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**Disasters and Coastal States:  
A Policy Analysis of Presidential  
Declarations of Disaster 1953-97**

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A Policy Analysis of Presidential  
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by

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## **Background and Project Relevance**

From 1953, the year the first presidential disaster declaration was issued, to September 1989 the United States never experienced a disaster costing more than \$1 billion in federal relief funds. Since September 1989, the U.S. has suffered ten major disasters, each exceeding \$1 billion in federal relief costs. Most of these disasters have struck coastal zone states. Since 1953 there have been about 2000 gubernatorial requests for presidential declaration of major disaster or emergency. About one-third of these requests were denied by the president (Eisenhower to Clinton).

The record of disaster experience of coastal zone states is important, but seldom analyzed. This study investigates the 44 year history of presidential disaster declarations for America's 30 coastal zone states and nine commonwealth or trust territories. For purposes of contrast all 20 inland states and the District of Columbia are included in the analysis. Based on data compiled from FEMA, NOAA, and other federal agencies, and on additional data collected, it tracks the record of natural and man-made disaster incidents involving gubernatorial requests for presidential disaster declarations.

The only other researcher who has attempted to analyze presidential disaster declarations is Prof. Allen K. Settle (1990). An immense body of scholarship exists regarding individual disasters or types of disaster incidents, but few have inspected the record of presidential declarations of major disaster and emergencies.

### **Objectives and Description**

Among the purposes of this investigation are, to review disaster frequency, type of primary incident or agent which caused the disaster, magnitude of loss, and federal disaster relief spending in coastal zone states and territories and across the nation as a whole; to examine the record of approvals and turndowns for coastal state governors/governments seeking presidential disaster declarations; to provide detailed GIS displays of coastal state disaster experience for the purpose of promoting multi-hazard disaster mitigation; to compare coastal zone state disaster experience with inland state disaster experience; and to statistically analyze the variables which seem most important in explaining declaration approvals and turndowns.

August 19, 1994, after seven months of meetings and negotiations with very kind and patient U.S. Federal Emergency Management Agency (FEMA) data managers, this researcher was able to secure two diskettes of disaster management information. They provided a comprehensive database for all declared major disasters (est. 1200), all declared emergencies (120), all fire suppressions (108) and all turndowns of gubernatorial requests (680) for each type of declaration dating from May 1953 through August 18, 1994. This preliminary (pre-Sea Grant) work involved approximately one year of organizing the data into an SPSS formatted file(s) and the addition of variables regarding state population and population change 1950 census to 1990 census inclusive. Also added was land area and more demographic data. During the period of data base construction and statistical analysis, an ArcView/ArcInfo GIS mapping capability was incorporated.

FEMA officials provided new data to this researcher in June 1997. That information added cases from 8/1994 to 6/1997 and updated cost information for all presidentially declared disasters since 1989. Incorporating this new data into the study was extremely demanding work. On top of this, it was determined that Excel97 (the format the new FEMA data was provided in) was a more superior analytic tool than SPSS. Consequently, tabular analysis in this study was done through Excel97.

The Color Chart Appendix at the back of this report contains ArcView GIS maps done by FEMA region, four per region. FEMA has 10 standard federal regions. ArcView GIS work was the most labor intensive component of this project. It required eight to ten hours of work per week under a team system in which this researcher, his research assistant and a member of the Academic Computing Staff met every Tuesday and Thursday from February 1, 1997 to June 15, 1997. Meshing the FEMA database with ArcView GIS FIPSE codes, down to county level, was extremely arduous and complicated work. It increased the case base by a factor of five since the new unit of analysis in ArcView became counties rather than gubernatorial declaration requests. Over 10,000 cases were run covering all 50 states and the results were configured into color maps. This required extraordinary amounts of computer space. Slight disparities between X-terminal color codes and laserjet color printer codes also complicated map production.

The maps contained in this report are in many ways unique. The federal government, through contractors such as [Michael] Baker Engineering, has generated similar color maps of county

disaster declaration histories, but their analysis does not provide state-county declaration history distinctions or the variety of themes incorporated in maps produced here.

My variable list for this analysis includes three separate descriptors regarding the type and nature of each disaster event for which a gubernatorial request was made. In essence, gubernatorial request is the standard unit of analysis (except in county level study) and about 2/3rds were approved and 1/3rd turned down by the president in office at the time of each request. FEMA slowly and reluctantly supplied cost information on approved requests. FEMA officials surrendered a hardcopy printout of federal relief costs (with category of aid type) for every approved request in my data set. After two weeks of numeric data entry federal disaster relief costs for the complete pool of approved requests (1428) was finally tabulated and statistically merged and analyzed. Initial cost data reflects status through August 18, 1994 but this project incorporated newer, updated FEMA disaster relief cost information through May 1997.

This new data was not received until all the ArcView map building had been completed using the 1994 data. In other words, the maps are based on findings up to August 18, 1994. However, the FEMA data for the interval August 18, 1994 to June 16, 1997 was included in Excel97 tabular, pie chart, and graph analyses used in this study.

### Methodology

Hypotheses which were tested include:

1. Coastal zone states receive disproportionately more presidential disaster declarations (all types) than non-coastal states, with control for population and land area.
2. Coastal zone states receive disproportionately more presidential disaster declarations for major disaster (first) and emergencies (second) than non-coastal states, with control for population and land area. [Note that the original proposal included fire suppressions, which relates basically to forest fires which threaten urbanized areas. Since presidents do not issue fire suppression actions and because fire suppressions usually - in FEMA funding - generate modest to zero dollar funding, the PI decided to omit fire suppressions from this analysis.]

3. Coastal zone states receive disproportionately more federal disaster relief assistance than non-coastal states, with control for population first, land area second, and both population and land area third.

4. Coastal zone states experience more flood disasters which earn presidential declarations than do non-coastal states, when controlling for population and population rank and when controlling for land area.

5. For coastal zone states as a group, ocean shoreline counties are more likely to be included as disaster declared counties in presidential declarations than are inland or estuarine counties in the same state, with control for county population and county land area.

6. A greater percentage of gubernatorial requests for presidential declarations will be approved for coastal states, than for non-coastal states, with control for population and land area. The assumption is that coastal states, owing to greater disaster experience, are better able to fashion and expeditiously file declaration requests than are relatively less disaster experienced non-coastal states.

7. Coastal states are more likely than non-coastal states to receive a disproportionate share of federal infrastructure (Public Assistance) repair and replacement funds, with control for population and land area differences, owing to greater infrastructure-damaging disaster experience in coastal states. The same hypothesis may be tested for coastal state counties based on format of hypothesis #5 above.

8. Coastal states are more likely than non-coastal states to experience a greater variety of different types of disaster incidents, with control for population and land area differences.

9. Per capita federal disaster relief assistance is greater for coastal states than non-coastal states, with control for population and land area, owing to relatively greater disaster devastation and frequency in coastal states.

10. U.S. commonwealth and trust territories are likely to have measurably greater per capita federal disaster relief costs than coastal states first, non-coastal states second, and all 50 states third, owing to greater hurricane and typhoon vulnerability.

11. The longitudinal increase in gubernatorial requests for presidential declarations of all disaster types will be greater for coastal states than for non-coastal states.

12. Correspondingly, the longitudinal increase in federal disaster relief costs under presidential declarations of all types will be greater for coastal states than for non-coastal states.

This study involved statistical and graphical analysis of all states and their counties with respect to disaster experience by type of incident, by standard federal region, by type of federal program assistance, by presidential administration, and by year. The work represents a summative policy analysis and it included use of GIS through ArcView/ArcInfo to furnish spatial renderings of disaster and emergency experience.



## **Chapter 1**

### **Essentials of Disaster Policy in the U.S.**

These are the fundamental definitions U.S. policy makers use in discussing presidential declarations.

**MAJOR DISASTER** means any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm or drought), or, regardless of cause, any fire, flood, or explosion in any part of the United States, which, in the determination of the president, causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of states, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

**EMERGENCY** "means" any occasion or instance for which, in the determination of the president, federal assistance is needed to supplement state and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

There is usually a \$5 million federal spending cap on emergencies. Incidents which require more than \$5 million in federal assistance ordinarily require a request for MAJOR DISASTER. **EMERGENCY ACTIONS** involve emergency work essential to save lives and protect property and public health and safety performed under Section 306 of the Disaster Relief Act of 1974 (U.S. Senate, Bipartisan Task Force on Funding Disaster Relief, 1995).

#### **Disaster Frequency and Costs**

Disasters and emergencies impose numerous kinds of costs on the individual, the society and the nation. Monetary or economic damages are an explicit part of disasters and emergencies, but disaster's social and human costs may also be severe. From a social perspective, the loss of human life and the suffering resulting from loss of life, loss of home, security, etc., has the potential to be greater than economic loss. Moreover, environmental costs in terms of the loss of land and ecosystems in general, or more accurately the irreversible change in land and ecosystems (which may never truly be restored), are also part of the metric of disaster loss. In recent years, as the number and magnitude of disasters and emergencies has increased, these forms of disaster cost have risen as well.

Why the increase in disaster incidence and cost? Natural cycles, meteorological anomalies, plate tectonics associated with seismic and volcanic activity, El Nino Pacific currents, and even alleged "global warming's" impact on climate change and sea level rise have been a few of the factors challenging scientific investigation and prediction. Compounding natural factors are social factors.

(1) Increasing Population Density: The population of the U.S., like that of the entire world, increases every day. More people live in major metropolitan areas and are thus vulnerable to disaster events.

(2) Increased Settlement in High-Risk Areas: More people reside in coastal areas which are hurricane prone and in earthquake prone areas, because of favorable climates and the availability of work.

(3) Increased Technological Risks: Large-scale use of hazardous chemicals in production processes and aircraft that carry larger numbers of passengers are but two of dozens of high risk technologies that did not exist in prior centuries.

Likewise, development in flood plains, the destruction of wetlands, the over-farming of land, deforestation owing to development, the paving of roads and parking lots, etc., have all served to increase the run-off from heavy rainfall. In addition, heavy engineering of flood control works sometimes lulls communities into a false sense of security and encourages inappropriate risk-taking. Ever-expanding sewer systems raise the probability that sewage plants will be inundated by flood water and that systems will back-up, thus flooding basements and low-lying areas.

The 1990s have witnessed more human-caused disasters as well. Terror bombings such as that of New York's World Trade Center in February 1993, killed six and injured hundreds. In April 1995 Oklahoma City's Alfred P. Murrah Federal building was devastated by a terror bomb which killed 167 and injured 460. These disasters, along with natural disasters, demand more and better response capabilities, resources, and mitigation.

Common problems posed by disasters are many, and they often pose political and policy questions for elected officials.

Here are a few examples:

1. Where does liability reside? Were damaged structures more vulnerable than they should have been? Were land-use and development activities properly conducted?

2. Where is the greatest need and how should each government mobilize to address that need? Should damage assessment precede state or federal disaster declaration issuance or should assessment be made after-the-fact? If governments respond too slowly and methodically they are accused of "foot-dragging" and incompetence. If governments respond too swiftly without following established procedure, they will be accused of waste, political favoritism, and bias.

3. When is the disaster over? Localities, businesses, and individuals receiving disaster aid, or eligible to apply for disaster aid, never really want help to end. Many would prefer to receive generous government help years after the disaster incident. If government keeps the books open on a disaster too long, abuse and over-spending of taxpayer monies become more likely and problems of fairness ensue. If government closes the books on a disaster too soon, deserving disaster victims may be denied the help they need owing to application problems they may not be responsible for. Political representatives may complain in seeking satisfaction for aggrieved constituents.

### **Terminology and Disaster**

Certain important terms must be understood and here are a few more essential terms shared by disaster sociologists and emergency managers:

**Hazard:** A condition with the potential for harm to the community or environment. Many use the terms "hazard" and "disaster agent" interchangeably. Hence, they refer to "the hurricane hazard" or even more broadly to "natural hazards" - which includes hurricanes, tornados, earthquakes and other natural phenomena that have the potential for harm. The hazard is the potential, the disaster is the actual event.

Americans tend to speak of three types of hazard:

1. **Natural Hazards:** Naturally caused events such as hurricanes, tornados, earthquakes, floods, volcanos and forest fires.

2. **Technological Hazards:** Typically human-related hazards such as nuclear power plant accidents, industrial plant explosions, aircraft crashes, dam breaks, mine cave-ins, pipeline explosions and hazardous material accidents.

3. **Conflict Hazards:** War, acts of terrorism, civil unrest, riots, and revolutions.

"Natural" disaster and "technological" disaster are neither neat nor mutually exclusive categories. Technological disasters are usually inferred to be human-caused (i.e., oil spills, hazardous materials accidents, certain structural failures, civil disorders, terrorism, etc.) However, natural disasters (i.e., earthquake, hurricane, tornado, flood, severe storms, drought, etc.) are sometimes made worse due to human activity of some sort (i.e., arson caused forest fires, snow induced structural collapse attributable to inferior roof design, housing development between a dune line and the ocean, poor agricultural techniques which can exacerbate drought or flood conditions, etc.).

Natural disaster and technological (man-made) disaster are sometimes useful designations, but human behavior can sometimes create conditions which convert relatively harmless natural events into disasters. Disaster risk and vulnerability are useful concepts to help make this connection.

The following points are illuminating:

- There are about 10,000 reported avalanche incidents annually.
- There are over 80,000 dams in the U.S., and more than 20,000 have been rated as hazardous, with 10,000 of these rated as "high-hazard."
- The 1994 Northridge earthquake resulted in 57 deaths and more than \$20 billion in damages. Every U.S. state is at risk from earthquakes, with the risk running from minor, through moderate, to severe. Earthquakes pose a significant risk in 39 states.
- On average there are about 6,000 deaths, 30,000 injuries, and about \$8 billion in damages annually in the U.S. caused by structural fires.
- Every state is at risk from flooding, and some 21,000 communities face significant flood risk. The 1993 Midwest Floods resulted in \$15-20 billion in losses. Annual flood damage is on the order of \$4 billion.
- In 1992, Hurricane Andrew resulted in \$30 billion in damages in Florida and Louisiana. More than 50 million Americans live near hurricane-prone coastlines.
- The estimated annual loss from subsidence incidents exceeds \$125 million annually. (A subsidence is a vertical displacement or downward movement of a generally level ground surface.)

- Every state is at risk from tornados. In February of each year, when tornado danger begins to increase, the center of maximum frequency lies over the central Gulf States. Then, during March, this center moves eastward to southern Atlantic states, where tornado frequency reaches a peak in April. During May, the center of maximum frequency moves to the southern Plains states and, in June, northward to the northern Plains and the Great Lakes areas and as far north of western New York state.
- The Mount St. Helens volcano in 1980 resulted in 60 deaths and \$1.5 billion in damages. The nation's most active volcano areas are in Hawaii and Alaska.
- Every state is at risk from wildfires, though California and the Northwest are especially vulnerable. More than 9,000 homes have been consumed by wildfire in the last decade. The record year for wildfire damage was 1996 when some 84,200 fires burned an estimated 5 million acres. The previous record was 1994 when 79,000 wildfires were reported (U.S. Senate, Bipartisan Task Force Report, 1995, Sec. 1, pp. 1-16).

The four phases of emergency management encompass:

1. MITIGATION - Deciding what to do where a risk to the health, safety and welfare of society has been determined to exist; and implementing a risk reduction program. It involves minimizing the potential adverse effects of hazard agents. It may also be any cost-effective measure that will reduce the potential for damage to a facility from a disaster event;
2. PREPAREDNESS - Developing a response plan and training first responders to save lives and reduce disaster damage, including identification of critical resources and the development of necessary agreements among responding agencies; both within the jurisdiction and with other jurisdictions;
3. RESPONSE - Providing emergency aid and assistance, reducing the probability of secondary damage, and minimizing problems for recovery operations; and
4. RECOVERY - Providing immediate support during the early recovery period necessary to return vital life support systems to minimum operational levels, and continuing to provide support until the community returns to normal (Petak, 1985, p. 3).

