitigation, FEMA distributed 15,000 questionnaires and conducted a series of 11 public Mitigation Forums across the United States.

The questionnaire solicited information regarding public awareness of risk from hazards and mitigation, FEMA's mitigation goals for the next 25 years, effective mitigation measures and methods of putting them into practice, and appropriate incentives and funding mechanisms. Accompanying each questionnaire was the brochure "Toward a National Mitigation Strategy," which discusses the goals of the Strategy.

The forums were held in the fall of 1994 and summer of 1995 in the following cities:

- Atlanta, GA -*September 14, 1994*
- Harrisburg, PA - *September 7, 1994*
- Berkeley, CA - *October 20, 1994*
- Honolulu, HI - *June 8, 1995*
- Boston, MA - *September 20, 1994*
- Houston, TX - *September 28, 1994*
- Boulder, CO - *September 27, 1994*
- Kansas City, MO - *October 12, 1994*
- Chicago, IL - *October 13, 1994*
- New Brunswick, NJ - *September 8, 1994*
- Seattle, WA - *October 25, 1994*

At each forum, open discussions were encouraged and completed questionnaires were collected along with other written comments. FEMA recorded the proceedings of each forum on audiotape and then compiled and categorized the oral and written comments, including the written comments on questionnaires from people who did not attend a forum. Comments were received from members of Federal, State, regional, tribal, and local government agencies; private industry; academia; non-profit research, professional, trade, environmental, and disaster response organizations; and individual citizens.

What we learned

Holding forums across the United States enabled FEMA to reach a broad and diverse audience having experience with a variety of hazards (e.g., hurricanes in the south and east, tornadoes in the Midwest, earthquakes in the west). While the primary hazards that affect lives and property often vary geographically,

the comments of the forum participants and those who completed the questionnaires revealed consistent positions on many issues that are integral to a successful national strategy.

These comments and suggestions addressed six questions fundamental to the National Mitigation Strategy. Following is a summary of the most frequent responses to the questionnaire:

1 How can the public become better informed about its vulnerability to natural hazards and more knowledgeable about ways to mitigate these hazards?

- electronic and print media
- displays and brochures
- presentations by Federal, State, and local agencies and professional organizations
- formal training courses and school curriculums
- public notification (e.g., newsletters, signs, mass mailings)
- legislation (e.g., mandatory hazard disclosure laws)

Suggested points of emphasis for hazard awareness and mitigation messages were:

- individual responsibility and self-reliance
- high costs of disasters
- need for coordinated, multi-hazard approaches
- need for ongoing mitigation efforts
- identification of resources

2 Are the 5-, 15-, and 25-year goals set forth in "Toward a National Mitigation Strategy" reasonable and if not, how should they be revised?

The responses to this question concerned not only the goals themselves but also the 5-, 15-, and 25-year timeframes, funding issues, measurements of progress, and coordination. A majority favored a timeframe shorter than 25 years, suggesting that remaining focused on the Goal for 25 years would be difficult. No one questioned the need for specific goals and methods of measuring progress toward them, but otherwise the comments varied widely – some respondents believed the goals were reasonable, some did not; some thought more time should be allowed; some thought less time should be allowed; many questions were raised about responsibilities and funding sources; and numerous suggestions for additional goals were provided.

3 What mitigation measures have proved to be the most effective?

- structure acquisition and relocation
- multi-hazard and hazard-specific building codes
- land use planning (e.g., zoning and development controls, floodplain management, transfer of development rights)
- public awareness efforts
- education and training
- structural measures (e.g., retrofitting, erosion control, flood control structures, site improvements, building elevation)
- incentives and disincentives (e.g., grants, tax credits, insurance rate adjustments)

4 Can mitigation measures be implemented consistently on a voluntary basis, or must they be mandated?

The vast majority of respondents felt that mitigation measures must be mandatory or that a combination of mandatory and voluntary measures should be employed. Many of the responses that recommended mandatory measures also stated that mandates must be supported by good data and public understanding and involvement. Similarly, it was noted that voluntary measures must be supported by effective incentives and disincentives.

