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# Federal Emergency Management Agency

## Recommendations and Actions

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### **FEMA03: Create Results-Oriented Incentives to Reduce the costs of a Disaster**

#### **Background**

Americans traditionally help one another when disaster strikes, but policies and practices of the government and others tend to discourage important self-help measures. This country's response to catastrophic events relies to a great extent on federal assistance to state and local governments, whether or not those governments have tried to reduce the effects, including the costs, of such disasters. The ready availability of federal funds may actually contribute to disaster losses by reducing incentives for hazard mitigation and preparedness.

#### **Federal Criteria and Disaster Costs.**

The Stafford Act defines the process that triggers most federal disaster assistance other than assistance for crop losses. The criteria for disaster declarations are vague. The law defines only two categories of presidentially declared disasters: emergencies and major disasters.

When the costs of a disaster exceed the resources of state and local government, a governor can ask the President to declare a major disaster.[1] Once the President determines that the event causes damage of sufficient severity and magnitude to warrant major disaster assistance, the affected area becomes eligible for a wide range of assistance coordinated by FEMA.

At least 13 federal agencies, including FEMA, provide a combination of services, technical assistance, grants, and low-interest loans for disaster response and recovery. FEMA's Disaster Relief Fund pays between 75 and 100 percent of the costs of immediate emergency services, public facilities repair, and assistance to individual families.[2]

Decisions about federal disaster relief are not constrained by immediate budget considerations. Most funds for disasters in the recent past have been provided by supplemental appropriations, which are exempt from federal discretionary spending limits.[3] Although California has levied special taxes to defray the costs of disaster assistance, the federal government has not, and disaster relief has added to the deficit.

Over the 10-year period from the beginning of fiscal year 1983 to the end of fiscal year 1992, annual obligations for FEMA's Presidential Disaster Relief Fund averaged \$668 million a year in constant 1992 dollars, much of it deficit-financed. Congress provided \$2.9 billion in supplemental FEMA disaster relief funds for Hurricanes Andrew and Iniki in 1992.[4] The FEMA share of disaster assistance for the 1993 floods in the Midwest will be at least \$1.7 billion.[5]

The system as a whole encourages state and local elected officials to ask for maximum federal disaster assistance. Requests have increased approximately 50 percent over the last 10 years. Even minor emergencies have been awarded full compensation. The federal government expects to pay 17 states and the District of Columbia a total of \$126 million for the costs of snow removal for emergency transportation after the March 1993 storms, even though snow is a regular, recurring event in many of the affected states.

To prevent the federal government from becoming the states' first-line resource in every emergency, objective criteria are needed to replace political factors affecting decisions about disaster declarations and the ensuing response. These criteria should be accompanied by efforts before catastrophe strikes to limit the costs afterward--a better alternative than limiting aid to suffering families and communities after a disaster hits them.

**Insurance and Mitigation.** The devastation caused by recent floods in the Midwest highlighted the need for communities to recognize and plan for risk. Adequate insurance can reduce the need for government assistance and speed recovery; dams and levees can limit the extent of flooding; clearing floodplains and elevating buildings can minimize structural damage when disasters occur.

Unfortunately, the floods also demonstrated that the country is not taking maximum advantage of available mechanisms to ameliorate the effects of disasters. While it will take time to isolate the most effective flood mitigation measures for the Midwest, the area graphically illustrates the nation's lack of adequate insurance against disasters.

Less than 15 percent of the people affected by the floods in the Midwest had insurance against that risk, even though they live on a recognized high-risk flood plain. Only 20 percent of all U.S. homeowners at risk of flooding have flood insurance. People living in a typical flood plain have a 26 percent chance of flood over the 30-year life of a mortgage. Although the risk of fire is much lower than the risk of flood, 96 percent of homeowners in flood areas have fire insurance.

In communities participating in the National Flood Insurance Program (NFIP), such insurance is mandatory for many people living in designated Special Flood Hazard Areas.[6] Yet enforcement of that requirement by mortgage lenders has been lax, and while 18,250 communities at risk of flooding participate in the program, 2,378 others do not.