America has an ongoing system intended to guide the governmental response to all natural disasters. Under the U.S. system, the process works from the bottom up. It begins at the local level and follows a series of pre-specified steps up through the state and ultimately to the national government. Local, state, and national governments are supposed to share their emergency management responsibilities. The higher levels of government are not intended to supersede or replace the activities of the lower levels. All three levels of government are supposed to develop coordinated, integrated emergency management procedures, and they should all participate in the process of implementing disaster-relief policies.

The federal disaster relief funding spending percentages of recovery (73%), mitigation (22%) and combined preparedness and response (5%), are illuminating. These figures highlight the need to promote more mitigation, preparedness, and response. The U.S. Senate's Bipartisan Task Force Report (1995) discloses that 54% of funding in the period measured has gone to grants for disaster victims and communities, as well as to payment of operating expenses of federal disaster response programs.

Despite the remarkable upturn in federal disaster spending, federal efforts are supposed to SUPPLEMENT the efforts of others. Most disasters do not involve the federal government. Local and state governments shoulder primary responsibility for managing emergencies. The federal role has increased since mid-century. Federal agencies, particularly FEMA, stimulate and guide emergency planning efforts, furnish substantial response and recovery funding, coordinate response efforts after (and sometimes before) a governor secures help from the president, and fund many disaster mitigation endeavors.

American governmental chief executives, despite what many people believe, cannot often exercise direct power, but must share power with others. Presidents and governors work as chief executives. They usually play a larger role in policy development than in the implementation of policy.

## **PRESIDENTIAL SOURCES OF POWER**

### **EMERGENCY POWERS**

These refer to the actions that the president may exercise on extraordinary occasions such as in the case of a rebellion, epidemic, labor strike, or disaster. Although no specific emergency powers were included in the Constitution, the president's oath of office requires him to "preserve, protect, and defend" the Constitution, as well as uphold its provisions. Presidents may claim in times of crisis that the Constitution permits them to exercise powers usually granted to the legislative or judicial branches of government, fusing all governmental power in the executive branch for the duration of the crisis.

The principal authorization of emergency powers for the president resides in Article II, Section 3 of the Constitution which states in part that "he shall take care that the laws be faithfully executed," and Section 2 which grants him power as Commander-in-chief of the armed

forces. President Lincoln justified the actions he took after the outbreak of the Civil War by claiming that the emergency made it necessary for him to exercise legislative powers until he could call Congress back into session. President Franklin Roosevelt threatened that unless Congress repealed a certain provision in a wartime economic measure, he would treat the law as if it had been repealed for the duration of the emergency, in effect threatening Congress with the loss of its legislative powers.

Overall, emergencies have helped to develop the use of these otherwise dormant powers as well as the novel application of ordinary powers. Although the National Emergency Powers Act of 1976 sought to limit past emergency powers that had been granted to the president via precedent, presidents still exercise vast emergency powers. Presidents retain the power to do what they want under the rubric of emergency powers until they are checked by one of the other branches of government. Checks and balances go a long way toward discouraging the president from abusing use of presidential emergency (the Supreme Court may declare certain emergency actions unconstitutional).

#### OTHER DIRECT SOURCES

1. Presidential personnel appointment powers of key departmental officials, as in Schedule C appointments, or in impaneling of special commissions and task force units. [Schedule C appointments fall outside federal civil service methods of recruitment and selection. Senior politically appointed federal executives need loyal staff help and Schedule C posts are often filled by workers who understand they are on temporary assignment, and they themselves may owe their appointment to their political service or to some special expertise they possess.] The president's appointed executives assume responsibility for both public management and promotion of their appointing president's policy initiatives.
2. Role in executive budget formulation, preparation of president's budget request for the next fiscal year.
3. President's ability to screen agency legislative proposals and to review and assess proposed regulations of federal executive agencies.
4. President has significant powers to reorganize executive branch agencies, subject to possible overrulings by a majority vote of either the House of Representatives or the Senate.
5. President has some control over the information which executive agencies under his direction supply to the Congress. This is especially the case in the area of national security, national defense, intelligence matters, and other areas involving restricted data.

#### INDIRECT SOURCES

1. The strength of the United States as a political and economic force in the world.
2. The president's own leadership style and personality.
3. The president's ability to seize initiatives and to exercise emergency powers in crises.
4. The legitimacy of the institution of the presidency in persuading others to take some course of action.
5. The president can veto bills passed by the Congress.

### Presidential Declarations of Major Disaster or Emergency

A PRESIDENTIAL DECLARATION of major disaster or emergency has far reaching consequences because it opens the door to federal assistance. The declaration specifies one or more political jurisdictions; it delineates exactly who is eligible for relief in the first place. The presidential declaration also contains an initial statement about the kinds of assistance that will be provided. This is extremely important because it determines whether disaster victims will receive direct cash grants, housing supplements, emergency medical care, etc. It also specifies whether or not state and local governments themselves are eligible to receive federal disaster assistance to replace or repair public facilities and infrastructure and certain non-profit facilities.

The presidential declaration is also vitally important to those directly affected by the disaster or emergency. It confers on them an "official" victim status needed to qualify for federal aid. To the general public, especially those not directly affected by the disaster, the president's declaration is a significant piece of information as well. At a rather basic level, it signifies that a major event has occurred, requiring the attention and resources of the federal government. In this manner, the content of the presidential declaration structures popular perceptions about the nature and scope of the disaster.

### Declaration Process

Under customary procedure, the president must be asked by a governor to declare a major disaster or emergency. However, the Stafford Act of 1988 and preceding laws, empower the president to declare a major disaster or emergency before a governor asks for one or in the absence of a governor's request altogether. The term, "White House Package" conveys some useful information about the process and about the information the president may choose to



consider before deciding whether to "approve" or "turndown" a governor's request for a declaration.

WHITE HOUSE PACKAGE refers to the documents prepared for the President's action on a Governor's request for a major disaster or emergency declaration. The package includes the governor's request and contains a memorandum from the FEMA Director to the president which summarizes significant aspects of the event, presents statistics relative to damage and losses, outlines the contributions made by federal, state, local and private agencies, highlights unmet needs for which the governor seeks federal assistance, and presents a recommended course of action for the president. Based on the recommendation, the package also contains appropriate letters and announcements related to the action to be taken (either a declaration or a turndown).

A TURNDOWN is referred to as the action authorized by the president and signed by the FEMA Director which denies a governor's request for a major disaster or emergency declaration.

History demonstrates that since the first presidential disaster declaration was issued in 1953, until 1994, about 1 in every 3 governor requests have been turned down by the president. The record since 1988, following adoption of the Stafford Act, demonstrates that governors have about a 1 in 4 chance that their request will be denied. In other words, since 1988, the odds a governor's request will be approved by the president have risen. Certainly, the broader authority to judge what is or is not a disaster under the Stafford Act has provided presidents since 1988 with more latitude to approve unusual or "marginal" events as disasters or emergencies. This may be one reason for the higher governor request success rate since 1988.

#### Criteria and Declarations

In examining the issue of presidential declarations, it is important to recognize that **the federal government has never developed or employed a set of objective criteria by which to approve or deny gubernatorial requests for presidential declarations of major disasters or emergencies.** Governors, assisted by their state emergency managers, petition the president for declarations through FEMA region offices to FEMA headquarters, with the close involvement of the FEMA Director. Each governor knows that he or she must prove to FEMA and the president that the disaster or emergency, of whatever nature, is beyond the state's ability to adequately respond so that federal assistance is needed. However, it is difficult, if not impossible, for

FEMA officials to ascertain that an event warrants a presidential declaration unless Preliminary Damage Assessments (PDAs) are first conducted and analyzed or unless media coverage of the event makes it obvious a major disaster has occurred. Moreover, it is difficult to judge whether state and local areas can recover on their own if disaster damage has not yet been assessed.

Furthermore, since enactment of the Disaster Relief Act of 1970, the definition of disaster has been expanded to include not only major disasters **but also emergencies**. In 1988, new categories of emergency were approved in law. Today the term "emergency" is used to define any event determined by the president to require federal assistance as stipulated by the Disaster Relief and Emergency Assistance Amendments of 1988. As noted previously, emergencies are usually of less magnitude and scope than major disasters and federal aid is capped at \$5 million. Emergency designations, more than major disaster designations are likely to stretch the rule that states must lack the capacity to recover on their own to qualify for a presidential declaration. In times when state and local budgets are tight or in deficit, and some incident occurs, emergency offers a flexible category for help. FEMA records disclose that snowstorms, windstorms, minor flooding, and drought are the most common types of emergency declarations. Emergencies also allow politically subjective determinations to come into play.

Another important area in which politically subjective determinations come into play is with respect to **marginal disasters**. Marginal disasters are those events that are of far less than catastrophic, that are not matters of national security, and that are near or within the recovery capacity of the state or states in which they occur. Researcher Richard Sylves claims from his analysis of 42 years of presidential disaster declarations that there have been hundreds of marginal disasters, some granted a presidential declaration and some denied approval. Specific case examples indicate that there are definite losers in the competition for presidential declarations. For example, in 1980, Florida experienced flooding after a dam failure and was denied a declaration. In the same year Oklahoma, asked twice within a two-week period for a declaration to cover devastation from severe storms and flooding, but was denied both times.

The record of approvals and turndowns raises questions about how gubernatorial requests for presidential declarations are considered, particularly for marginal disaster denials. Since there were no objective criteria governing approvals and turndowns, only the president who received the request knows the reasoning in each case. FEMA, for example, does not keep records of

fatalities in disaster incidents. Consequently, it is not possible to ascertain from government records whether or not fatalities played a role in the president's decision. The FEMA Director may make recommendations to the president that a request be turned down because it does not fit within the Stafford Act's general criteria of eligibility, yet the ultimate decision resides with the president.

This invites political subjectivity into presidential decision-making. Governors also play the game by seeking presidential declarations for drought, crop failures, minor wildfires, small floods, beach erosion, and a wide range of other calamities that cannot be considered catastrophes, major disasters, or emergencies under the "beyond the capability of the state/local government to adequately respond." Table 2-A shows that for all the gubernatorial requests for presidential declarations (including major disasters, emergencies, and fire suppressions), about 66.2% are approved and 33.8% are turned down. This covers the entire time span of presidential declarations from May 1953 to May 1997. Those records of approvals and turndowns contain many possible candidates for marginal disaster declaration. Examining 1980 again, Missouri received \$137,182 in federal aid under declaration #620 for severe storm and tornado damage. Maine was also granted \$385,610 in emergency declaration #3082 for local fishing interests that were suffering under the effects of red tide induced toxic algae in their fishing grounds (Sylves and Waugh, 1996, p. 33).

#### Politics and Declarations

According to FEMA Director James Lee Witt, each event or incident is evaluated individually on its own merits. Criteria set forth in the Stafford Act for evaluation are:

- (1) **the severity and magnitude of the incident;**
- (2) **the impact of the event; and**
- (3) **whether the incident is beyond the capabilities of the State and affected local governments.**

Overall, the process and criteria are purposely subjective to allow the President discretion to address a wide range of events and circumstances. FEMA Director Witt states that there are no definitive objective evaluators that could be used in the declaration process, although he recommends that FEMA endeavor to establish some. Without such objective criteria, governors and their state disaster officials have little to guide them in estimating whether to go ahead with a

request for presidential declaration of major disaster or emergency. They have little basis for concluding in advance whether their petition for a presidential declaration will be approved or denied. However, as long as a governor or other state officials know that the state can afford to shoulder the 25% share of the 75/25 federal aid formula contained in a presidential disaster declaration, they have an incentive to request a federal declaration. State officials logically minimize their own capacity and capability to address disaster in petitioning for federal help by crying poor.

### Media Coverage and Electoral Issues

Over the past 20 or more years, presidents have taken a greater interest in disasters, particularly major ones. President Carter issued a presidential disaster declaration while over flying Washington state's Mt. St. Helens volcanic eruption; President Reagan was photographed shoveling sand into a gunnysack on the banks of a flooding Mississippi River; President Bush was filmed commiserating with victims of the Loma Prieta earthquake in a heavily damaged San Francisco neighborhood; and, TV showed President Clinton at shelters and inspecting freeway damage in the days after the Northridge earthquake. Today, Americans expect their president to both dispatch federal disaster help and personally visit damaged areas. It is now customary for most of the president's cabinet, especially officials heading disaster-relevant departments, to visit major disaster sites.

Such visits have both political and administrative consequences. The Bush administration's awkward handling of the Hurricane Andrew disaster in south Florida, despite the benefit of a presidential visit to the devastated areas, was alleged to have nearly cost Bush Florida's electoral votes in the 1992 election. California, another state that has had a disproportionately large number of disasters and emergencies over the years, has 54 electoral votes (more than any other state), one fifth the total needed to win the presidency. These factors do not go unnoticed in the White House. How presidents manage disasters, and how responsive they are perceived to be to the needs of victims, has far-ranging political and electoral consequences. This underlines the importance of the role of the FEMA Director: how well the Director manages their agency's response to disaster is of great political importance to the President and his staff (Sylves and Waugh, 1996, p. 27).

The Clinton administration, like others before, appreciates the role the news media have in covering disasters. Both Pres. Clinton and current FEMA Director James Lee Witt have emphasized post-disaster public relations, in part because they believe the President's public image is at stake in disaster circumstances. The public requires reassurance that federal leaders are doing all they can to help disaster victims. How the FEMA Director and their staff manage the federal response, and how they portray this effort to the media, shapes public opinion of both the presidency and the agency. Major disasters customarily pull the nation together, encourage a centralization of authority, and often improve the president's approval ratings in public opinion polls. For example, after the Northridge earthquake, President Clinton, usually accompanied by FEMA Director Witt, visited the damaged areas where he met with victims, emergency responders, and state and local officials. Such activity promotes public awareness of the disaster across the state, nation, and world. It underscores the legitimacy of the government's response and it may convey a greater sense of urgency to responders and to those considering the offer of help.

#### White House Organization

The White House staff consists of key aides the president sees daily - the chief of staff, congressional liaison people, press secretary, national security advisor, and a few other political and administrative assistants. Actually there are about 600 people who work on the White House staff who the president rarely sees but who provide a wide range of services.

Most presidents rely heavily on their staffs for information, policy options, and analysis. Different presidents have different relations with, and means of organizing, their staffs. President Carter was a "detail man" who poured endlessly over memoranda and facts. President Reagan was the consummate "delegator" who entrusted tremendous responsibilities to his staff. President Bush fell somewhere between the Carter and Reagan extremes and was considerably more accessible than President Reagan. President Clinton, like Carter, is a detail man, but someone who has also run an open White House with fluid staffing (Lineberry, 1995, pp. 312-313).

In any disaster or emergency, many of these offices are likely to engage in facilitating the president's work. Clearly, within the Political Offices, all units of the Communications office

would be tasked, especially the Press Secretary. Intergovernmental Affairs and Public Liaison would also be heavily involved.

Also helping the president, within the Policy Offices domain, the Domestic Policy Council and Cabinet Affairs would most likely take on emergency or disaster management duties. Support Services would probably call on Scheduling and Advance if the president were to make arrangements to visit the disaster area. Secret Service, Military and Medical may also play roles.

Remember that various White House offices and officials come and go with the passage of time and the change of president.

