



Grand Challenges for Disaster Reduction

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U.S. Subcommittee on Disaster Reduction

- The U.S. Subcommittee on Disaster Reduction (SDR) is an element of the President's National Science & Technology Council charged with establishing clear national goals for Federal science and technology investments in disaster reduction.
- Promotes interagency cooperation for natural and technological hazards and disaster planning.
- Facilitates interagency approaches to identification and assessment of risk, and to disaster reduction.
- Advises the Administration about relevant resources and the work of SDR member agencies.



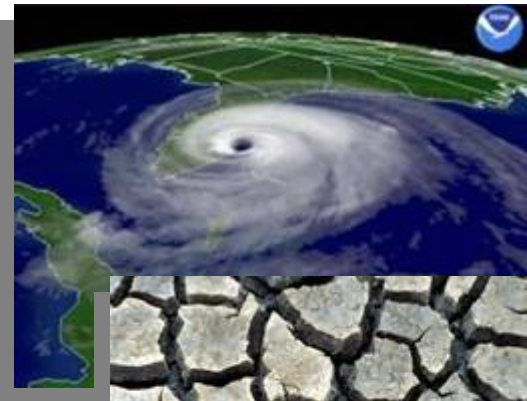
SDR Member Agencies

- Centers for Disease Control and Prevention
- Department of Defense
- Department of Energy
- Department of Homeland Security
- Department of Housing & Urban Development
- Department of the Interior
- Department of State
- Department of Transportation
- Environmental Protection Agency
- Federal Emergency Management Agency
- National Aeronautics & Space Administration
- National Geospatial-Information Agency
- National Guard Bureau
- National Institute of Standards and Technology
- National Oceanic & Atmospheric Administration
- National Science Foundation
- U.S. Agency for International Development
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. Department of Agriculture
- U.S. Forest Service
- U.S. Geological Survey
- U.S. Public Health Commissioned Corps



Framing the Grand Challenges for Disaster Reduction

Objective: To enhance disaster resilience by composing a ten-year agenda for science and technology activities that will produce a dramatic reduction in the loss of life and property from natural and technological disasters.



Grand Challenges *for* Disaster Reduction

National Science and Technology Council
Committee on Environment and Natural Resources



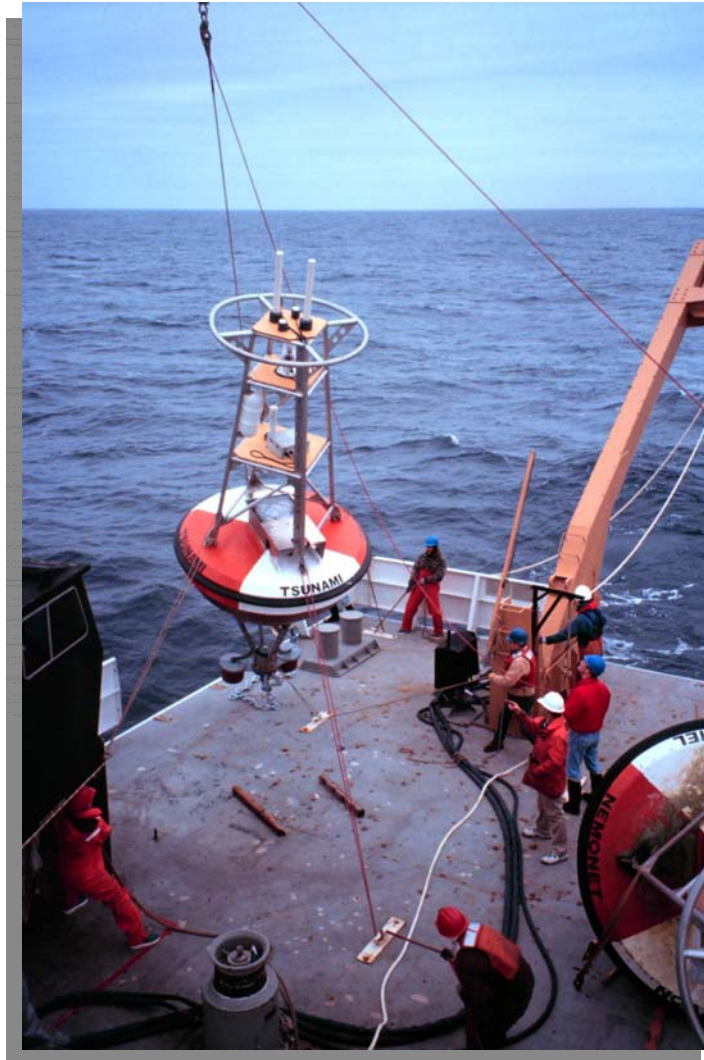
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Grand Challenge #1 Provide Hazard and Disaster Information Where and When It Is Needed.



Grand Challenge #2 Understand the Natural Processes That Produce Hazards.



Grand Challenge #3 Develop Hazard Mitigation Strategies and Technologies.



Grand Challenge #4 Recognize and Reduce Vulnerability of Interdependent Critical Infrastructure.



Grand Challenge #5 Assess Disaster Resilience Using Standard Methods.



Grand Challenge #6 Promote Risk-Wise Behavior.