Beyond increasing insurance coverage, the already-high and rising costs of

disasters need to be reduced. The National Research Council has estimated that the annual costs of disasters (of which FEMA bears only part) now average \$20 billion a year.[7] The total direct and indirect losses from recent disasters have been even higher: \$45 to \$60 billion in 1989 from Hurricane Hugo and the Loma Prieta earthquake, and \$30 billion from Hurricane Andrew.[8] By August 1993 the direct losses from the floods in the Midwest were estimated to be \$12 billion.[9]

This country is vulnerable to high disaster costs caused by large numbers of natural hazards (e.g., earthquakes, droughts, floods, hurricanes, landslides, tornadoes, tsunamis or waves caused by seaquakes or underwater volcanoes, volcanoes, and wildfires), coupled with human factors that increase the effects of these hazards (e.g., population growth; development patterns; the density and complexity of housing, communications, and transportation systems; and economic interdependence). These costs, however, can be reduced.[10]

It has been estimated that better construction could reduce the costs of nine threats (i.e., earthquakes, expansive soil, riverain floods, hurricane winds or storm surges, tornadoes, local floods, local winds, and tidal waves) by 25 percent.[11] One expert estimated that lack of compliance with building codes may have accounted for as much as one-fourth of the \$20 billion insurance bill for Hurricane Andrew.[12]

Earthquakes, in particular, threaten people and property in the United States far more than they should. It is known that earthquake risks extend throughout the United States, not just California, albeit in widely varying degrees. For example, geologists predict that a major earthquake is virtually certain to strike somewhere in the eastern two-thirds of the country within the next 20 years.[13]

Beyond the physical havoc wreaked by earthquakes, the financial costs can exact a tremendous toll. A simulation of an earthquake 50 miles north of Memphis along the New Madrid fault line, centered in northeast Arkansas and southwest Missouri, produced estimates that insured losses alone could total \$50-60 billion.[14] Another simulation of a major earthquake in the Los Angeles area produced estimated losses of \$80 billion, attributable to direct costs of property damage and personal injury, and indirect effects on the economy.[15]

The National Earthquake Hazards Reduction Program (NEHRP)--in which FEMA, the National Science Foundation, the U.S. Geological Survey, and the National Institute of Standards and Technology cooperate--has developed strategies to reduce earthquake losses appropriate to the type of construction and level of risk. In general, so-called seismic building codes add less than two percent to the cost of new construction.[16]

The benefits from earthquake mitigation can be quite dramatic. One of the most powerful earthquakes of the century struck Guam on August 8, 1993. Early reports indicated there were no deaths, few injuries, and no homelessness because Guam used seismic construction.[17] The Lawrence Berkeley Laboratory estimates that spending \$4 million on reinforcement of its facilities prevented \$50 million in

damages from the Loma Prieta earthquake.[18]

Nevertheless, with all this information available, too few communities are preparing for earthquakes and other hazards. People tend to discount the risks of earthquakes and floods in choosing development sites. People like to live near the ocean, in spite of hurricanes, tidal waves, and mudslides. The uncertainties or lack of precision in assessing risks make it easier for short-term benefits of economic development to overpower long-term costs when local zoning and building codes are set. Communities fear losing business to other communities if they implement strong disaster mitigation measures such as seismic building codes.[19] Mitigation has been called the most neglected aspect of emergency management.[20]

FEMA provides some funding for mitigation, but it is generally thought that it is better for the federal government to create incentives for mitigation rather than to pay for it directly. Various approaches have been tried and suggested.

One federal program cited for creating mitigation incentives is the NFIP. Even though many households in floodplains do not carry insurance, their communities have adopted building codes and ordinances to mitigate flood damage as a condition of participation in the program. If a community exceeds the federal standard, its citizens receive a break in their insurance rates. The NFIP believes that \$569 million a year in flood damage prevention is attributable to community compliance with its regulations.

Some have suggested extending the NFIP model (i.e., combining community standards of hazard mitigation with increased insurance coverage) to other hazards such as earthquakes and hurricanes in order to reduce disaster costs and the financial vulnerability of the federal government.[21] The insurance industry estimated that legally required universal earthquake insurance would have reduced the need for federal disaster assistance in the 1987 Whittier Narrows earthquake by 38 percent.[22]

Others have proposed incorporating additional hazards like earthquakes, volcanic eruptions, and tsunamis into the basic coverage of homeowners policies. Still others have suggested funding mitigation from a share of insurance premiums.[23]

Earthquake (or all-hazards) mitigation could also be increased by expanding the requirements imposed on federal agencies in Executive Order 12699. This presidential order directs agencies to incorporate cost-effective seismic safety measures in new buildings owned, leased, assisted, or regulated by the federal government. The order could be expanded to include buildings with federally insured mortgages within the meaning of assisted buildings. Because the federal government is forced to pay heavily for disasters, direct expenditures on mitigation (grants, tax credits, tax exemptions) may save federal money over time.[24]

Several considerations affect the search for a new federal policy. Land use and construction requirements are determined by states and localities. Implementing

construction requirements is complicated by other factors: most builders are not engineers, many localities do not have enforcement staffs, and risks vary within regions in unpredictable ways.[25] Premiums for risk-based natural hazards insurance can substantially increase home insurance costs. Cost is one reason people do not voluntarily insure against known risks.[26] The appropriate relationship between government and private insurers must also be considered.