In the past, the White House staff and other administration officials have stepped in to fill post-disaster power vacuums. For example, President Bush assigned John Sununu, his White House Chief of Staff, the job of leading the federal government's response to the Loma Prieta earthquake (in part because FEMA only had an acting Director at the time). Some three years later, Bush asked Transportation Secretary Andrew Card to lead federal response to Hurricane Andrew. President Bush also left the FEMA Directorship vacant for months, suggesting that he did not trust FEMA Directors to handle Executive Branch leadership in these circumstances. Rotating federal disaster leadership among disaster management inexperienced White House staffers and cabinet secretaries may produce inefficient and parochial outcomes.

This seems to have been addressed in the Clinton administration due to the unique relationship between the President and the current FEMA Director, James Lee Witt. Thus far, President Clinton seems to trust his former Arkansas emergency management director, Mr. Witt, with central federal emergency management responsibility.

President Clinton has added the FEMA Director as a participant in his Administration's weekly Cabinet meetings. This has helped communicate to Cabinet officials that the President values emergency management and has facilitated the FEMA Director's ability to coordinate government-wide support for disaster activities. This is crucial because, FEMA, relative to many bigger and more politically powerful federal departments and agencies must lead through its ability to maintain presidential confidence and through its capacity to supervise and mediate the coordination of a host of federal, state and local organizations.

## **Early Federal Disaster Relief Efforts**

Even before the United States became an independent nation, public institutions were providing assistance to victims of natural disasters. For example, local officials helped Boston residents affected by a major earthquake in 1755. Overall, disaster relief was historically considered to be a local responsibility. In the event of a disaster, city and county officials were the ones expected to step in and help those in need. In addition, local government actions were often supplemented by the efforts of private relief agencies such as religious organizations and the American Red Cross. In general, however, there was no expectation that higher levels of government would become involved in disaster relief events.

State governments could be called in to help if local resources were inadequate but state-level organizations were for the most part ill-equipped, unprepared, and unwilling to intervene. They lacked the resources, expertise, and inclination to aid local efforts. The federal government played a role similar to that of the states, a very limited one. The federal government could be asked to step in when events exceeded local, private, and state capacities. The U.S. Congress then established the legal basis for federal intervention in 1803 when it granted special allowances to the victims of a natural disaster in Portsmouth, N.Y.

After setting this precedent, the federal government provided aid to victims of 128 disasters from 1803 to 1947. What is noteworthy is that in each case, specific legislation was passed to deal with each event. During this time, federal disaster was characterized by a lack of coordination and certainty. "There were no general policies or guidelines to shape governmental intervention, and it was never clear whether the federal government would intervene at all. Basically it responded to each disaster on a piece-meal, case-by-case basis. Furthermore, federal intervention was often politically motivated as elected officials pushed through relief proposals in order to alleviate specific disaster-related conditions in their own states and congressional districts" (Schneider, 1995, p. 19).

Aside from being motivated by CONSTITUENCY INTERESTS, governmental disaster activities were also characterized at this time as REACTIVE, with institutions providing relief only after disasters. In the 1920s and 1930s, however, some preventive measures were passed such as flood control structural mitigation. In effect, however, these early efforts were approved for political reasons, to create jobs and supply an influx of revenue in the areas where levees and

flood walls needed to be constructed and maintained. Moreover, highlighting structural solutions to disasters did not seek to prepare citizens and communities in the event of a disaster. This method of policy making continued apace into the New Deal program of President Franklin D. Roosevelt from 1933 to 1941.

In 1950, however, Congress enacted legislation to deal with both military-related and natural disaster events through the passage of the Civil Defense Act of 1950 and the Disaster Relief Act of 1950.

### **CIVIL DEFENSE ACT OF 1950**

Although federal civil defense programs had existed since 1916, civil defense against nuclear attack did not emerge as an issue until the Soviet Union detonated its first atomic bomb in 1949. In response to the start of the Cold War and the impending threat of a nuclear attack on the United States, Congress passed the Federal Civil Defense Act of 1950. At its inception, the act sought to respond to public and media fears concerning the possibility of nuclear threat. For example, the 1957 Gaither report declared that the American public was vulnerable to, and ill-prepared for, a Soviet ICBM nuclear attack. The civil defense programs set up under the act were initially designed to concentrate on plans to protect the population and government services from nuclear attack and subsequent radioactive fallout.

In keeping with these goals the program focused on EVACUATION PLANNING, SHELTERING, EMERGENCY WARNING OPERATIONS (such as the Emergency Broadcast System), and EVACUATION PLANS. As the Cold War and the arms race escalated, the construction of "fallout/bomb" shelters became an important part of this policy, reaching their peak during the Cuban Missile Crisis of 1962.

Moreover, a related program evolving from executive orders was "CONTINUITY OF GOVERNMENT," a secretive and often disputed program which attempts to safely evacuate and protect a select group of the nation's leadership during nuclear threat. This was seen as essential to assure the public and the nation that legitimate government would be maintained even in the event of a nuclear attack.

The Civil Defense Act had two major effects on disaster policy. The law acknowledged for the first time that MAN-MADE HAZARDS had reached a stage in which they could be just as,



if not more, destructive than natural hazards. This concept was later expanded to other man-made disasters such as oil spills and radioactive waste. More importantly, from a political perspective, is that civil defense against nuclear attack came to overshadow other traditional domains of disaster policy. Its mission, funding and general operations dominated the administrative agencies dealing with disaster-related issues for several decades. For example, by 1957 civil defense monies were the primary source of federal funds to subnational governments engaged in upgrading disaster and civil preparedness.

### **DISASTER RELIEF ACT OF 1950**

Congress passed the first permanent statutes for federal disaster assistance in 1947 and 1950. The 1947 legislation provided surplus property and personnel as needed and its 1950 counterpart gave the president authority to determine what type of aid was required. These measures changed the nature of disaster relief in the United States. The Disaster Relief Act of 1950:

1. Clearly stated for the first time that federal resources could and should be used to supplement the efforts of others in the event of a disaster;
2. Made federal disaster assistance more accessible since it no longer required specific legislation but simply a Presidential decision; and
3. Specified a standard process by which localities and states could request assistance.

It should be noted that the Disaster Relief Act of 1950 was not intended or initially recognized as PRECEDENT-SETTING. It was originally passed as another limited response to a particular disaster event, flooding in the Midwest, that was not intended to go beyond earlier disaster legislation efforts. Previous measures that identified responsibilities of various federal agencies in disaster circumstances began to proliferate. Only later did Congressional leaders begin to see the act as precedent-setting and as an early, general, national level disaster policy model.

It set precedents by establishing a federal policy for providing emergency relief, laying out national governmental responsibility in disasters, and transforming the intergovernmental context of disasters. In effect, it set up a framework for government disaster assistance that continues today.

The main provisions of the 1950 Disaster Relief Act have continued to have a significant influence on all legislation in the disaster policy/funding area. Congress built on the 1950 Act by passing a number of laws through the 1970s which expanded the scope of federal government

responsibility with respect to disasters. In general, aid grew from being entirely GOVERNMENT-TO-GOVERNMENT to being government-to-government and INDIVIDUAL ASSISTANCE as well. Legislation incorporated new groups (such as farmers living in rural areas) and new forms of relief (such as temporary housing, unemployment insurance and small business loans). From a political standpoint, it is important to note that this shift in aid was done in a way that effectively doled out pieces of political power to a number of governmental agencies and departments, rather than consolidating that power in one unit. For example, when individual small business loans were enacted as an assistance program in 1953, the U.S. Small Business Administration (SBA) was put in charge of administering the program. Subsequent legislation expanded SBA's responsibilities in the area of disaster loan assistance to the point that SBA's disaster loans are currently the primary form of federal business assistance for non-farm private sector disaster losses.

Moreover, the basic governmental approach to disasters shifted away from an exclusive "STRUCTURAL" CONTROL emphasis to one which included a variety of "NON-STRUCTURAL" CONTROLS. Instead of merely initiating projects designed to build physical barriers, emphasis was placed on keeping people out of hazard-prone, high-risk areas through zoning laws, building codes, and land-use regulations. Thus, public policies forced people and lower levels of government to assume responsibility for where and how they lived. Such lifestyle-changing policies, however, often created disputes between levels of government and between the government and the public. At one end of the spectrum is a growing sentiment among federal, and some state, officials that their governments should not have to "BAIL OUT" communities that do not pro-actively protect themselves from known hazards through the use of zoning laws, building codes, and land-use restrictions. At the other end are resentful local officials and citizens who see such measures as unnecessarily burdensome. They argue that these measures invade their personal freedom and are financially costly to them. Local officials fear federal encroachment into areas they perceive as their traditional jurisdiction.

### **DISASTER RELIEF ACT OF 1974**

Evolutionary change in government disaster policy continued into the 1970s and many of these changes were consolidated in the Disaster Relief Act of 1974 and the amendments soon after. The 1974 act was precedent-setting in its own right. Here are a few of its features.

1. Instituted the Individual and Family Grant (IFG) program which provided 75 percent of

the funding for state-administered programs providing cash help for furniture, clothes, and essential needs.

2. Institutionalized efforts to mitigate against, rather than simply respond to disaster events;
3. Mandated local, state, and federal agencies to develop strategies aimed at preventing disasters in the future; and
4. Stressed a multi-hazard approach to disasters, in which governmental efforts would be capable of handling all kinds of hazards, rather than being designed for particular disasters.

In establishing a new wave of federal policy, the federal government sought to focus on **INDIVIDUAL ASSISTANCE PROGRAMS, MITIGATION EFFORTS, and MULTI-HAZARD APPROACHES**. Although various laws provided temporary housing aid and other forms of individual assistance, the Individual and Family Grant program bridged the gap between public and individual assistance.

Mitigation efforts, were also institutionalized for the first time in the 1974 statute under the assumption that mitigation was a primary foundation for emergency management and would decrease costs and demands in subsequent disasters.

Finally, multi-hazard approaches to emergency management were emphasized in the testimony of government officials. They insisted that there was a great need to plan for disasters of all types. This multi-hazard or **ALL-HAZARDS APPROACH** to emergency management implicitly alleged that disaster policy up to 1974 was fragmented and pre-occupied with confronting individual disasters or types of disasters. This was most readily apparent in the division between civil defense programs and domestic emergency programs. Civil Defense programs seemed distinct from other emergency management programs and were viewed as part of the "national security structure." By emphasizing a multi-hazard or all-hazards approach, the Disaster Relief Act of 1974 inaugurated a trend toward the diminution of civil defense issues, funding, and concerns in the realm of domestic emergency management.

## **ROBERT T. STAFFORD DISASTER RELIEF AND EMERGENCY ASSISTANCE ACT, P.L. 93-288 AS AMENDED**

The principal federal authority for providing disaster relief today resides in the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Congress continued past disaster policy trends by enacting the Stafford Act as part of an effort to clarify inconsistencies in disaster laws of the past.

The law begins, "The Congress hereby finds and declares that,

1. because disasters often cause loss of life, human suffering, loss of income, and property loss and damage; and
2. because disasters often disrupt the normal functioning of governments and communities, and adversely affect individuals and families with great severity; special measures designed to assist the efforts of the affected States in expediting the rendering of aid, assistance, and emergency services, and the reconstruction and rehabilitation of devastated areas, are necessary.

It is the intent of the Congress, by this Act, to provide an orderly and continuing means of assistance by the Federal Government to State and local governments in carrying out their responsibilities to alleviate the suffering and damage which result from such disasters by -

1. revising and broadening the scope of existing disaster relief programs.
2. encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the States and by local governments;
3. achieving greater coordination and responsiveness of disaster preparedness and relief programs;
4. encouraging individuals, States, and local governments to protect themselves by obtaining insurance coverage to supplement or replace governmental assistance;
5. encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations; and
6. providing Federal assistance programs for both public and private losses sustained in disasters."

Source: Federal Emergency Management Agency, "Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended," reprinted March, 1994.

The major provisions that the Stafford Act provided for were:

1. A refinement of the definition of an "emergency";
2. An expansion of the responsibilities and obligations of public institutions during emergencies;
3. Further emphasis on the importance of mitigation and preparedness activities;
4. The establishment of a process to guide when and how the government would become involved in disaster circumstances; and
5. A delineation on how response efforts would move from the local, to the state and up to the national level of government.

Overall, the Stafford Act authorizes the president to issue major disaster or emergency declarations, sets broad eligibility criteria, and specifies the type of assistance the president may authorize. The definition of "emergency" has been a politically charged issue. EMERGENCY refers to "any occasion or instance for which, in the determination of the president, federal assistance is needed to supplement state and local efforts and capabilities to save lives and protect property and public health and safety, or to lessen or avert the threat of catastrophe in any part of the United States." This refinement of emergency clearly affords the president a great deal of political subjectivity in determining what is or is not an emergency. In effect, this subjectivity often leaves governors guessing about whether they qualify for aid and whether they should seek a presidential declaration of emergency or not.

It is also important to note that the Stafford Act is merely an expansion of the first permanent authority conferred in the Disaster Relief Act of 1950 (P.L. 81-875). That law provides disaster assistance on a continuing basis without the need for congressional action. Several components of that 1950 measure continue to serve as a foundation for the Stafford Act's authority including the following:

1. The President is given complete authority to determine that a major disaster (or emergency since 1974) has occurred and that federal aid is warranted;
2. The governor of the affected state must request federal assistance and provide assurances that state and local resources are committed;
3. Federal assistance supplements but does not supplant state or local resources;

4. The President is authorized to direct all federal agencies to provide needed assistance; and

5. The role of the voluntary sector and the need to coordinate federal efforts with those of relief organizations are recognized.

Since the passage of the Stafford Act, there have been no major legislative or statutory revisions in governmental policy, but there have been elaborations and additions. In the late 1980s, the Federal Emergency Management Agency (FEMA) began working on a new set of guidelines and directives in response to criticism. The Federal Response Plan of 1992 was the outcome. It represents a cooperative agreement between 26 federal agencies and the American Red Cross. In effect, the Federal Response Plan specifies national government's roles and responsibilities in responding to a disaster or emergency. The Federal Response Plan:

1. Serves as a blueprint to coordinate and mobilize resources in disasters and emergencies;
2. Provides greater detail concerning the roles and activities of different federal agencies during large-scale natural disasters;
3. Groups together the different types of emergency assistance available to public organization and private citizens and identifies a lead agency for each of these types of assistance; and
4. Specifies a process in which the resources of the federal government can be deployed more quickly and efficiently.

## **DISASTER LAWS AND POLICY AS A FUNCTION OF GREATER TRENDS**

In examining disaster laws and policy one needs to understand that they reflect greater overall trends in politics and policy making in the United States. Although disasters and emergencies represent unique events, government's involvement in them is similar to the way it has approached many other policy issues. This is true with respect to the nature of events as well as the governmental actions that have been designed to deal with them.

One could easily make the case that government's increased involvement in disasters is

nothing more than a manifestation of a larger trend towards GREATER PUBLIC SECTOR RESPONSIBILITIES. The U.S. has undergone a tremendous growth in terms of the size and scope of government. For example, in 1992 public expenditures were approximately \$2.5 trillion, while in 1942 they had been only about \$47 billion. In addition to spending more money, the government has also chosen to address more issues and problems while allocating more money to them.

Another similarity that disaster policy has with other public activities is the trend toward GREATER INVOLVEMENT BY THE NATIONAL GOVERNMENT relative to the state and local levels. As mentioned previously, the federal government began to play a more active role in disaster policy during the 1930s and enacted legislation in 1950 which established a basic framework for disaster policy under which the federal government was allowed to direct and coordinate efforts in the event of severe disasters. That function, and role of the federal government, was expanded through the 1970s and in 1979, FEMA was established to consolidate and coordinate those actions. The creation of this new administrative unit was a clear sign that the issue of disasters had become a permanent addition to the federal government's policy agenda.