5 What incentives would encourage the implementation of mitigation measures or programs?

Responses identified both incentives for undertaking mitigation measures and disincentives for failing to mitigate. Suggested incentives include grants, tax credits and reductions, low-cost and no-cost loans, insurance rate reductions, rebates, free technical assistance, and cost sharing. Suggested disincentives included elimination of public assistance and disaster assistance, refusal of insurance coverage for avoidable damages, increased insurance rates and decreased coverage limits in high hazard areas, and denial of Federal and State grants for projects in high-hazard areas.

6 How should mitigation measures be financed?

The responses suggested a wide variety of funding mechanisms, including special taxes and fees, surcharges on insurance premiums, grants and loans, bonds, and Federal/State/local/private partnerships.

Conclusion

All comments have been considered for their contribution to the Strategy. From the beginning, FEMA has sought to make the development of the National Mitigation Strategy a collaborative process. The Mitigation Forums have provided the basis for a strategy that is not simply Federal or governmental but truly national in its scope, its goals, and its benefits.

Contributing Organizations

Hundreds of organizations and individuals contributed to the National Mitigation Strategy through the forum, questionnaire, and draft review processes. Listing all of them here would not be practical.

Appendix C

Instead, the following partial list of contributing organizations is provided to illustrate the breadth of public and private sector expertise and perspectives that helped guide the development of the Strategy.

Alaska Geological Survey

American Institute of Architects

American Littoral Society

American Red Cross

American Society of Civil Engineers

Arkansas Department of Financial Authority

Association of State Dam Safety Officials

Association of State Floodplain Managers

California Department of Water Resources

California Seismic Safety Commission

California Universities for Research in Earthquake Engineering

Church World Services

Colorado Emergency Planning Commission

Colorado Forest Service

Commonwealth of Virginia

Council of American Building Officials

Delaware River Basin Commission

Farmers' Home Administration

Florida Department of Community Affairs

Friends of the Earth

General Services Administration

Gulf Coast Conservation Association

Hawaii Department of Budget and Finance

Hawaii Department of Defense

Hawaii Department of Land and Natural Resources

The Hazard Mitigation Institute

Illinois State Geological Survey

Indiana Emergency Management Agency

Institute for Transportation and the Environment

Institute of Real Estate Management

Insurance Institute for Property Loss Reduction

International Conference of Building Officials

Kansas Department of Agriculture

League of Women Voters

Lower Colorado River Authority

Maryland Department of Natural Resources

Maryland Department of Water Resources

Massachusetts Coastal Zone Management Program

Mennonite Disaster Service

Michigan Department of Natural Resources

Michigan Department of State Police

Minnesota Department of Natural Resources

Minnesota Department of Public Safety

Mississippi Cooperative Extension Service

Mississippi Emergency Management Agency

Mississippi Fire Marshal's Office

Missouri Department of Natural Resources

Montana Department of Military Affairs

National Association of Home Builders

National Conference of State Legislatures

National Coordinating Council on Emergency Management

National Fire Protection Association

National Institute for Urban Search and Rescue

National Institute of Building Sciences

National Institute of Standards and Technology

National Science Foundation

National Weather Service

Natural Hazards Research and Applications Information Center

Nebraska Civil Defense Agency

New England States Emergency Consortium

New Hampshire Department of Resources and Economic Development

New Jersey Department of Environmental Protection and Energy

New Jersey Marine Sciences Consortium

New Jersey State Police

New Mexico Department of Public Safety

North Carolina Department of Environmental, Health, and Natural Resources

Northeastern Illinois Planning Commission

Ohio Adjutant General's Department

Ohio Department of Natural Resources

Ohio Emergency Management Agency

Oklahoma Water Resources Board

Oregon Department of Transportation

Oregon Emergency Management Agency

Pacific Basin Development Council

Passaic River Coalition

The Pennsylvania Building Officials Conference

Pennsylvania League of Cities and Municipalities

Popio-Missouri River Natural Resources District

Richard Stockton Coastal Center

Salvation Army

Sierra Club

Southern Building Code Congress International, Inc.