### **Preparedness.**

Beyond mitigation, preparedness reduces the cost of disasters that cannot be prevented. For example, quick protection of threatened facilities saves replacement costs and reduces interruptions of normal economic activities. Like mitigation, however, local governments--which are in the best position to act quickly--often do not treat disaster preparedness as a high priority.[27]

FEMA currently encourages state and local preparedness through training and emergency management exercises, and by state matching grants that directly fund state and local emergency preparedness. The effectiveness of current federal preparedness programs could be improved by using performance measures that encourage states to use federal funding efficiently for the most productive emergency management activities.

States could use civil defense funds to prepare for natural disasters. However, former FEMA management officials and some states have narrowly interpreted a 1981 amendment to the Civil Defense Act of 1950, which provided that these funds may be used to prepare for other hazards, to the extent that such use is consistent with, contributes to, and does not detract from attack-related civil preparedness.

Civil defense funds (approximately \$100 million annually) could be put to better use if all states developed a comprehensive all-hazards response capability, and prepared better for the disasters they consider to be the greatest risk--hurricanes in the Southeast and gulf coastal areas, earthquakes in California, and floods and tornadoes in the Midwest, for example. It would be appropriate for states' emergency management plans to reflect the respective risks, but states contend that FEMA has not encouraged them to redirect their plans from civil defense. FEMA should proceed with its concentration on all-hazards preparation, but it needs to make it clearer that states have the flexibility to tailor individual approaches to local problems.

FEMA should incorporate guidance on targeted all-hazards preparedness in the new grant application materials now under development. In addition to allowing more flexibility, federal preparedness assistance can also be improved by linking grant amounts to a state's success in disaster preparation. The General Accounting Office has noted that problems and weaknesses identified during emergency training exercises and drills are not corrected.[28] Tying grant award amounts to measures of preparedness would increase the efficiency and effectiveness of FEMA's preparedness programs.

The federal government should be a resource for information about the tools needed for hazards mitigation and disaster prevention.[29] It should offer incentives to the states to mitigate disasters and to prepare for those that cannot be prevented. Federal funding, for both advance mitigation of and preparation for disasters, should be tied to the effectiveness of state and local programs. FEMA should focus on outcomes and keep states informed about their progress. An effective system should define and appropriately respond to different levels of disaster. Insurance should be used whenever possible.

## **Actions**

1. FEMA should develop objective criteria for declaring emergencies and major disasters.

To reserve federal disaster assistance for situations of clear need, FEMA should develop objective indicators to define the emergencies and major disasters for which federal disaster relief is now authorized. Such indicators should take into account both the disaster itself and state capabilities for meeting the costs of the disaster. Distinctions should be made between the need for immediate federal services during the emergency, and other methods of financing response and recovery.

These criteria should be established and agreed to by FEMA, the White House, other agencies, and state and local governments. Because Congress has objected to attempts to introduce this type of change by regulation alone, FEMA should work with Congress to develop disaster criteria and determine whether legislation is advisable.

Use of objective criteria within the framework of existing law would depoliticize the process of declaring disasters. Advance knowledge of assistance that will and will not be forthcoming from the federal government will enable states and localities to prepare and implement their own disaster relief measures more effectively.

2. FEMA should enforce existing flood insurance requirements applicable to people living in high-risk areas.

FEMA should develop cost-effective proposals for enforcement of requirements for mandatory flood insurance in order to reduce the need for disaster assistance. The agency should evaluate proposed legislation under consideration by Congress which would require that:

---lenders and federal agencies not waive the mandatory purchase requirement for flood insurance for any purpose, nor provide any amount of financial assistance without enforcing the mandatory purchase requirement;

---certification of the mandatory purchase requirement be made by lenders on each mortgage sold on the secondary market to government-sponsored portfolio purchasers, such as the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation;

---lenders escrow flood insurance payments if taxes, insurance, and other items are escrowed, and authorize lenders to pay insurance premiums and fees owed from an account;

---appropriate federal banking agencies review lending portfolios of respective insured depository institutions as part of scheduled on-site examinations to ensure compliance with flood insurance purchase requirements, and report such findings to Congress annually; and

---penalties be imposed on lenders for failure to require flood insurance in Special Flood Hazard Areas.[30]

3. The administration and Congress should explore incentives to expand insurance coverage against natural hazards and increase mitigation.