The history of government involvement in disasters also reveals the REACTIVE NATURE OF POLICY-MAKING in this policy domain. Major disasters have often served as stimulants of change and reform in disaster policy. Although this was evident in the early history of disaster policy when aid was tied to specific legislation and done in a piece-meal fashion, it continues today. Policy expansion and clarification often continues to take place after severe disasters. This makes sense when disasters are viewed from the perspective of crises. Major disasters call for an immediate public sector response since the public wants something done immediately. In the same manner, however, these events do not sustain long-term public or governmental interest and involvement. Once action has been taken or normalcy returns, the public and government tend to move on to other matters.

Finally, the basic government approach to disaster policy is EVOLUTIONARY. At first the government was strictly reactive with respect to its policies; it took action after a disaster occurred and the extent of its action was limited and arbitrary. Current policies place more emphasis on pro-activeness, often through mitigation and preparedness measures. This change

has been one that has occurred over the course of many years. Similar to other public policy areas, the government finds it difficult to shift its focus in disaster-relief activities.

Nevertheless, ever-present INCREMENTAL decision making also continues. Past policies become entrenched and they provide the foundation for future government activity. Incrementalism is a pervasive, limiting force in governmental disaster-relief policy making. Moreover, public sentiment may deter public officials from pursuing alternative policies, those that stress more preventive strategies. People may not want the government to enact stronger and more effective building codes and zoning laws if they are believed costly or likely to inhibit lifestyles, as might occur when government prohibits development in hazard-prone areas.

There has been a shift at all levels in how the government approaches the issue of disasters. This is because policy makers and policy executors have come to agree that it is more cost-effective to prevent a disaster than to deal with its consequences. Although mitigation and preparedness programs cost money and time, they may be very cost-effective. For example, the establishment of stricter building codes and regulations in disaster-prone areas has saved millions of dollars in property losses while warning and evacuation procedures have served to prevent the loss of human life. Another reason for the shift in government approach to disaster policy is the result of changes in the definition what is a disaster. Man-made events such as oil spills [e.g., the **Exxon Valdez** spill], toxic-waste dangers (e.g., Love Canal), and chemical plant releases (e.g., the Union Carbide plant in Bhopal, India) reveal that humans are now capable of causing calamities comparable to natural disasters. As a result modern relief efforts have to anticipate these new disasters as well as the traditional ones and this has placed new demands on those charged with the responsibility for dealing with disasters.

In effect, disasters which used to cost millions of dollars and affected only a few thousand victims now commonly cost many billions of dollars and affect hundreds of thousands of victims. For example, as a result of the Northridge earthquake of 1994 in the Los Angeles, California area, some 670,000 individuals and families registered for disaster assistance.

In 1994 the federal cost of disaster relief was \$4.4 billion. In that year there were 16,272 locally declared disasters. Of this total, 299 became state declared emergencies, and 37 federally declared (generally, 2-3% of local disasters that require significant assistance by a state are



declared emergencies by the governor.) In Fiscal Year 1995 there were 28 presidentially declared disasters, the federal cost of which was over \$3 billion. The trend continues. During just the first six months of 1996, 43 major disaster declarations were issued (compared to a year like 1978, when there were "just" 9 declarations.)

After a Presidential Disaster Declaration has been issued several types of federal disaster assistance become available. Under disaster or emergency circumstances, states receive from FEMA a match supported subsidy (75/25) to provide supplemental assistance to individuals and families adversely affected. This is defined as **INDIVIDUAL ASSISTANCE**. While some forms of individual assistance such as temporary housing are managed exclusively by FEMA, others such as loans to businesses and farm loans are managed by the Small Business Administration (SBA) and the U.S. Department of Agriculture (USDA) respectively. FEMA also provides **PUBLIC ASSISTANCE** to state and local governments or certain private, not-for-profit organizations, on a 75/25 cost sharing basis, to help restore public services and to provide infrastructure support. (Note, that the president has the authority in law to increase the federal share of the match beyond 75 percent, and up to 100 percent, when he determines this to be necessary.) The agency is also empowered to fund the Hazard Mitigation Assistance program. This helps state, local and other eligible parties lessen or avert the threat of future disasters through funding projects aimed at reducing or eliminating future disaster vulnerability.

Appendices 1, 2 and 3 are provided in order to convey more information about federal, state and local emergency management respectively.

## **Chapter 2**

### **Regional Analysis and Coastal vs Inland**

Regional analysis provided a worthwhile record of the disaster histories of coastal and inland states. Regional analysis was also advisable because GIS ArcView renderings of states and counties were more visually observable (renderings of the entire nation were impractical, required over-sizing, and were of awkward scaling). The U.S. Federal Emergency Management Agency, like most federal agencies, has 10 Standard Federal Regions. The Regions, like the nation itself, vary a great deal in almost every way.

Alaska (1959) and Hawaii (1960) were the only two states admitted to the Union during the 44 year sweep of this study. Interestingly, Alaska won a series of disaster declarations during the Eisenhower Administration and shortly before its admission to statehood. Alaska is in Region X and Hawaii Region IX. Appendix 1, regarding FEMA, and Appendix 2, about states and territories, both furnish information about U.S. territories. The records of territorial presidential disaster declaration are included in tabular findings of this study but are omitted from GIS ArcView maps owing to scaling, distances and relevance. Tables referring to territories mention (Panama) Canal Zone, however, Canal Zone reverted to Panama in 1979 and no declarations ever went to the Canal Zone before 1979.

Tables 1-C and 1-D provide a good overview of the disaster history of each region. Remember, each of these tables include only presidentially declared MAJOR DISASTERS and EMERGENCIES. Fire suppressions, for reasons explained earlier, were omitted. Note that all reference to relief spending is for federal disaster relief spending from the President's Disaster Relief Trust Fund and from FEMA (and its predecessor agency accounts). All dollars are 1994 constant dollars, including those for spending in the 1995-1997 interval (updated cases added June 1997).

"Type of Disaster" in Tables 1-C and 1-D refers to primary incident type. For example, Hurricane Andrew is labeled the primary incident type in its declaration. However, that hurricane manifested itself in wind damage, inland flooding, coastal flooding (including storm surge), and even in tornado damage. In other words, the primary incident - hurricane - produced a variety of secondary and tertiary consequences. However, Tables 1-C and 1-D consider only the primary incident designation.

Chapter 1 made it clear that presidential declarations of major disaster and emergency are "only issued to states." Counties may be identified in a governor's request for a presidential declaration, but counties cannot bypass their governor/state authorities in requesting a presidential declaration. Once a state has been issued a presidential declaration, the president, usually at the governor's request, may add more counties to the original declaration.

### **Highlights of Regional Analysis**

Tables 1-C and 1-D unearth some striking findings about the number and costs of presidential declarations by incident type. Table 1-C makes it apparent that every region has experienced flood disaster. Of 1299 declarations encompassed in this study, 628, almost half, were for primary incident flood. Table 1 shows that 59% of the flood declarations issued from May 1953 to May 1997 went to coastal states; this reflects no bias in favor of coastal states. However, 70 percent of all flood disaster federal relief, in the flood primary incident category, went to coastal states. This is marginally biased in favor of coastal states. If approval vs. turndown percentages are considered, as they are in Table 1-A, coastal states are turned down 30% (157 of 525 requests) and inland states are turned down at a rate of 26% (90 of 350 requests). This suggests that in the aggregate, inland states are treated no worse, and perhaps slightly better than coastal states in their flood disaster requests for presidential declarations.

If tornado (112) and flood & tornado (104) are considered together, more remarkable regional findings are apparent. Table 1-C shows that Southeast Region IV has 34 declarations for "flood & tornado" and another 36 for "tornado" alone. This yields a combined 70 declarations, 13 more than the next highest region, South Central (57). The top "flood & tornado" plus "tornado" regions are Southeast Region VI (70), South Central Region VI (57), Great Lakes Region V (50) and Central Midwest VII (25). The only inland states in Region IV are Kentucky and Tennessee. However, Central Midwest is composed entirely of inland states.

Table 1-A concerns approvals and turndowns. Coastal states experienced a turndown rate as a group of 21% (18 of 86 requests) for "flood & tornado," while inland states had a 25% turndown rate (12 of 48 requests). For "tornado" primary incident requests, turndown rates are higher. Coastal states had a 41% turndown rate (51 of 123 requests) and inland states had only a 32% turndown rate (19 of 59 requests). Remember that turndowns may result from a variety of factors: failure to meet criteria of deservedness owing to private insurance coverage, recovery capacity of the affected state(s), political factors, coverage by other federal programs, etc.

Table 1 reveals that for the "flood & tornado" category, coastal states won 68 declarations to 36 for inland states. So coastal states hold 65% of all "flood & tornado" declarations issued for the period studied. This is not disproportionate to the share of coastal states in the entire U.S. If tornado alone is considered in Table 1, coastal states hold 72 declarations to inland state's 40, or 64% of the total issued for tornado. Again this is not significantly higher than the share coastal states represent. What is noteworthy (from Table 1) is that coastal states secure 71% of all federal disaster relief (1994 constant dollar) funding for "flood and tornado" and 73% of all federal disaster relief for "tornado" primary incidents.

Severe storm primary incident declarations have been conferred in all 10 regions. However, Regions III (Mid-Atlantic), IV (Southeast) and V (Great Lakes) have each won 13 declarations in this category, the maximum of all regions. Region IX (Southwest) collected a remarkable \$446 million in federal disaster relief for its 7 declared severe storm incidents. In contrast, Region V Great Lakes, in Table 1-D, received next largest federal disaster relief funding in this category with \$355 million in aid. The Southeast (Region IV) follows with \$240 million and behind that is Region VI (South Central) with \$173 million. What is significant is the breadth and frequency of severe storm primary incident declarations across U.S. regions. Table 1-A demonstrates that coastal and inland states as separate sets have comparable turndown rates on severe storms. Coastal states have had a 36% (36 of 100 requests) turndown rate on severe storm requests while inland states have had a 38% turndown rate (17 of 42 requests).

Table 1 shows that coastal states have won 70% of all severe storm declarations and 84% of all federal disaster relief expenditures for severe storm from May 1953 to May 1997. Table 1-B, covering much of the 1990s, shows that coastal states have won 69% of all severe storm declarations (not an over-large share) but 84% of all federal disaster relief for this type of primary incident. Clearly, for coastal states to secure \$1.44 billion in relief to only \$282 million for inland states (Table 1), reflects a decided and disproportionate relief benefit for coastal states.

When coastal storm is considered, New England Region I tops out at 5 declarations. Regions II, III, IV and IX each only received one in the period covered by Table 1-C. Interestingly, New England's \$46 million for 5 coastal storms is only slightly larger than Region IX's (Southwest) \$43.5 million for a single coastal storm declaration. Coastal storm declarations are not easily won. Table 1-A reveals that 7 of 16 coastal state "coastal storm" requests have been turned

down: a 44% rejection rate. Two inland state "coastal storm" requests were denied and to date none has ever been approved for an inland state.

Drought declarations have been issued for all 10 regions. Region II (Northeast) had 8, Region III and Region VIII had 6, and Region IX had 5, according to Table 1-C. Perhaps more illuminating is Region V (Great Lakes) with only 3 drought declarations, secured more federal disaster relief (in 1994 constant dollars) than any other region: \$103.5 million. Runner up for drought disaster relief totals is Region VIII (Mountain), composed entirely of inland states in relatively arid regions of the west. That region collected \$81.3 million cumulatively for its six drought declarations (from Table 1-D). Table 1 makes it clear that inland states hold a small advantage in both percentage of drought declarations conferred 42% (when inland states are only 40% of all states) and 45% for federal disaster relief. However, inland states, according to Table 1-A are turned down for drought declarations an extraordinary 47% of the time, to only 32% for coastal states.

Unsurprisingly, regions IX and X were the only regions to secure presidential declarations for primary incident earthquake. Region IX had 12 and Region X had 5, according to Table 1-C. What is surprising is that owing to California quakes especially, Region IX amassed about \$7.4 billion in federal disaster relief for primary incident earthquake. This is the lion's share of spending for all types of disasters in Region IX, and this helps to push Region IX federal disaster relief to the highest for any single region: \$11.3 billion as depicted in Table 1-D. Table 1-A indicates that there has been only one turndown for earthquake primary incident.

Six regions won presidential declarations for hurricane. According to Table 1-C, Region IV (Southeast) took the grand prize maximum of 35 declarations. Region II (Northeast) and Region VI (South Central) each collected 17 and Region I (New England) was issued 13. Region III (Mid-Atlantic) won 6 and Region IX won 4. It is important to include typhoon in this discussion because there were 37 declarations for typhoon, all in the territories of Region IX. Table 1-D makes it obvious that by combining Region IX's hurricane relief with its typhoon relief, some \$900 million in federal disaster spending has flowed to this region for these primary incident types. In terms of maximums, Region IV (Southeast) collected almost \$4 billion in federal disaster relief, much of this attributable to Hurricane Andrew's damage to Florida. Region II (Northeast) received substantial hurricane relief at \$2.1 billion. Note that besides New York and

New Jersey, Region II contains Puerto Rico and the U.S. Virgin Islands, both of which have suffered from recurring hurricane devastation.

Table 1-A shows that requests for hurricane primary incident declarations are not automatically approved. Twelve of the 106 requests (12%) have been denied and all denials have gone to governors of coastal states. Moreover, 5 of 42 typhoon requests (12%) have been turned down.

The only thing distinctive about regional findings on "dam/levee break," "mud landslide," and "fishing losses," is the paucity of declarations for these types of incidents. In the first instance, dam/levee break may have been lumped into the flood category by FEMA in most instances. Mud and landslides are often slow moving events impacting a limited area. The federal government seems to be very reluctant to declare mud or landslides major disasters or emergencies. This may be explained by recovery capacity of states, insurance coverage which precludes the need for federal assistance, and coverage by other programs (federal highway maintenance, local infrastructure operations, Small Business Administration disaster loans, etc.). The federal government seems to resist setting a broad precedent by extending disaster relief to mudslides and landslides, especially if those disasters could have been prevented or mitigated beforehand. Table 1-A shows an astounding 16 mud & landslide request turndowns for coastal states and 2 for inland. Only one mud & landslide request has been approved in 44 years.

Fishing losses constitute another extremely controversial domain of disaster policy. Various natural forces, like red tides or killer algae, certainly do impact the fishing industry. The problem is whether or not fishing interests are entitled to relief under presidential declaration authority. The general record seems to be that they, for the most part, are not. Region X (Northwest) and Region IX (Southwest) appear to be the only gainers under fishing loss, according to Table 1-D. It should be noted that this report focuses on coastal states and so fishing losses are very meaningful. However, within the realm of disaster policy "fishing losses" are seldom primary incident declarations and they do not produce substantial federal disaster relief spending when compared with other types of disaster incidents. Table 1-A shows that more fishing loss disaster requests are denied than are approved (7 of 11 or 64%).

Fire is an important agent of disaster, however, a huge share of the nation's major fires are

forest fires and these are managed under other agency programs (Forest Service, Bureau of Land Management, National Park Service, etc.). When major urban fires occur or when wildfires burn into suburban or urban areas, a presidential declaration of major disaster or emergency may be issued. Region IX (Southwest), again owing largely to California's wildland/urban interface fires, has won 16 declarations for fire according to Table 1-C. This has produced a substantial \$452 million in federal disaster relief. Region X (Northwest) weighs in with \$50 million for fire disaster relief. Again, it is necessary to remember that these figures OMIT forest service fire suppressions, which often draw funding from the President's Disaster Relief Fund. Table 1-A reveals that turndown rates for fire requests are 64% or 9 of 14 for inland states, to 37% or 14 of 38 for coastal states.