Southern Ute Indian Tribe

State Farm Insurance

Tennessee Fire Marshal's Office

Tennessee Valley Authority

Texas Department of Licensing and Regulation

U.S. Army Corps of Engineers

U.S. Department of Agriculture

U.S. Department of Energy

U.S. Department of Housing and Urban Development

U.S. Department of the Navy

U.S. Department of State

U.S. Department of Transportation

U.S. Environmental Protection Agency

U.S. Geological Survey

Urban Creeks Council

Urban Drainage and Flood Control District, Denver, Colorado

Utah Department of Natural Resources

Utah Department of Public Safety

Virginia Department of Emergency Services

Washington Department of Community, Trade, and Economic Development

Washington Department of Ecology

Washington Department of Transportation

Washington Wildlife Study Council

Western Illinois Regional Council

Wisconsin Department of Military Affairs

Wisconsin Department of Natural Resources

World Council of Churches

CHECKLIST FOR IMPLEMENTATION OF THE NATIONAL MITIGATION STRATEGY

Appendix D

Hazard Identification and Risk Assessment

	Timeframe (Years) 1	2	5	10	15
Complete report on known hazard and risk information nationwide.	☑	☐	☐	☐	☐
Develop plan for inventory of existing structures in hazard areas.	☑	☐	☐	☐	☐
Complete inventory of existing structures.	☐	☐	☑	☐	☐
Complete development of earthquake loss methodology, complete pilot test, and begin transfer of methodology to State and local governments.	☑	☐	☐	☐	☐
Refine loss methodology to include wind and water hazards.	☐	☐	☑	☐	☐
Establish standards for digital hazard risk data.	☑	☐	☐	☐	☐
Complete evaluation of technologies for digital topographic data collection.	☑	☐	☐	☐	☐
Initiate program to accelerate conversion of FIRMs to digital format.	☑	☐	☐	☐	☐
Complete conversion of 80 percent of FIRMs to digital format.	☐	☐	☑	☐	☐
Complete risk assessments for all 54 states and territories.	☐	☐	☑	☐	☐
Provide for the transfer of natural hazards data and maps to the State and local governments by electronic means.	☐	☐	☐	☑	☐

Applied Research and Technology Transfer

	Timeframe (Years) 1	2	5	10	15
Evaluate state-of-the-art technologies for dissemination of research results.	☑	☐	☐	☐	☐
Develop public-private partnerships for undertaking all-hazards research.	☑	☐	☐	☐	☐
Formulate and publish plan for private and public collaboration in further development of all-hazards building standards.	☑	☐	☐	☐	☐
Develop all-hazards design standards for Federal buildings and refine multi-year plan for developing all-hazards building standards.	☐	☐	☑	☐	☐
Complete development of performance-based consensus design standards for all natural hazards and complete development of all-hazards retrofitting guidelines and standards.	☐	☐	☐	☑	☐
Complete national survey of design standards for critical facilities and infrastructure.	☐	☑	☐	☐	☐
Complete national inventory of ongoing all-hazards mitigation research.	☐	☑	☐	☐	☐
Complete national assessment of all-hazards mitigation research needs and develop national agenda for mitigation research and multi-year implementation plan.	☐	☐	☑	☐	☐
Review the national agenda and revise as necessary.	☐	☐	☐	☑	☑
Complete evaluation of impediments to building code compliance and identify ways to remove the impediments.	☐	☑	☐	☐	☐
With consensus standards organizations, develop recommended guidelines for the performance of public facilities following natural hazard events.	☐	☐	☑	☐	☐
Develop and implement consistent methodology for assessing effectiveness of post-event mitigation efforts.	☐	☐	☑	☐	☐

	Timeframe (Years) 1	2	5	10	15
Develop clearinghouse for collection, storage, and dissemination of natural hazards research data.	☐	☐	☑	☐	☐
Develop and implement systematic approach to review, examination, and testing of new mitigation technologies.	☐	☐	☑	☐	☐
Complete development of all-hazards design standards for critical facilities and infrastructure.	☐	☐	☐	☑	☐

Public Awareness, Training, and Education

Develop strategic all-hazards awareness, training, and education plan and identify most effective methods and messages.	☑	☐	☐	☐	☐
Implement priority items of the strategic plan.	☐	☑	☐	☐	☐
Assess strategic plan and revise as necessary.	☐	☐	☑	☑	☑
Complete assessment of most effective information technologies for dissemination of natural hazard and mitigation information.	☐	☑	☐	☐	☐
Develop all-hazards mitigation marketing campaign..	☑	☐	☐	☐	☐
Develop program for State and local officials to encourage legislative and administrative policies that support mitigation.	☐	☑	☐	☐	☐
Develop program to encourage public-private partnerships for businesses to help educate employees and customers.	☐	☑	☐	☐	☐