Increased insurance coverage against loss from natural disasters is desirable. The Administration, in partnership with Congress and the states, should evaluate legislative proposals that increase insurance coverage for property and casualty losses against natural disasters, while creating incentives for mitigation.

4. Grants for mitigation and preparedness should fund preparedness for the greatest risks.

FEMA should implement a competitive, prioritized grant award process, including performance measures not now included in the process, so that all awards encourage and reward states that prepare for the highest risk.

5. FEMA should propose comprehensive federal policies that reduce the total cost of disasters and minimize federal costs of disaster assistance.

The development of objective criteria for disaster assistance, and increased mitigation proposed by the NPR, will help to encourage greater levels of mitigation and protection against uncompensated disaster losses. But these are only part of the solution.

FEMA should lead a collaborative, interagency, intergovernmental effort to develop a comprehensive strategy to increase mitigation and equitably allocate the costs of mitigation and recovery. It is time to make more productive use of the accumulating knowledge about risk, disaster costs, and mitigation effects and costs.

In the course of this policy development effort, FEMA should involve other federal agencies that administer policies and programs related to mitigation, preparedness, response to, and recovery from natural and man-made disasters. The agency should also involve members of Congress, representatives of state and local government, the business community, insurers, and others affected by disaster management policy.

FEMA and its collaborating partners should seek the best scientific and economic

advice. It should sponsor public conferences to cast broadly for creative policy solutions, involve the general public in the debate, and forge a general consensus.

The recommended policy initiative should include an examination of the effects of all levels of government, business, and individuals on disaster costs, and how the costs are distributed. The effort should clarify interdependent responsibilities.

The goal is improved federal policy. Policies that allocate the costs of risks to those who bear the risks are believed to be most effective in increasing risk avoidance. FEMA should examine the effectiveness of a wide range of options, including the following identified during the NPR review:

---increasing the match rate for disaster assistance to states with effective mitigation and preparedness;

---creating additional distinctions among levels of disasters for determining the amount of federal aid; and

---using insurance or loans to cover more of the disaster costs of state and local government.

Within a year and a half of this report, FEMA should submit a comprehensive plan, including proposed executive orders or legislation designed to reduce the cost of disasters.

### **Implications**

Improved mitigation, preparedness, response, and recovery will reduce the suffering and economic loss of disasters. The foregoing proposals are complementary and aim to reduce the total cost of disasters by encouraging mitigation and by clarifying state responsibility for disaster costs.

### **Fiscal Impact**

Savings from reducing and reallocating the costs of disasters from the federal government will be substantial, although data upon which to base good estimates are not available.

### **Endnotes**

1. The governor's request includes a statement of the impact on the affected area, the resources on hand, and the unmet needs that require federal help.
2. For a comprehensive description of current disaster relief policy and issues see U.S. Congress, House, Committee on Banking, Finance and Urban Affairs, A Descriptive Analysis of Federal Relief, Insurance, and Loss Reduction Programs for Natural Hazards: A Report Prepared Pursuant to the Request of the Subcommittee on Policy Research and Insurance of the Committee on Banking, Finance and Urban Affairs, Committee Print 102-15 (Washington, D.C.: Congressional Research

Service, October 15, 1992). For the period from 1977 to 1990, about two-fifths of nonagriculture federal disaster relief funds went to Federal Emergency Management Agency (FEMA) programs; two-fifths to the Small Business Administration (SBA) and to the Farmers Home Administration (FHA), primarily for low-interest loans; and one-fifth to other agencies. The SBA provides loans to repair businesses and homes; appropriations are needed to cover interest and defaults equaling about a third of their total loan amounts. The FHA provides loans to repair farm buildings. Other agencies have smaller programs directly related to their missions. For example, the Department of Education funds school repairs. Tax deductions for disaster losses also help cover disaster costs.

3. The regular appropriation process has provided \$292 million for the Disaster Relief Funds in fiscal 1992 and 1993. Disaster relief requirements have exceeded that, and Congress has made supplemental appropriations of emergency funds.

4. Odeen, Philip A., Panel Chair, National Academy of Public Administration, *Coping with Catastrophe: Building an Emergency Management System to Meet People's Needs in Natural and Man-made Disasters* (Washington, D.C., February 1993), p. 4.