Snow/Ice disasters and emergencies are obviously concentrated in regions occupying northern climates but it is interesting to note that every region has received at least one declaration for snow/ice. Region II (Northeast), owing largely to New York state snow emergencies, has received 11 declarations and \$251 million in federal disaster relief. Table 1-C, however, shows that region IV (Southeast) has 18 declarations, with Region III (Mid-Atlantic) and Region V (Great Lakes) securing 17 declarations a piece for this type of primary incident disaster. Region's IV, III, and V have won \$216 million, \$144 million, and \$189 million respectively for this type of disaster. New England Region I, a region whose states are all in a northern climate, won 13 declarations and only \$110 million in federal disaster relief for snow and ice. This may indicate that Region I states are accustomed to the calamities caused by snow and ice. Correspondingly, Region IV, Southeast states in more temperate climates may be caught off guard by snow and ice storms and so require federal assistance.

If coastal and inland states are considered as separate sets, Table 1-A documents that snow/ice requests are rejected 46% of the time (66 of 143) for coastal states and an alarming 53% of the time (23 of 43) for inland states.

It is somewhat intriguing that on the "toxic substance" and "human caused" disaster categories, declaration approvals and federal relief have flowed predominantly, if not overwhelmingly, to coastal states. Table 1 indicates that 5 of 7 total toxic substance declarations have gone to coastal states. The same table shows that \$47 million in total was allocated to those 5 coastal state declarations while only \$353 thousand went to the two inland state toxic substance

declarations. In other words, 99% of the funds dedicated to toxic substance disaster went to coastal states. Correspondingly, of 6 human caused disasters, 4 went to coastal states. About \$323 million went to those 4 coastal human caused disasters. Only \$35 million went to the inland state human caused disasters. So 90% of all human caused disaster federal relief went to coastal states. The bulk of the toxic substance funding went to Region II at \$34 million. The bulk of the human caused disaster funding went to Region IV (Southeast), most of it to cover Florida's expenses incurred after the Mariel boat-lift of the early 1980s, at about \$314 million. Only about \$7.7 million went to Region II via the New York City World Trade Center bombing. Only about \$36 million went to the Oklahoma City Murrah Office Building bombing of Region VI.

It is difficult to draw grand conclusions regarding toxic substance and human caused disaster. Coastal states generally have higher population and greater industrial densities. Terrorism and pollution incidents may be more common in coastal states on account of this, though the most deadly terrorist bombing to date took place in Oklahoma City, situated squarely in an inland state. Confounding generalization is the fact that a variety of federal disaster programs outside eligibility for presidential declaration relief may be responding to these type of incidents routinely.

### **Highlights of New England Region I**

Connecticut, Maine, Massachusetts, New Hampshire and Rhode Island are Region I coastal states. Vermont is the region's only inland state. Flood, hurricane, and snow/ice stand out as this region's most frequent primary incident type declarations. With 89 total declarations for the region, 36 (40.4%) have been for flood. Fifteen have been for hurricane, but note that one hurricane sometimes impacts many states in the region and may generate multiple presidential disaster declarations. It is noteworthy that New England Region I is only behind Southeast Region IV (35), Northeast Region II (17) and South Central Region VI (17) in terms of maximum declarations for hurricane.

The Region I Flood Incidents Only map makes it obvious that Maine's westernmost counties have sustained major recurring flood damage, as has Vermont's north central and northeastern counties. Region I has collected over \$313 million in 1994 constant dollar federal disaster relief from May 1953 to May 1997. Hurricane relief from the federal government, again according to Table 1-D, was about \$161 million and snow/ice about \$110 million. New England received the



smallest total amount of federal disaster relief of any region: \$723 million. However, New England received 5 declarations for coastal storm, far and away the most for any region.

With respect to coastal county disaster experience, if all incidents are considered, the coastal counties of Connecticut, Rhode Island, Massachusetts, New Hampshire and Maine generally receive more declarations than inland counties. However, counties most frequently flooded in the region are mostly inland, with the exception of Connecticut's three western most coastal counties, two Massachusetts counties (see Flood Incidents Only Region I), New Hampshire's single coastal county and three counties of south coast Maine.

### **Highlights of Northeast Region II**

Region II is anomalous in several respects. First, it consists of only two mainland states, less than any other region. It also includes Puerto Rico and the U.S. Virgin Islands, which are not states but territories, and for that matter jurisdictions some 2000 miles away from New York and New Jersey in the eastern Caribbean.

Table 5-C-1 is probably most useful in discussing Region II highlights. New York received 40 declarations, 21 for flood, 8 for snow ice, and 5 for hurricane, for the period May 1953 to May 1997. New Jersey, New York's neighbor and another densely populated state, has 18 total declarations, 8 for flood, 3 for snow/ice, 2 for hurricane, 2 for drought, and 2 for severe storm, to name a few.

Puerto Rico had 16 declarations, 8 for flood and 5 for hurricane. The island also suffered two droughts which garnered declarations. The U.S. Virgin Islands, despite its diminutive land area, won 11 declarations: 5 for hurricane, 3 for flood, and 3 for drought. U.S.V.I. is, as Table 2 shows, the most frequent recipient of presidential disaster declarations for drought.

Region II as a whole has 85 declarations, fewest of any region. Forty of the total are for flood, 17 for hurricane, 11 for snow/ice and 8 (the most for any region) for drought. Most remarkable for Region II is its \$2.1 billion in federal disaster relief after hurricanes. The region's flood relief is also mammoth in relative terms at \$1.3 billion. This flood relief total is four times the amount that Region I received for flood and is third highest of any region (behind Regions III and IX).

The Northeast Region II state incident type pie chart map shows that New York and New

Jersey weigh in heavily on flood, snow/ice, and hurricane. The Northeast Region II county level all incident type map shows generally that New Jersey coastal counties, New York's Long Island and three NYS Lake Ontario counties have declaration frequencies in the 9-11 range. Coastal disaster vulnerability is more obvious for New Jersey than it is for New York. The Northeast Region II flood only map reinforces the claim made in the previous sentence. The New York/New Jersey metropolitan area (outside New York City) has recurring flood vulnerability. However, it is also obvious that NYS Catskill and Southern Tier counties, as well as New York State's Oswego County on Lake Ontario, sustain recurring flood disasters.

In closing it is notable that Region II total federal disaster relief from May 1953 to May 1997 in 1994 constant dollars is nearly \$3.8 billion, third largest of any region.

### **Highlights of Mid-Atlantic Region III**

Mid-Atlantic Region III is composed of coastal states, Delaware, Maryland, Pennsylvania, and Virginia. Inland jurisdictions include West Virginia and the District of Columbia. While eastern Pennsylvania's Delaware River is partially estuarine, most of the state, with the exception of a single northwestern county on the shores of Lake Erie, has little coastline. However, in all fairness, Delaware, Maryland and Virginia have only modest Atlantic coastlines but substantial estuarine areas owing to Delaware Bay for Delaware and the Chesapeake Bay and Potomac for Maryland and Virginia.

The Region secured a total 114 declarations for the period May 1953 to May 1997. More than half of the declarations (67) were for flood, 17 were for snow/ice (tied for second greatest number of snow/ice declarations with Great Lakes Region V), and 13 were for severe storms. Intriguingly, Region III has 6 declarations for drought (second most and tied with Mountain Region VIII). With about \$2 billion in federal disaster relief 1994 constant dollars, a mammoth \$1.6 billion is for flood alone. In other words, 80% of region III's federal disaster relief for 44 years has been for flood. This may be even more pronounced when one considers that the third largest category of federal disaster relief spending for Region III is for severe storm at \$140 million.

Going directly to Region III Mid-Atlantic's flood incidents only map, it is apparent that few of the region's flood disasters impact ocean, lake and estuarine counties. Instead, interior counties along the Susquehanna in Pennsylvania and counties of interior West Virginia and

Virginia, many in the Alleghenys and Blue Ridge Mountains or along the Shenandoah, have sustained extensive recurring flood damage as evidence by declaration frequency.

When individual Region III states are examined, it becomes clear that Pennsylvania and Virginia, both large and populous states, hold most of the region's declarations. Pennsylvania, with 32 for the period studied, had 20 for flood, 4 for severe storm, and 3 for snow/ice. The state had only two for hurricane. Also from Table 5-C-1, Virginia had 26 declarations, 15 for flood, 4 for snow/ice, and 3 for severe storm. Maryland's 14 declarations 8 for flood, 4 for snow/ice and one each for severe storm and flood & tornado. Delaware's 7 declarations covered 2 for flood, 2 for severe storm, and one each for coastal storm, drought, and severe storm.

Table 5-I-1 depicts inland state primary incident declarations. That table reveals that West Virginia experienced an extraordinary 31 declarations, second most for the region and one behind Pennsylvania. Twenty-two of West Virginia's declarations (or 71% of all its declarations) were for flood. Drought, hurricane, snow/ice and severe storm each collected 2 declarations for this state. District of Columbia, arguably one of the most densely populated urbanized areas of the U.S., won 4 declarations: 2 for snow/ice and 2 for severe storm.

A major conclusion for Region III is that coastal and lake shore disaster threats, though serious and genuine, do not stand out relative to inland disaster impacts. Floods, snow/ice, and severe storms are the top threats to Region III with respect to declaration totals and federal relief spending.

### **Highlights of Southeast Region IV**

Region IV moves us to a much greater order of magnitude both in land area covered and in population encompassed. Comprised of the "Old Confederacy" (absent Virginia, Arkansas, Louisiana and Texas) and the border state of Kentucky, the southeast region is huge. Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee and already mentioned Kentucky form Region IV.

Table 1-C shows that Region IV's 227 declarations, more than any other region by at least 30 declarations, totaled 81 for flood (second largest of any region), a truly remarkable 34 for "flood & tornado," and an astounding 35 for hurricane. The latter total for hurricane is nearly twice the second highest region total (region II and VI had 17 each). Moreover, Region IV secured 36 declarations for tornado alone, the largest number of any region on primary incident tornado.

Region IV is tied with III and V for the maximum number of severe storm declarations (13). Region IV also holds the maximum for snow/ice declarations at 18. The region also had 1 coastal storm and 4 drought declarations.

Recall, the only inland states of Region IV are Tennessee and Kentucky. Alabama, according to Table 5-C-1, had 35 declarations for the interval: 10 for flood, 5 each for tornado and severe storm, 4 for hurricane, and 9 for "flood & tornado." Neighboring Mississippi also had 35: 11 for "flood & tornado," 10 for tornado alone, 6 for flood and 4 for hurricane. Georgia has 29 declarations, 10 for flood, 9 for tornado and 5 for "flood & tornado," and 2 for hurricane. North Carolina weighs in with 26 declarations of which 9 were for hurricane, 5 each for flood and severe storm and 4 for tornado. South Carolina has 7 of which 4 are for hurricane. Dispersed in Table 5-C-1 are other primary incident types not discussed in this paragraph. What is extraordinary is the region's flood & tornado, tornado, and flood numbers.

Florida stands as a case of its own. With 39 declarations (four other states have more), Florida may not seem unique. However, that state has 12 hurricane declarations (four more than the next highest: Texas), 13 for flood, 5 for snow/ice (ice and frigid crop damaging temperatures), 4 for flood & tornado, and 2 for severe storm. The state also received one for coastal storm. This disaster vulnerability seemed to crest with the devastation of Hurricane Andrew in 1992. Human caused disaster relief to the region is \$313 million, most of that to pay for the costs of the Mariel boat lift invasion of undocumented (Cuban) aliens in 1980.

Inland states Tennessee and Kentucky show substantial disaster legacies as well. Kentucky had 32 declarations in the May 1953 to May 1997 interval, 20 of which were for flood, 4 for tornado, 2 for "flood & tornado," and 3 for snow/ice to name a few. Two-thirds of Tennessee's 24 declarations are for flood (16) and it had 3 each for flood & tornado and for tornado alone.

Much can be explained for Region IV by inspecting Table 1-D. Thanks predominantly to Andrew, the region has received a total \$3.9 billion in federal disaster relief (1994 constant dollars). Clearly other hurricanes between 1953 and 1992 add substantially to this total, particularly Hurricane Hugo in 1989. Note as well that for "flood & tornado" no other region collected as much money as IV: \$436 million. Moreover, no other region collected as much money as IV in the tornado category: \$147 million. The region's \$937 million in flood primary incident federal relief is fourth highest behind IX, III, II, and VII respectively.

ArcView maps of Region IV, which cover the interval 12/64 to 8/94, provide stark evidence from the pie chart of incident types that Kentucky and Tennessee sustain huge shares of flood disaster. Alabama and Mississippi stand out dramatically in this realm as well. There are sizable hurricane wedges in Florida's, Mississippi's, Alabama's and North Carolina's and South Carolina's pie charts. But also flood & tornado stand out, especially for Mississippi, Alabama, Georgia and Florida. The total incidents chart by county for the region shows that the mass of Alabama and Mississippi counties and mid- to south coast Florida counties have frequently been included in declarations. Certainly east central Tennessee counties appear disaster prone as well. Eastern Kentucky counties have major recurrence of disasters as well. When flood alone is considered, eastern Kentucky counties stand out among all counties in the region. Flood disasters are very common for the Gulf Coast counties of Mississippi, Alabama, the Florida panhandle and the Tampa/St. Petersburg areas.

Clearly, and sadly, no other region of the country has more hurricane declarations, more hurricane disaster relief spending from Uncle Sam, and more tornado and flood & tornado declarations. No other region has received as much federal disaster relief for tornados and flood & tornado incidents. At \$6.2 billion in federal disaster relief for May 1953 to May 1997, Region IV is second only to Southwest Region IX. If federal relief for the nation is totaled for the 44 year interval, Region IV has collected 20 percent of the federal disaster relief expended through the accounts considered in this study. Region IV is disaster prone, and yet also exceptionally successful as a region in avoiding turndowns of gubernatorial requests for presidential disaster declarations. It may have been a harbinger of the region's disaster future when, on May 2, 1953, President Eisenhower issued Presidential Declaration #1 for major disaster: a tornado in Georgia.

### **Highlights of Great Lakes Region V**

Region V is another incredibly expansive and varied region. Composed entirely of states bordering the Great Lakes, the region stretches from Ohio to Minnesota. The weather systems created by or impacted by the Great Lakes dramatically influence the region's disaster history. Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin are part of America's "Old Northwest" and heartland.

Region V, as denoted in Table 1-C, has 161 declarations. Seventy-six, or about 47%, of the region's declarations were for flood primary incident disasters. However, like Region IV,

Region V has a great many declarations for "flood & tornado" (27) and for "tornado" (23). The region has 13 severe storm declarations (a maximum shared with III and IV) and unsurprisingly 17 for snow/ice (1 shy of Region IV's 18 maximum). The region is also drought vulnerable owing to 3 declarations for that primary incident type.

Table 1-D demonstrates that flood disaster federal relief spending is \$834 million for the period studied. While this amount is comparatively substantial, the region is about average on this account. Region V is definitely not average in the matter of severe storm disaster spending. It received \$355 million for severe storm primary incident disasters, tops for all regions but IX. The region's snow/ice federal relief at \$189 million is second only to Region IV's \$216 million. Also remarkable is that Region V's 3 drought declarations produced more federal disaster relief spending for that purpose than any other region, about \$104 million.