Implementing the Grand Challenges

The implementation strategy for the Grand Challenges will be outlined in a series of four-page documents describing the science and technology agenda for all major types of hazards as well as critical cross-cutting topics.

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The *Grand Challenges for Disaster Reduction* is a ten-year strategy developed by the SDR. It sets forth six Grand Challenges for disaster reduction that, when addressed, will enhance community resilience to disasters and thus create a more disaster resilient Nation. These Grand Challenges require sustained Federal investment as well as collaborations with state and local governments, professional societies and trade associations, the private sector, academia and the international community to successfully transfer disaster reduction science and technology into common use.

To meet these Challenges, the SDR has identified implementation actions by hazard. Addressing these implementation actions will improve America's capacity to prevent and recover from disasters, thus fulfilling our Nation's commitment to reducing the impacts of all hazards and enhancing the safety and economic well-being of every individual and community.

What's at Stake

Definition and Background. A heat wave is a prolonged period or warm season temperatures well above normal for the area, often accompanied by high humidity. Heat waves can persist from a couple of days to several weeks and are often accompanied by periods of little or no rain and, in cities, by poor air quality. Heat waves are among the most deadly of all weather events.

Impacts. Although extreme events such as hurricanes, tornadoes, and floods make headlines for widespread physical destruction and heavy loss of life that can occur, more than 8900 deaths were directly attributed to excessive heat from 1979 to 2002 in the United States¹ and thousands more died as a result of heat-related causes.² In the summer of 1980, approximately 1700 deaths were directly attributed to persistent and oppressive heat that affected the East and Midwest. The Midwest heat wave of 1995 killed at least 465 people in Chicago alone.³

Heat wave impacts are widespread. While a large number of deaths may not occur in a single city every year, the cumulative impacts across broad regions over several days to weeks can result in heavy loss of life.

In an average year, 175 Americans die from the direct effects of extreme heat⁴ due to a combination of factors such as failure to take adequate precautions, high humidity, lack of adequate ventilation or air conditioning, poor health and old age. Many more hundreds of deaths are associated with excessive heat attributed to heart attack, stroke, and also respiratory stress. Most deaths occur in urban areas where concrete, asphalt and physical structures raise temperatures in urban heat islands, and nighttime temperatures remain above average.

Heat waves also impact farming and ranching through loss of cattle other livestock. The 1999 drought in the U.S., associated with unusually warm temperatures, led to farm net income losses of approximately \$1.35 billion.⁵ About 25 percent of United States' harvested cropland and 32 percent of the pastureland were affected.

Transportation is impacted by highway and railway buckling, and mechanical failures to trucks and railroad locomotives. Heat waves also can lead to water and electricity shortages.



HEAT WAVE

A report of the Subcommittee on Disaster Reduction (www.sdr.gov)

An element of the National Science and Technology Council (NSTC)

Implementation topics

Grand Challenges implementation plan topics include:

- Coastal Inundation
- Drought
- Earthquake
- Environmental/Public Health Hazards
- Fire
- Flood
- Hurricane
- Landslide
- Technological Hazards
- Tornado
- Volcano
- Winter Storms



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A DISASTER RESILIENT AMERICA

In accordance with the legislation, a coordinated Federal effort, in cooperation with other levels of government, academia, and the private sector, will improve the understanding of vulnerabilities and their impact, and develop and encourage implementation of cost-effective mitigation measures to reduce those impacts while providing emergency resilience. — Executive Summary, Workforce Impact Reduction Implementation Plan

The Subcommittee on Disaster Reduction (SDR) is an element of the President's National Science and Technology Council and facilitates national strategies for reducing disaster risk and losses that are based on effective use of science and technology.

Mitigating natural and technological disasters requires a solid understanding of science and technology, rapid dissemination of research information etc. Disaster reduction programs and applications, and efficient access to disaster information available from both public and private entities. Chairman SDR, the SDR provides a unique federal forum for information sharing, development of collaborative opportunities, formulation of science and technology-based guidance for policy makers, and dialogue with the U.S. policy community to advance informed strategies for managing disaster risk.

To develop a ten-year strategy for disaster reduction through science and technology, the members of the SDR collaborated with scientists and engineers worldwide to identify a suite of Grand Challenges for disaster reduction. This document presents six Grand Challenges for disaster reduction and provides a framework for prioritizing the related Federal investments in science and technology. Addressing these Grand Challenges will improve America's capacity to prevent and recover from disasters, thus fulfilling our Nation's commitment to reducing the impacts of hazards and enhancing the safety and economic well-being of every individual and community. — Dr. John H. Marburger, III, Director of the Office of Science and Technology Policy and Science Advisor to the President

Tsunamis are low probability but high impact events, and the Indian Ocean tsunami of December 26, 2004 demonstrated international vulnerability. Over the past year investments in tsunami detection and warning have made individuals safer in their homes and places of work. Working with our national and international partners, we also produced the national plan for tsunami risk reduction to provide a framework for ongoing federal investment in activities that will continue to reduce risks to life and property. — Dr. John H. Marburger, III, Director, Office of Science and Technology Policy

Website maintained by the White House Environmental Affairs Data and Information Service

<http://www.sdr.gov>