5. *Washington Post* (August 7, 1993), p. A1. Accounting for disaster relief costs is complicated by the fact that funds other than FEMA funds also provide disaster relief. The \$5.7 billion figure for the Midwest floods includes an appropriation of \$2.3 billion for crop losses as well as funds for other agencies. There are other programs, such as the Food Stamp Program, which may not require special disaster appropriations if funds are available within existing ceilings. The proportion of disaster assistance going to expenses of state and local governments, or to expenses of individuals, varies by disaster. The highest portion of disaster aid for the Midwest floods will go for public response and recovery efforts. The public assistance share of disaster relief ranged from 75 percent to 42 percent of annual disaster relief costs between 1988 and 1992.

6. Flood insurance coverage in designated Special Flood Hazard Areas is mandatory for loans made by the Department of Veterans Affairs, the Federal Housing Administration, the SBA, and institutions regulated by federal agencies such as the Office of Comptroller of the Currency and the Federal Deposit Insurance Corporation.

7. National Research Council, *A Safer Future: Reducing the Impacts of Natural Disasters* (Washington D.C.: National Academy Press, 1991), p. 7.

8. *Ibid.*, p. 1. Also see U.S. General Accounting Office, *Disaster Management: Improving the Nation's Response to Catastrophic Disasters* (Washington, D.C.: General Accounting Office (GAO), July 1993), p. 4.

9. "Flood Damage Vast from any Viewpoint," *New York Times* (August 1, 1993), p. 1.

10. National Research Council, *A Safer Future*, p. 1, and Office of Science and

Technology Policy, Federal Coordinating Council for Science, Engineering and Technology (OSTP/FCCSET), *Reducing the Impacts of Natural Hazards: A Strategy for the Nation* (Washington, D.C., May 1992), p. 1.

11. Lee, Larry T., Jon D. Chrostowski, and Ronald T. Eguchi, *Natural Hazards: Riverain, Storm Surge, Tsunami Flood Loss Models* (J. H. Wiggins Company, 1978); and Petak, William J., Arthur A. Atkisson, and Paul H. Gleye, *Natural Hazards: A Public Policy Assessment* (J.H. Wiggins Company, December 1978).

12. See Kunreuther, Howard, 18th Annual Hazards Research and Applications Workshop (Boulder, CO, July 1993).

13. U.S. Congress, House, Committee on Science, Space, and Technology, Subcommittee on Science, statement by Ron Packard, 102nd Cong., 2nd Sess., August 11, 1992, p. 4.

14. Center for Strategic and International Studies, *Managing the Economic Consequences of Catastrophic Earthquakes* (December 1991), p. 4. This report was incorporated into the hearing record, U.S. Congress, House, Committee on Science, Space, and Technology, Subcommittee on Science, 102nd Cong., 2nd Sess. (August 11, 1992), pp. 30-57.

15. Gordon, Peter, and Harry W. Richardson, *Business Interruption Effects of a Major Earthquake in the Newport/Inglewood Fault Zone (NIFZ)* (Los Angeles, CA: Planning Institute, School of Urban and Regional Planning, University of Southern California, July 1992), p. 7. This insurance industry report was incorporated into the hearing record, U.S. Congress, House, Committee on Science, Space, and Technology, Subcommittee on Science, 102nd Cong., 2nd Sess. (August 11, 1992), pp. 89-106.

16. Federal Emergency Management Agency (FEMA), *Seismic Considerations for Communities at Risk, Earthquake Hazards Reduction Series 13* (Washington, D.C., October 1990), p. 46. Locating buildings away from risk areas and retrofitting buildings may be desirable, depending on the situation.

17. *Washington Post* (August 10, 1993), p. A6.

18. Eagling, Donald G., and James R. Hill, "Safety and Economic Benefits Realized from Upgrading the Lawrence Berkeley Laboratory," *Proceedings of the 23rd Joint Meeting of the U.S.-Japan Cooperative Program in Natural Resources, Panel on Wind and Seismic Effects*, Joel J. Raufaste, ed. (Gaithersburg, MD: National Institute of Standards and Technology, September 1991), pp. 225-228.

19. Mitigation generally includes structural mitigation such as elevating buildings above the flood plains or reinforcing them against earthquakes and nonstructural mitigation or, for example, zoning that locates communities away from flood plains, vulnerable shores, and earthquake faults.