Table 5-C-1 reviews primary incident declaration frequencies and types for the six states of Region V. Illinois has 34 total declarations of which 12 were for flood and 10 were for "flood & tornado." On top of this the state had 6 tornado only, 4 severe storm, and 2 snow/ice declarations. Illinois is one of the most tornado prone U.S. states, if declaration issuance is the basis of evidence. Indiana has 23 declarations, 12 of which were for flood. The Hoosier state has 4 for snow/ice, 3 for tornado, and 2 each for "flood & tornado" and severe storm.

Minnesota has 29 declarations, of which 17 are for flood. It also has 5 declarations for "flood & tornado" and 4 for snow/ice as well as 2 for severe storm and 1 for drought. Wisconsin has 25 declarations. Twelve of those were for flood, 5 for "tornado & flood," 4 for tornado alone, 2 for severe storm and 1 each for drought and snow/ice. Michigan has 21 declarations. Eight were for flood and 6 were for tornado alone. The state also secured one each for flood & tornado, drought, and severe storm.

Ohio has 29 declarations and 15 were for flood. Four each were for "flood & tornado" and tornado alone, suggesting that Ohio too is tornado prone. Ohio also has 2 each for snow/ice and severe storm.

ArcView maps of Region V, again covering the interval 12/64 to 8/94, reflect the region's flood, flood & tornado, and tornado disaster propensity. Significant wedges for snow/ice declarations are apparent in each of the six states' pie charts. Total incidents by county is

difficult to interpret. Obviously the extreme northwestern counties of Minnesota stand out for Red River flood recurrence, as do a few Mississippi River counties of western Illinois. More readable is the flood only county declaration map. Mississippi River basin counties, and many lake bordering counties of Wisconsin, Illinois, Michigan and Ohio stand out as frequent recipients of presidential declarations for flood disaster. Also notable are flood prone counties of Illinois River central Illinois and Ohio River southeast Ohio.

### **Highlights of Region VI South Central**

Region VI encompasses the coastal states of Texas and Louisiana as well as the inland states of Arkansas, Oklahoma and New Mexico. As a whole Region VI secured 196 total declarations for the period May 1953 to May 1997. Remember declarations are for major disaster or emergency. This total is the second largest, behind Southeast Region IV. Exactly half of the region's declarations have been for flood.

It is remarkable that this region has had 98 primary incident flood declarations in 44 years, more than any other region. Region VI is third highest in "flood & tornado" declarations (24) and second highest of all regions in tornado (alone) declarations (33). Region VI has had 3 drought declarations and 3 fire declarations. No less remarkable is its 17 declarations for hurricane and 10 for severe storm. The region even sustained 5 snow/ice declarations.

If federal disaster relief is the bottom line, Region VI (like II and IV) has received more money for hurricane relief (\$815 million) than for flood relief (\$684 million). Region VI also scores high on flood & tornado relief (\$246 million), tornado relief (\$134 million ranking it number two among all regions), and severe storm (\$173 million). Region VI's \$2.2 billion total for federal disaster relief places it fourth behind Regions IX (\$11 billion), IV (\$6 billion), and II (\$3.8 billion).

Region VI, South Central, GIS ArcView maps make it obvious that the coastal states of Texas and Louisiana have won 55 and 33 declarations for all incident types (between 12/64 and 8/94), and that flood and flood & tornado stand out as huge wedges of each state's regional declaration proportion pie chart. Table 5-C-1 covers May 1953 to May 1997 and shows Texas with 64 declarations, second only to California (65). The table also indicates that for primary incident flood, Texas won 30 declarations and Louisiana 20. By contrast Arkansas won, according to Table 5-I-1, 15 flood declarations. Oklahoma won 19 and New Mexico 14. Texas, with 12

declarations for tornado alone and another 7 for flood & tornado, is arguably the nation's most often tornado disaster declared state.

Table 5-C-1 documents that Texas had 8 declarations for hurricane, 1 for drought, 1 for fire, 2 for snow/ice and 3 for severe storm. Louisiana has 41 declarations of which 20 were for flood, 9 for hurricane, and 3 each for flood & tornado, tornado alone, and severe storm. The state also had 2 snow/ice declarations. Louisiana declaration and federal relief totals are well above average, especially for a state of such relatively moderate size.

Region VI's inland states also reflect some disaster distinctions. Oklahoma, according to Table 5-I-1, had 40 declarations. This is more than any other inland state in the U.S. The inland state with the second largest declaration total is neighboring Arkansas with 36 declarations.

Oklahoma had 19 flood declarations, 8 for tornado alone, 7 for flood & tornado, and 2 each for fire, severe storm and human caused (one of which was for the Oklahoma City Murrah Office Building terror bombing). Arkansas has 15 declarations for flood, 10 for tornado, 7 for flood & tornado, 2 for severe storm, and one for drought as well as one for snow/ice. These two inland states manifest serious disaster histories. New Mexico, a big area state with relative low population compared to other Region IV states, has 15 declarations of which 14 are for flood and 1 is for drought.

The two ArcView county level maps for Region VI demonstrate that eastern and Gulf Coast areas of Texas and Louisiana have pronounced incident recurrence. However, a near equal number of Oklahoma and Arkansas counties reflect the same finding. The flood only map for Region VI is more illuminating. Clearly the major river bordering counties of Oklahoma, Arkansas, Louisiana and Texas suffering recurring flood disaster. Coastal and near-coastal counties of Texas and Louisiana indisputably stand out when it comes to flood disaster declaration frequency.

Region VI stands out for riverine flood vulnerability, tornado disaster, and hurricane. East Texas and Louisiana project extraordinary disaster frequency, but then so too do the inland states of Oklahoma and Arkansas.



## **Highlights of Central Midwest Region VII**

Iowa, Kansas, Missouri and Nebraska comprise Region VII. All four are inland states. Based on Table 1-C, the region won 99 declarations for the May 1953 to May 1977 interval. The vast majority of declarations (62), 63% of the region's total, were for primary incident flood. Table 1-D reveals that of the \$1.3 billion the region received in total federal relief for the period, a full \$1 billion (77%) was for flood.

The region has 13 "flood & tornado" and 12 "tornado" alone presidential disaster declarations. The region also sustained 3 drought declarations, 3 snow/ice declarations and 6 severe storm declarations. What is most distinctive in interpreting the findings of Tables 1-C and 1-D is that Region VII has the fewest variety of disaster types of any region: "flood & tornado," drought, flood, snow/ice, tornado, and severe storm.

The ArcView state incident type pie chart map for Region VII depicts all six disaster types but makes it apparent that Missouri and Iowa lead the way. Iowa experiences more flood and tornado declarations than Missouri, yet Missouri experiences more "flood & tornado" and severe storm declarations than does Iowa. Table 5-1 demonstrates that among inland states, Missouri (\$562 million) and Iowa (\$387 million) are near the top of the list for federal disaster relief (1994 constant dollars, May 1953 to May 1997). Missouri is first and Iowa third behind West Virginia, which is in the number two spot. Also notable is that Missouri has the highest average federal relief costs for any inland state at \$20 million per declaration. The ArcView Region VII flood only map vividly demonstrates Iowa and Missouri county flood vulnerability and flood disaster recurrence.

## **Highlights of Mountain Region VIII**

Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming are in Region VIII Mountain. Again, all six states are inland states.

The mountain region actually has the fewest declarations of any region of the U.S., only 79 from May 1953 to May 1997. A full 50 of the region's declarations are for primary incident flood, according to Table 1-C. Table 1-D shows the region collected \$817 million in federal disaster relief (again in our standard 1994 constant dollar units). Only New England Region I received less money.

Region VIII had 7 snow/ice and 7 severe storm declarations, as well as 4 "flood and tornado," and 3 tornado alone declarations. The region's 6 drought declarations stand out, and Table 1-D shows that only Region V received more money for drought than did Region VIII.

The combination of low population density, expansive land area, relatively less development than other regions, and accommodation with the natural forces of the region, may explain why VIII has such low declaration and relief spending numbers. The growth and development of Colorado may signal a change in the region. Though it has only 12 declarations, 9 of which are for flood, Colorado has received, in Table 5-I, about \$145 million for the 44 year interval. More remarkable yet is North Dakota, a state with 25 declarations and \$232 million in federal disaster relief. Neighboring South Dakota has 19 declarations and \$268 million in relief. The most telling findings about these two states are apparent in the ArcView Region VIII flood incident only map. Three river systems in North Dakota flood so frequently that the state looks like the Grand Central Station of recurring county flood disaster. Every single county on North Dakota's eastern border, each on the Red River, has won flood declarations 9 to 11 times in the 30 year interval covered by the map. South Dakota suffers flood disasters too, but not apparently more so than fellow region states like Montana, Wyoming, Utah and Colorado.

### **Highlights of Southwest Region IX**

Like the final act of a good play, Region IX stands out in crescendo fashion. With 158 total declarations for 44 years (see Table 1-C), IX is only fourth among the regions in total declarations. What stands out in Region IX is variety and relief costs. Region IX is California, Arizona, Nevada, Hawaii, as well as the Pacific Trust territories.

Table 1-D demonstrates that Region IX, at \$11.3 billion, collected more federal disaster relief (1994 constant dollars) than did any other region. The next highest region in relief costs is IV with \$6.2 billion. It is no surprise that Northridge earthquake spending (which continues to this day and which will go on for many years) skews the numbers upward. Table 5-C shows that with 65 declarations, including Northridge, California collected \$10 billion in federal disaster relief. This is about a third of all federal disaster relief (1994 constant dollars), and well more than the next highest federal relief state, Florida, which was at \$2.7 billion.

The Northridge quake occurred in January 1995. The data used in this study cut-off at June 1997. Consequently, only 2 1/2 years of Northridge federal disaster relief has been expended

thus far, an estimated \$4 billion. Much more than this amount is obligated for future rebuilding but yet unspent. Table 7 shows that from January 1990 to May 1997, California collected about \$6.7 billion in federal relief (1994 constant dollars). The point is that even if Northridge is removed as an extremely costly outlier event, California still comes in with more federal disaster relief than any other state by far. Table 5-C, again skewed by Northridge, shows that the average California presidential declaration is for \$154 million per declaration. In contrast, Puerto Rico is at an average \$101 million for its 16 declarations and behind PR is Virgin Islands with \$83 million per for 11 declarations and Florida with \$68 million per for 39 declarations (it is also skewed by Hurricane Andrew).

Region IX had 66 flood declarations of which 33 were for California, tops for any state or territory. Table 1-D reveals that the region received about \$1.8 billion for federal flood relief, the most for any region. The ArcView map of Southwest Region IX Flood Incidents Only demonstrates both California's and Arizona's flood propensity counties. Remember, the maps cover only a 30 year interval thus inferring that some counties receive presidential disaster declarations for flood about every three years or more!

The inland IX states of Arizona and Nevada are unremarkable in disaster history. Both are largely arid states, but both have been flood vulnerable. Arizona had 14 declarations in 44 years, 12 of which were for flood. Nevada had 13 declarations, 10 of which were for flood. Arizona also has one declaration for drought and one for severe storm. Nevada has one for drought, one for severe storm and one for earthquake.

Before returning to a review of California, a few more extremes need to be reviewed. Hawaii has 19 declarations for the 44 year interval, only 7 of which were for flood. The state earned 3 for earthquake (only California has more with 8), 2 for volcano (Washington state and Idaho have the only other declarations for volcano, both stemming from the 1980 Mt. St. Helens' eruption), 2 for typhoon, 1 for hurricane, and 2 for severe storm. This island state is quite disaster vulnerable.

The Pacific trust territories have their own disaster stories, little known to many. Region IX has an astounding 37 declarations for typhoon in the 44 year interval. Two, as mentioned were for Hawaii, but the remainder all are for Pacific trust territories or affiliated commonwealths.

American Samoa has 7 declarations, 3 for hurricane, 2 for typhoon, 1 for drought and one for flood. Micronesia also has 7 declarations of which 6 are for typhoon and 1 for drought. Guam also has 7 and all are for primary incident typhoon disasters. The Marshall Islands have 6 of which 3 are for typhoon, 1 for flood, 1 for fire and 1 in the "other" category. The Northern Marianas Islands have 8 declarations. Seven are for typhoon and 1 is for flood. The Republic of Palau has 1 for typhoon. FEMA has an undifferentiated trust territory designation incorporating Pacific entities and used in the early years. The TT group, according to Table 5-C-1 has 11 with 9 of them typhoons, 1 flood and 1 fire. Table 1-D reveals that for the typhoon category Region IX, the only region with typhoon primary incidents, received \$737 million in federal relief 1994 constant dollars. Typhoons and Pacific hurricanes (like Iniki in 1992) wreak havoc on Pacific island jurisdictions. Combining typhoon relief with IX's hurricane relief produces a federal assistance figure of over \$900 million, a very substantial sum in the grand pool of about \$31 billion in federal relief assistance to all regions.

Returning to California, besides floods (discussed above), the state has a remarkable 14 declarations for major fire. Recall, this is for primary incident fire presidential declarations, not for Forest Service fire suppressions in which FEMA has a role. Federal major fire relief costs stand at about \$452 million for the 44 year period. California's single coastal storm disaster declaration generated about \$44 million in federal relief (1994 constant dollars) and this was second only to New England Region I's \$46 million (which covered 5 coastal storm declarations). The only presidential declaration issued for dam/levee break went to California which received \$7.5 million in federal assistance (1994 constant dollars). California is the only state in the region to have won a declaration for fishing loss (Coho Salmon fisheries closure) and that generated \$2.1 million in federal relief. It also is the only IX state to win a declaration for snow/ice, that producing about \$15 million in federal relief. California has a dizzying array of disasters and often expensive disasters at that.

Demographics explain some but not all of California's circumstances. California has over 29 million people (1990 Census - See Table 8) and is the third largest state in land area. About 1 in every 9 Americans lives in California. Many areas of the state are mountainous and only lightly habitable. Besides being one of America's most seismically active states, California has experienced colossal development often in high hazard zones. The concentration of Californians living near the coast is epically huge. However, it might also be added that California's long

experience with such an array of disasters has made it expert in assessing damage and in formulating requests for declarations. With 52 congressional districts and 54 electoral votes in presidential elections, the state also has arguably more political clout than any other state. This may be one reason why the state asks for and receives presidential declarations so often. That is not to say the state is never turned down. Table 5-C-2 shows 28 turndowns, ranking it fourth most turned down state in the U.S. Nevertheless, California is a unique disaster prone state along almost every scale.

### **Highlights of Northwest Region X**

Ironically Northwest Region X has only four states, but owing to Alaska and the expanses of the northwest, it is the largest region in land area. Alaska, Oregon, and Washington State are the region's coastal states. Idaho is the region's sole inland state.

Region X has 91 declarations in Table 1-C, 52 of which are for flood. Ninety-one puts it in the middle of the ten regions. Noteworthy is the region's severe storm total of 12, its fire total of 6 and its earthquake total of 5. Not to be overlooked are two declarations for volcano, both stemming from the 1980 eruption of Mt. St. Helens.

Table 1-D discloses that about half of the region's total federal disaster relief (1994 constant dollars) (\$1.2 billion) went to flood primary incident declarations (\$679 million). Also, \$285 million in earthquake relief is not in a league with Region IX, but X is the only other region to secure federal assistance for earthquake relief besides IX.

Table 5-C reveals that Washington State secured 35 declarations and some \$433 million in 1994 constant dollar federal relief. In contrast, Alaska, with 20 declarations, received \$450 million in federal disaster relief as tabulated. Alaska has 550,000 people, while Washington State has about 4.9 million inhabitants. Alaska is vulnerable to devastating floods with the start of each spring thaw. Before it achieved statehood, it won a series of declarations under a "hardship" category (4 "Other" in 5-C-1) which add to its federal relief totals substantially. The state has also had declarations for flood (7), earthquake (1), fire (3), snow/ice (3) and severe storm (2). Alaska's isolation and climate make it extremely expensive to conduct disaster recovery operations there. Huge quantities of aid must be flown in or air dropped. The cost of living in Alaska is substantially higher than in almost every area of the lower-48.