	Timeframe (Years) 1	2	5	10	15
Incentives and Resources					
Conduct review of current incentives and disincentives for pre- and post-disaster mitigation and identify needs.	☑	☐	☐	☐	☐
Provide Federal funding for hazard mitigation officer in each State.	☑	☐	☐	☐	☐
Depending on available premiums, establish mitigation assistance grants for states and communities as authorized by NFIRA of 1994.	☑	☐	☐	☐	☐
Apply existing mitigation authorities to the EZ/EC initiative.	☑	☐	☐	☐	☐
Encourage states to establish disaster funds to provide cost sharing for disaster assistance and mitigation actions.	☑	☐	☐	☐	☐
Provide additional flood insurance coverage for compliance with State and local land use and control measures as authorized by NFIRA of 1994.	☐	☑	☐	☐	☐
Develop and implement mechanisms to provide technical assistance to State and local governments for mitigation strategies.	☐	☑	☐	☐	☐
Determine feasibility and cost-benefit of a mitigation tax credit for new construction and retrofitting.	☐	☑	☐	☐	☐
Determine the most effective means for providing increased resources for pre-disaster mitigation.	☐	☐	☑	☐	☐
Develop and apply models to determine social and economic benefits and costs of alternative mitigation measures for all hazards.	☐	☐	☑	☐	☐
Make direct Federal assistance to communities contingent on community adoption and enforcement of building codes and life-cycle maintenance plans.	☐	☐	☑	☐	☐

Leadership and Coordination

	Timeframe (Years) 1	2	5	10	15
Incorporate mitigation into every Presidentially declared disaster recovery effort.	☑	☐	☐	☐	☐
Require that mitigation be integrated into all Federal programs that affect the built environment.	☑	☐	☐	☐	☐
Convene first Biennial National Mitigation Conference.	☑	☐	☐	☐	☐
Implement NFIRA of 1994.	☑	☐	☐	☐	☐
Complete and issue to Federal agencies guidance concerning implementation of Executive Order 12941.	☑	☐	☐	☐	☐
Convene Federal Interagency Mitigation Task Force.	☑	☐	☐	☐	☐
Designate Federal focal point for collaborative international mitigation activities.	☑	☐	☐	☐	☐
Establish a National Multi-Hazard Mitigation Council	☐	☑	☐	☐	☐
Expand the responsibility of Local Emergency Planning Committees to include planning for reduction of natural hazard risks.	☐	☑	☐	☐	☐
In collaboration with the private sector, develop and implement standard format for documenting impacts of natural hazard events.	☐	☑	☐	☐	☐
Establish Lifeline Seismic Safety Executive Board.	☐	☑	☐	☐	☐
Ensure that support for and implementation of mitigation practices are included as an integral part of emergency management plans at the State and local levels.	☐	☑	☐	☐	☐
Complete national assessment of relationship between natural and technological hazards and identify activities and resources to mitigate both types of hazards.	☐	☐	☑	☐	☐
Develop coordinated national approach to wind hazard mitigation.	☐	☐	☑	☐	☐

	Time Frame (Years) 1	2	5	10	15
In collaboration with professional organizations and State and local licensing bodies, establish national standards for professional competence in hazard mitigation.	☐	☐	☑	☐	☐
Achieve adoption and enforcement by all cites, counties, and states of all-hazards building codes for new construction.	☐	☐	☐	☑	☐
Develop all-hazards safety program for all Federal buildings and implement it for Federal buildings in areas of highest risk.	☐	☐	☐	☑	☐
Implement all-hazards safety program for all other Federal buildings.	☐	☐	☐	☐	☑
Complete comprehensive assessment of progress toward goal and objectives of the National Mitigation Strategy (to be presented in 2009).	☐	☐	☐	☐	☑

For a brief history of
FEMA's mitigation effort
go to
VacationLeaveGrp@AOL.com

The term "Mitigation" undefined
first appeared in the
Disaster Relief Act of 1974
(Public Law 93-288)

Never updated
MRE-VLG
6/09

The National Mitigation Strategy is reviewed and updated biennially. Your comments and suggestions are welcome.

We are continually looking for ways to improve the quality of the National Mitigation Strategy. We would appreciate it if you would share your comments and suggestions with us at:

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Thank you for your time and interest. If you would like an additional copy of this document, please contact the FEMA Publications Office at (202) 646-3484.