20. Cigler, Beverly A., "Current Issues in Mitigation," in Louise K. Comfort, ed.,

Managing Disaster: Strategies and Policy Perspectives (Durham, NC: Duke University Press, 1988), p. 39.

21. U.S. Congress, House, A Bill to Provide for a Federal Program of Insurance Against the Risk of Catastrophic Earthquakes, Volcanic Eruptions, and Hurricanes, and for Other Purposes, 103rd Cong., 1st Sess., 1993, H.R. 935; and U.S. Congress, House, A Bill to Provide for a National Insurance and Reinsurance Program Against the Risk of Hurricanes, and for Other Purposes, 103rd Cong., 1st Sess., 1993, H.R. 1302.
22. U.S. Congress, A Descriptive Analysis of Federal Relief, Insurance, and Loss Reduction Programs for Natural Hazards, p. 40., cites State of California, California Department of Insurance, California Earthquake Zoning and Probable Maximum Loss Evaluation Program, 1988, pp. 17-22. Disaster relief from all federal agencies totaled \$191 billion for the Whittier Narrows earthquake (Cowan, Brian, Earthquake Hazards and the Role of Insurance, National Earthquake Hazards Reduction Program, FEMA).
23. U.S. Congress, Senate, A Bill to Amend the Earthquakes Hazards Reduction Act of 1977 to Provide for an Expanded Federal Program of Hazard Mitigation and Insurance Against the Risk of Catastrophic Natural Disasters, Such as Hurricanes, Earthquakes, and Volcanic Eruptions, and for Other Purposes, 103rd Cong., 1st Sess., 1993, S. 1350; U.S. Congress, House, A Bill to Amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act to Provide for an Expanded Federal Program of Hazard Mitigation, Relief, and Insurance Against the Risk of Catastrophic Natural Disasters, Such as Hurricanes, Earthquakes, and Volcanic Eruptions, and for Other Purposes, 103rd Cong., 1st Sess., 1993, H.R. 2873.
24. For an example of advocacy of federal policies that would increase mitigation but also increase federal mitigation costs see FEMA, Office of Earthquakes and Natural Hazards, Report of the Advisory Committee of the National Earthquake Hazards Reduction (NEHRP) (Washington, D.C., January 1993), p. 14. For a discussion of the need to evaluate the effectiveness of federal mitigation expenditures for reducing federal disaster relief expenditures see U.S. Congress, A Descriptive Analysis of Federal Relief, Insurance, and Loss Reduction Programs for Natural Hazards, p. 142.
25. U.S. Congress, House, Committee on Science, Space, and Technology, Subcommittee on Science, statement by William J. Petak, 102nd Cong., 2nd Sess. (August 11, 1992), p. 193.
26. In California, earthquake insurance premiums increase the costs of homeowners insurance by as much as 60 percent. See U.S. Congress, A Descriptive Analysis of Federal Relief, Insurance, and Loss Reduction Programs for Natural Hazards, pp. 106-107, citing U.S. Congress, House, Committee on Banking, Finance, and Urban Affairs; Subcommittee on Policy Research and Insurance, Earthquake Hazard Mitigation and Earthquake Insurance, Hearings, 101st Cong., 2nd Sess., September 11-12, 1990 (Washington, D.C.: Government

Printing Office, 1990), materials submitted for the record by the California Seismic Safety Commission, citing the California Department of Insurance, p. 1030.

27. Odeen, Philip A., *Coping with Catastrophe*, pp. 102-105.

28. U.S. General Accounting Office, *Disaster Assistance: Federal, State and Local Responses to Natural Disasters Need Improvement*, RCED 92-43 (Washington, D.C.: GAO, March 6, 1991), pp. 29-30.

29 OSTP/FCCSET, *Reducing the Impacts of Natural Hazards*, p. 17.

30. U.S. Congress, House, *A Bill to Revise the National Flood Insurance Program to Provide for Mitigation Insurance Coverage and Claims Payments to Reduce Damages to Structures Suffering Severe or Repetitive Flooding or Subject to Shoreline Erosion, to Promote Compliance with Requirements for Mandatory Purchase of Flood Insurance, and for Other Purposes*, 103rd Cong., 1st Sess., 1993, H.R. 62; and U.S. Congress, Senate, *A Bill to Strengthen the National Flood Insurance Program and to Reduce Risk to the Flood Insurance Fund by Increasing Compliance, Providing Incentives for Community Floodplain Management, Providing for Mitigation Assistance, and for Other Purposes*, 103rd Cong., 1st Sess., 1993, S. 1405.



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