Washington State won 25 declarations for flood, 4 for severe storm and single declarations for drought, earthquake, fishing loss, major urban fire, snow/ice, and volcano. Oregon won 19 declarations total with 11 for flood, 4 for severe storm, 2 for earthquake, and single declarations for fishing loss and drought. The Region X state incident type pie chart map reflects the preponderance of declarations received by Washington State and the map also demonstrates high flood frequency of all four states and disaster type variety. Both the county all types incidents map and the flood only county ArcView map (both for Region X), indicate that counties around Puget Sound Washington state and the Fairbanks administrative region of Alaska have been disaster vulnerable jurisdictions. However, coastline counties on the Pacific show no extraordinary declaration frequency.

In contrast, the inland state of Idaho has 17 declarations of which 9 are for flood, 2 for major fire, and 2 for severe storm. Single declarations went to drought, earthquake, snow/ice and volcano (ashfall from Mt. St. Helens).

## Chapter 3

### Hurricane Disaster

The nation's history of hurricane experience is not a happy one. Before mid-century, problems of forecasting and tracking as well as the limits of meteorological study and technology limited hurricane preparedness and response efforts. Haphazard, uncontrolled, and inadequate development and construction booms along coastlines increased the nation's hurricane vulnerability. In recent years, owing to devastation from Andrew and other hurricanes, there has been a more concerted effort to improve zoning policy as well as building design and regulation. Retrofitting existing structures and relocating others has become part of the lexicon of hurricane preparedness and mitigation policy.

This chapter reviews America's experience with hurricane disaster. It examines hurricane-related laws and programs aimed at each stage of the disaster cycle. It considers the frequency, extent and federal disaster relief costs of hurricanes from 1953 to 1997. At the local level in the pre-disaster period, hurricane-related politics involve decision making regarding zoning, building regulation for hurricane mitigation, setback rules, beach preservation and dune protection, open space requirements, and a host of other concerns which affect a community's degree of protection and vulnerability to hurricane. As a hurricane looms, authorities must decide whether or not to call for an evacuation of threatened areas, and whether evacuation will be voluntary or compulsory. These decisions embody dramatic economic and political implications.

At the state level, authorities must promote and disseminate hurricane forecast and tracking information, help (along with localities) effect evacuation and sheltering when needed, maintain state utility infrastructures, conduct damage assessment, and facilitate post-hurricane reconstruction.

The federal government supplements state and local duties under the federal response plan before, during and after hurricane landfalls. Legislative officials engage in post-disaster oversight of responding public agencies.

The Disaster Relief Act of 1969 coordinates hurricane recovery programs. The Disaster Assistance Act of 1970 provides grants, loans, and temporary housing to victims of hurricane devastation. The chief laws applying to hurricane are the National Flood Insurance Act of 1968

and the Flood Disaster Protection Act of 1973. The latter sets out penalties for local governments that do not participate in, or comply with, the National Flood Insurance Program.

Waugh's article on "Hurricanes" defines the phenomenon as huge, cyclonic, low pressure storms in the Atlantic and Caribbean. The western Pacific refers to them as TYPHOONS and in the Indian Ocean they are called CYCLONES (Waugh and Hy, 1990, pp. 61-80).

Table 1 is Coastal vs. Non-Coastal States by Type of Disaster Incident, Number of (Presidential) Declarations and Federal Disaster Relief Spending in constant 1994 dollars from May 1953 to May 1997. There are 30 coastal states and 20 inland states. Therefore, coastal states represent 3/5ths of the total states. If territories and the District of Columbia are included, coastal jurisdictions jump to 39 and inland to 21. Presidential disaster declarations run from the first in May 1953 to a total 1299 in June 1997 with major disasters and emergencies included together. Remember, emergencies are very similar to major disasters except their relief spending is capped at \$5 million in federal expenditures. Constant dollar base year of 1994 was used since this was the last year of data in the original data set supplied by FEMA. Deflators were used for federal spending in the years 1995, 1996 and 1997 in order to incorporate cost data up to June 1997. Remember that federal relief spending is for FEMA and predecessor agencies only and excludes other federal disaster relief programs not funded by the President's Disaster Relief Fund (i.e., Small Business Administration disaster loans, U.S. Department of Agriculture crop insurance, Housing and Urban Development disaster aid, Department of Transportation disaster aid, etc.)

One would expect coastal states to experience hurricanes more frequently than inland states. Consequently it is no surprise that the 39 coastal jurisdictions secured 92 declarations for hurricane to only 2 for inland states. What is remarkable is that more than \$7.3 billion in federal relief went to coastal jurisdictions representing about 27% of the \$27.6 billion total constant dollars spent by the federal government for all coastal state disaster relief over the interval 1953-1997. Correspondingly, that \$7.3 billion is 23% of the \$31.8 billion spent on all presidentially declared disasters in the interval. About half of the \$7.3 billion was for Hurricane Andrew's devastation alone. Remember, Hurricane Andrew relief spending continues well beyond June 1997 and continues at this writing. Only \$14 million went to inland states for post-hurricane disaster relief from mid-1953 to mid-1997.



Moreover, hurricane and typhoon declarations together bring the 44 year total of these primary incident declarations to 131 (129 coastal and 2 inland) or about 10 percent of all declarations for major disaster and emergency. If the 37 declarations for typhoon are added to the hurricane totals, federal relief spending for hurricane/typhoon declarations jumps to over \$8 billion or nearly 30% of all coastal state constant dollar federal disaster relief and 25% of all constant dollar federal disaster relief.

An extraordinary share of the nation's disaster declarations and federal disaster relief spending flow from hurricanes and typhoons. It is worth emphasizing that for the 44 year period, 30% of all coastal state constant dollar federal relief spending is for hurricane/typhoon and 25% or a quarter of the constant dollar federal relief spending is for hurricane/typhoon. Admittedly, about half of each of these percentages is attributable to hurricane Andrew alone. However, should the nation again suffer Andrew scale hurricane damage, the percentages of post-hurricane/typhoon relief will be skewed even more dramatically upward.

Table 2 depicts Presidential Disaster Declarations by primary incident type by state, maximums only. That table reveals that Florida, Louisiana, and Texas have won the greatest number of declarations for hurricane. The Trust Territories in the Pacific, including Micronesia, possess the largest number of typhoon declarations.

### **The Carolinas**

Schneider examines a wide range of federal, state, and local government responses to hurricanes and the public's reaction to federal government efforts (Schneider, 1995). The public's general impression of how well the government handles disasters and emergencies is important and often has political consequences. How they vote in local, state or national elections may be influenced by whether they believe emergency management is poorly handled or effectively operated. It may also affect legislators in their decisions about how emergency management is authorized and funded. Schneider's review of Hurricane Hugo in the Caribbean, South Carolina, and North Carolina shows successes and failures in the governments' handling of response and recovery operations as well as different levels of political involvement. Schneider also elaborates on the response efforts and public impressions which stemmed from Hurricane Andrew's destruction in southern Florida and Louisiana.

North Carolinians seemed to react positively to how Hurricane Hugo's recovery was managed

in their state. In that state, emergency response procedures worked as planned (bottom-up approach) with FEMA and other federal agencies supplementing local and state efforts, and the state government acting as the liaison between the federal and local level. The state had engaged in extensive emergency management training before the disaster, had full-time professionals trained in emergency management, and allocated more state money for disaster management when compared with other state jurisdictions affected by the hurricane. In North Carolina, state politicians did not criticize FEMA or other federal efforts and procedures were followed smoothly.

South Carolina's experience was not as positive. The state allocated proportionally less money to disaster preparedness procedures and staffing. Confusion on procedures and duties resulted. The Governor (aware of the state emergency management team's lack of knowledge) appointed an ad hoc state emergency management team shortly before Hugo made landfall in South Carolina. This created confusion about who to contact at the state level and proved frustrating for local and federal emergency personnel. South Carolina's local authorities lacked a knowledge of emergency management procedures. Consequently, some localities improperly reported damage and this seriously delayed their assistance. The dual state emergency groups caused overlap in duties and actions and communication confusion. The bottom-up emergency response plan failed and state and city officials and the public started placing blame, primarily on the federal government's level of emergency response. In this case, if local and state officials were better prepared, less confusion would have resulted and the bottom-up approach may have worked better.

Hugo caused massive devastation in the U.S. Virgin Islands and Puerto Rico. Virtually all transportation and communication systems were destroyed or disabled and life-threatening dangers abounded (contaminated drinking water, lack of food, and as islands, these jurisdictions could not easily go to adjacent jurisdictions for help). Here, a bottom-up emergency response, in which the federal government supplements local and state efforts, was not really possible.

U.S.V.I. and Puerto Rico's residents, local leaders, and territorial leaders alike were disoriented and somewhat powerless in coping with the disaster. Officials were unprepared and ill-equipped to provide guidance or assistance to their own jurisdictions. During the first 24 hours, most emergency personnel could not even be located, let alone mobilized to help relief efforts.

By U.S. law, only the governor of a territory or state can request federal assistance, and the federal government in this case was unwilling to bend this rule no matter how extreme the circumstances. This was problematic since the governor of the U.S. Virgin Islands could not be contacted. He was on the island of St. Thomas with no means of communicating from that island to the mainland. Eventually, the governor gained access to a HAM radio and made a verbal request for federal aid, which President Bush then granted. The governor of Puerto Rico submitted a verbal request for aid in a similar fashion, and President Bush approved it. The federal government could now officially initiate a full-scale response.

Emergency relief was not administered quickly or efficiently throughout all disaster-stricken areas in the Caribbean. In Puerto Rico, several thousand displaced residents were living in makeshift shelters six weeks after the storm. It took several months for some hurricane victims in U.S.V.I. to receive safe drinking water and appropriate medical supplies. Electrical power and communication systems were not repaired in some areas for almost a year.

In the end, FEMA did play a critical role in facilitating recovery efforts in the Virgin Islands and Puerto Rico. It distributed an immense amount of financial aid to private businesses and governmental institutions, and helped over 200,000 victims obtain essential disaster assistance.

The public's perception of the government's response to Hurricane Hugo was not favorable. Most reports on Hugo focused on the outbreaks of civil disobedience (looting and domestic violence), the total failures of communication linkages with the U.S. mainland, and the massive breakdown in electrical power systems on the islands. In addition, there were serious issues surrounding the government's handling of this crisis, such as why local and territorial governments were completely unprepared, why the federal government seemed caught off guard, and why emergency management response was so slow in some areas. In sum, the federal government seemed to be tremendously unprepared for this disaster in this region (US GAO 1991).

It should be noted that Puerto Rico and the U.S. Virgin Islands have no electoral votes in American presidential elections, though they are accorded limited participation in American political party convention activity and until 1995 held limited voting status for committee votes only (or observer status) for their sole representatives to Congress. This infers that Puerto Rico

and the U.S. Virgin Islands have little political influence within the U.S. government, especially at the presidential level. This may have been a contributing factor in poor interchanges between those island governments and the federal government.

Political factors surrounded both preparedness and response in the Hurricane Hugo disaster. When the political leadership of a state or territorial jurisdiction supports, funds, and engages in pre-disaster emergency management, outcomes seem to be more favorable. Moreover, response activities seem to be managed better as well when elected political leaders support disaster management.

Political intervention in emergency management, as when South Carolina's governor felt the need to create ad hoc emergency management during the disaster itself, is sometimes paralleled at the federal level. President Bush appointed his Transportation Secretary as the lead emergency manager in addressing Hurricane Andrew. When political officials make extraordinary changes in emergency management leadership during or shortly after a major disaster, this is often an indication of a breakdown in normal emergency management operating procedure.

Waugh says that American hurricanes pose several political dilemmas. The death and injury toll from hurricanes is, in historical terms, diminishing. Americans are becoming more informed about proper land-use and building techniques & practices which afford greater mitigation against wind and storm surge. Yet, coastal populations in hurricane prone areas continue to increase and public knowledge and experience with hurricanes is relatively low. The political salience of hurricane disaster mitigation and preparedness is also low, especially in areas which have not been hit by hurricanes for a great many years.

States sometimes undermine sound hurricane mitigation through policies which encourage coastal development, usually in the interest of increasing tax revenue and employment. Waugh observes that some states actually provide tax credits to coastal property owners in order to relieve some of the high insurance cost burdens they bear for owning structures along vulnerable shorelines.

Hurricane mitigation efforts for hurricane prone communities can make a tremendous difference in the impact of such extreme climatic events. Waugh details three categories of mitigation efforts that coastal communities could adopt.

1. Hard engineering
2. Soft engineering
3. Passive

The first three mitigation efforts need the support of public officials to be implemented. Issues like new setback requirements, changing zoning laws, creating or strengthening building codes, can be political "hot cakes." What may be good for the community and provide more of a buffer to a hurricane's force may be opposed by voters because they feel it infringes on their individual, or business, property rights, or affects tourism. Resort developers oppose setbacks because it gives them less usable property. Other considerations, like having suitable evacuation routes able to handle an entire population, can be overlooked in the face of development. Equally poor is when state, regional and local politicians create tax incentives to encourage further development into areas subject to hurricanes, especially when this increased development overwhelms evacuation abilities. Godschalk describes just such actions in the recovery efforts of Pleasure Island and Gulf Shores, Alabama following Hurricane Frederic in 1979 (Godschalk, 1988, pp. 199-212).

Relocating a town or certain structures may also be challenged politically. After a hurricane it may be prudent to relocate communities or certain structures further inland, but people's desire to immediately "get back to normal" may encourage officials to disregard building codes or relocation options in exchange for returning to business as usual.

Godschalk explains and reviews the political and economic forces which complicate hurricane mitigation, particularly at the local level. It illustrates these complications through the example of Gulf Shores, Alabama, a community racked by Hurricane Frederick in 1979 and a town devoid of national flood insurance at the time of the disaster. The case reveals that town officials feared that the disaster had permanently damaged the community's tax base. On top of this, owing to pre-disaster flaws in the town's preparedness planning and bungled evacuation efforts, the community's mayor and city council were voted out of office during the months after the disaster. The local civil defense director resigned and the building inspector and town clerk were replaced. This case clearly shows that disasters may carry local political consequences.

The case also demonstrates official local ambivalence regarding how far to push hurricane mitigation during rebuilding. The town's new leadership group promoted better development regulations, zoning and subdivision ordinances, building codes and local plans. But in their quest to capitalize on HURRICANE RENEWAL (a term coined by Godschalk), the town did not relocate utilities far enough back from the beach, imposed a temporary and uneven building moratorium, and ran into legal challenges in pressing for a deeper setback line for reconstruction of beach front structures. What is valuable in this case is the generalizability of Godschalk's findings to the experience of many other coastal communities. With the exception of efforts like meteorological experiments, most mitigation techniques are the responsibility of state and local governments and subject to economic and political considerations.

Today, as in other catastrophic natural disasters, the costs of hurricane recovery efforts may be in the billions. Federal government monies may be allotted once a presidential declaration has been issued. FEMA, as lead federal agency, has its regional offices play a major part in its hurricane program. Those offices provide guidance to states eligible to participate in the program. In FY 1994, FEMA reallocated \$2 million of its funds to that program. Up to that time and since 1980, FEMA's annual expenditures for hurricane preparedness totaled less than \$900,000. The agency received \$2,896,000 in FY1995 & FY1996 and \$5,896,000 in FY1997 for the Hurricane Program (Bipartisan Task Force Report, 1995, pp. 147-149).

Researchers examining recent hurricanes have confirmed that many simple and inexpensive mitigation and preparedness measures taken by homeowners, apartment dwellers, and business people hold the potential to dramatically reduce hurricane damage and subsequent disaster assistance costs.

The insurance industry also plays a role in the politics of paying for hurricanes. Insured losses from hurricanes are 20 times more costly now than in the 1960s. With this in mind, the insurance industry and its lobbying arm are becoming more political. The extent of insured losses has pushed some insurance companies into insolvency and caused others to terminate coverage in high risk areas. The federal government has deemed this act as discriminatory and has insisted that insurance companies continue insuring against hurricane damage in hurricane-prone areas. In return, the insurance industry has demanded stronger hurricane mitigation efforts (i.e., stricter building codes and more suitable zoning of insured structures) in these high risk

areas. Thus, special interests may also play a political role in who pays the costs of a hurricane disaster.

The federal Hurricane Program's legislative authority resides in the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (P.L. 93-288, as amended in 1994). The program is subject to annual appropriations and FEMA is the administering agency.

The Hurricane Preparedness Grant Program, as it was known before fiscal year 1994, consisted mainly of efforts to conduct studies for coastal areas to help state and local emergency management agencies in evacuation planning. The U.S. Army Corps of Engineers played a role by managing and funding some studies, while the National Weather Service (NWS) supported the development of hurricane storm surge models for coastal areas. Overall, the major emphasis was on protecting the at-risk population from storm surge and coastal flooding, forces which had historically produced the most hurricane-related deaths (until Hurricane Andrew).

Through 15 years, the Hurricane Preparedness Grant Program has completed hurricane evacuation studies for most of the nation's coastal areas vulnerable to hurricanes, though many of these need to be updated to take into account population growth and new development. Such studies were in place and used in South Carolina when Hurricane Hugo struck in September 1989 and in Florida for Hurricane Andrew in August 1992. Public awareness materials and videos have been produced and distributed. Week-long training courses sponsored by FEMA and conducted at the NWS National Hurricane Center, now in Coral Gables, Florida, have provided valuable information to state and local emergency management officials. Various decision assistance tools have been developed and made available to coastal states. These and other activities have protected people vulnerable to hurricane storm surge but they did not fully address the issue of reducing property damage associated with hurricanes.

Since fiscal year 1994, FEMA has reconstituted the old program and now has in place its improved Hurricane Program. This enhanced program seeks to significantly reduce the loss of life, property, economic disruption, and disaster assistance costs resulting from hurricanes. It embodies new mitigation programs. It has three components:

1. state and local assistance to improve preparedness and mitigation capabilities,
2. evacuation studies, including hazard analysis, transportation analysis, shelter

analysis behavioral analysis, and post-storm analysis aimed at measuring the effectiveness of mitigation efforts and response activities,

3. funding programs for training and exercises to fine-tune mitigation and operations planning, public awareness and education to improve public warning capabilities, public cognizance, and state and local public information materials,

This program must be promoted in the political environment of state and local governments. Public education is important, but it will take more than that to change the decision making of state and local building regulators, zoning authorities, homebuilders, home buyers, and development interests.



## **Chapter 4**

### **Flood Disasters**

America is no stranger to flood disaster. Some allege that no less than 75% of all presidential declarations of major disaster and emergency are for flood (as either the primary or secondary incident type). Flood damages are often expensive and there has been a political ground-swell of opposition to federal disaster relief for "recurring" flood damages. In response, the nation has endorsed national flood mitigation and has enacted flood disaster laws. Of particular significance are structural and non-structural flood hazard mitigation efforts. The Great Midwest floods of 1993 served as a catalyst for modern flood policy reform.

Too few Americans understand that the private sector does not offer flood insurance to homeowners and businesses. Instead, the U.S. maintains a National Flood Insurance Program under which private insurers market, sell and service residential and commercial flood insurance but with the federal government collecting the premiums and controlling rules of claims payouts. This chapter examines aspects of this program and discusses relevance for coastal and inland states.

#### **History of Flood Policy**

Floods are America's most frequently occurring agent of natural disaster. More than half of all presidential declarations of major disaster are for floods (Sylves study of FEMA DARIS database 1997 unpublished). Owing to more than 100 years of dissension, confusion, political intrusion, inadequate infrastructure, high cost, unavailability of flood insurance, and more, the federal government decided to basically direct and subsidize flood insurance and re-orient flood hazard mitigation from exclusively building dams and other flood works to a combination of structural and non-structural efforts. Political challenges in flood disaster involve, zoning for floodplain usage, building regulation decisions, planning and funding flood control projects -including relocation actions-, and coordination of effort from locality to locality and from state to state.

Shortly after its creation in 1979, FEMA assumed flood management responsibilities from the U.S. Department of Housing and Urban Development. FEMA is the lead agency in implementation of national flood disaster policy, but shares responsibility with several other federal agencies.

A short history of American flood management is necessary. Also, there are several other federal agencies besides FEMA involved in flood control, among them, the U.S. Army Corps of Engineers, the U.S. Department of Agriculture's Agricultural Stabilization and Conservation Service, the U.S. Department of the Interior's Bureau of Reclamation and Bureau of Land Management, the U.S. Department of Commerce's National Weather Service, and the U.S. Environmental Protection Agency, to name a few.

A FLOOD or FLOODING is defined as the temporary inundation of normally dry land areas from the overflow of inland or tidal waters, or from the unusual and rapid accumulation or runoff of surface waters from any source. The rise in water may be caused by excessive rainfall, snow melt, natural stream blockages, wind storms over a lake, or any combination of such conditions. A FLASH FLOOD is a flood that crests in a short period of time and is often characterized by high velocity flow. It is often the result of heavy rainfall in a local area.

Cigler and others advocate better floodplain management through a combination of structural and non-structural approaches. NON-STRUCTURAL approaches entail restricting development in flood-prone areas as well as use of natural buffers, such as wetlands which help absorb flood waters. They modify the exposure of buildings to floods through flood-proofing, land-use planning, setback rules, warning measures, and insurance. STRUCTURAL approaches include elements of building design and construction aimed at reducing flood vulnerability. One practice involves ELEVATION of structures located in V-ZONES (vulnerability zones), that is, areas prone to flooding or coastal storm surge. Elevation means raising a structure to place it above flood waters on an extended support structure.

FLOODPLAINS are normally dry land susceptible to being inundated by water from any natural source. These areas are usually low land adjacent to a river, stream, watercourse, ocean or lake. Flood frequency studies and flood hazard boundary mapping have been used to calculate a "100-YEAR FLOOD," which means a flood of magnitude expected to be equaled or exceeded on the average of once every hundred years. Such a flood has a one-percent chance of being equaled or exceeded in any given year. The general public often mistakenly believes that such 100-year floodplain areas are only subject to flooding every 100 years. Meteorological and natural forces may produce 100-year magnitude floods at any time.

Among structural floodplain management measures has been the highly controversial construction of "hard" engineered public works projects such as dams, dikes, LEVEES, channel enlargements, diversions, and along coastlines - seawalls, jetties, sea groins, and other physical structures. These actions are taken to modify the way floods behave. Owing to a mixed record of performance, high cost, negative environmental side-effects, and the realization that such structures often inadvertently contribute to over-development in flood-prone areas, national policy has begun to back away from heavy reliance on "hard" engineered flood mitigation works.

A LEVEE is a man-made structure, usually an earthen embankment, designed and constructed in accordance with accepted engineering practices, to contain, control, or divert the flow of water so as to provide protection from temporary flooding. A LEVEE SYSTEM is a flood protection system comprised of a levee, or levees, and associated structures, such as enclosure and drainage devices.

Floods, like many other disasters, are low probability, high consequence events. From a national government perspective, such disasters are a major problem. Floods are responsible for the majority of presidentially declared disasters. For officials at the state and local level, however, flood disasters are experienced with relatively less frequency than they are on a national level. In other words, flood disasters perceived nationally are more common than flood disasters perceived from any single state or locality.

Cigler explains that local officials are less likely (than state and federal officials) to perceive the flood problem as important and so, they tend to give the topic low priority on their policy agendas. She defines this as an "intergovernmental paradox," in that local government officials are unlikely to judge flood or other disasters as a major problem, but it is local authorities who must assume center-stage as the first responders and emergency managers when floods or other disasters occur. Whether it is first line emergency response, or land use planning and implementation activities associated with the mitigation of hazards, local governments have cardinal responsibilities.

The first national flood control law was the Flood Control Act of 1936. Its central premise was that floods could be controlled or averted through the building of engineered structures such as levees, dikes, spillways, channels, jetties, reservoirs, dams, flood walls, etc. The principal

federal agency involved in the construction of flood and erosion control projects is the U.S. Army Corps of Engineers, although other agencies have major roles. The federal water resources development projects traditionally have multiple purposes and often include a flood- or erosion-control element. The U.S. Congress selects the Corps' projects through a 2-phase authorization and construction appropriations process which is highly political. In the authorization phase, members of Congress vote collectively on a group of water projects in an "omnibus" rivers and harbors bill. Congress then selects many of the authorized projects for appropriations.

Many flood control projects (i.e., dams and levee building) have embodied "PORK BARRELING," under which federal resources were concentrated in a way which over-benefited certain areas at the expense of the national taxpayer. Various legislators may insist that their state needs a costly structural flood control project (regardless of actual necessity), so as to generate substantial federal funds for their jurisdiction. Congressional, state and local officials derive tremendous political gain from infrastructure projects and facilities, heavily subsidized by the national taxpayer, which they claim credit for securing. In effect, they are often said to be "bringing home the bacon" or "porkbarreling" on behalf of their constituencies.

Cigler indicates that structural flood control projects are often very costly, have limited utility, and routinely come with undesirable environmental side-effects. National reforms were needed to curtail costly and confused individual state flood control efforts.

### **Coastal States and Flood Disaster**

Table 1 is Coastal vs. Non-Coastal States by Type of Disaster Incident, Number of (Presidential) Declarations and Federal Disaster Relief Spending in constant 1994 dollars from May 1953 to May 1997. There are 30 coastal states and 20 inland states. Therefore, coastal states represent 3/5ths of the total states. If territories and the District of Columbia are included, coastal jurisdictions jump to 39 and inland to 21. Presidential disaster declarations run from the first in May 1953 to a total 1299 in June 1997 with major disasters and emergencies included together. Remember, emergencies are very similar to major disasters except their relief spending is capped at \$5 million in federal expenditures. "Emergencies" are approximately 10% of the 1299 declaration pool with "major disaster" representing about 90%. Constant dollar base year of 1994 was used since this was the last year of data in the original data set supplied by FEMA. Deflators were used for federal spending in the years 1995, 1996 and 1997. Remember that

federal relief spending is for FEMA and predecessor agencies only and excludes other federal disaster relief programs not funded by the President's Disaster Relief Fund (i.e., Small Business Administration disaster loans, U.S. Department of Agriculture crop insurance, Housing and Urban Development disaster aid, Department of Transportation disaster aid, etc.)

Inland and coastal states frequently experience flooding. It is important to remember that Table 1 data is for presidential declarations of major disaster and emergency. Not all floods win such designations. Consequently the data used in this study are not a meteorological record, but instead constitute a political-administrative record of presidential declarations in which flood is the primary incident in the declaration. The Tornado and Severe Storm chapter employs a category FEMA labels "Flood and Tornado." Consequently, there are about 104 "Flood and Tornado" declarations excluded in this flood focused chapter which are taken up in the next. Moreover, the table is based on "primary" incident frequency not on second or third order incidents. For example, floods are often a consequence of hurricanes and typhoons, as well as coastal storms. However, this chapter only concerns the narrow category in which "Flood" is the primary incident. Therefore, a great number of other primary incidents beside "flood" include flood devastation.

In spite of these qualifications, the number and constant dollar 44 year damage totals for floods is incredibly high. No less than 628 of the 1299 declarations in Table 1, are for primary incident "flood." With 3/5ths of the states in the coastal category, 59% of the declarations are directed to coastal states. **Consequently, coastal states do not win a disproportionately large number of declarations for "flood" primary incident disasters.** Coastal states do secure 70% of the federal disaster relief constant dollar funding for primary incident "flood" declarations in the 44 year interval. This again, is not disproportionately large, especially when one considers that the territories, all coastal jurisdictions, are included in the coastal state set.

All references to federal relief spending below are in constant 1994 dollars and percentages were calculated from Table 1. It is remarkable that for coastal states, primary incident flood declaration federal relief spending is 24.6% of all coastal federal disaster relief from 1953 to 1997. Primary incident flood declarations for coastal states yields 21.3% of all federal disaster relief over the same period. By contrast, inland states primary incident flood declaration federal disaster relief is a mammoth 69.6% of all inland federal disaster relief from 1953 to 1997.

However, non-coastal (inland) state primary incident flood declaration disaster relief is only 9.2% of all federal disaster relief for the 44 year era.

These findings suggest that flood disasters (in terms of primary incident declarations) generate a substantial but modest share of coastal state constant dollar federal disaster relief. Table 1 reveals that hurricane and earthquake generate higher sums of constant dollar federal disaster relief for coastal states than do floods. However, for coastal states, the combined "flood" and "flood and tornado" primary incident categories produce a constant dollar relief amount greater than the individual quake and hurricane categories. The main point is that flood is a paramount form of disaster damage for coastal states, but in the aggregate, hurricane and earthquake rival and exceed flood in terms of constant dollar federal relief expenditures for the 44 year interval. For inland states, flood is far and away the most costly disaster agent if share of constant dollar federal disaster relief spending is considered.

It is somewhat surprising that in the interval covered, according to Table 2, California and Washington State (both coastal states) have the largest number of primary incident flood federal disaster declarations. One might have assumed that inland states along major river systems (i.e., Mississippi, Ohio, Missouri, Red, etc.) would have the most flood declarations.

### The National Flood Insurance Program

Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. The act was broadened and modified later with passage of the Flood Disaster Protection Act of 1973 and other measures. The NFIP is administered by the Federal Insurance Administration (FIA) and is a component of FEMA.

The national response to flood disasters in the decades before NFIP consisted of building flood control works such as dams, levees, and the like and providing disaster relief to flood victims. Disaster relief did not reduce losses or discourage unwise development. Moreover, the public could not buy flood insurance from insurance companies, and building techniques to reduce flood damage were overlooked. Owing to mounting flood losses and escalating costs of flood disaster relief, Congress created the NFIP. "The intent was to mitigate future damage and provide protection for property owners against potential losses through an insurance mechanism that allows a premium to be paid for the protection by those most in need of it" (FEMA,

FIA2/August 1987, p. 1). The NFIP is based on an agreement between local communities and the federal government which states that if a community will implement measures to reduce future flood risks to new construction in Special Flood Hazard Areas, the federal government will make flood insurance available within the community as a financial protection against flood losses which do occur.

If a local government adopts building codes and zoning regulations which limit development in floodplains and promotes flood mitigation, residents (homeowners and business owners) become eligible to purchase relatively low-cost national flood insurance (private flood insurance is unavailable). The National Flood Insurance Program provides policyholders SUBSIDIZED RATES, meaning that the federal government encourages the purchase of national flood insurance on existing structures at "reasonable and affordable" rates, though these determinations are themselves a political issue. Unlike private insurers, the federal government does not need to make a profit on the sale of the insurance it sells.

Over the years about 90 percent of America's flood-prone jurisdictions have enrolled in the NFIP. Local governments remain principal providers of flood mitigation while FEMA's role is one of information support and coordination. With approximately 18,500 of the 20,000 U.S. flood-prone communities currently participating in NFIP, the federal government's role is to build the commitment of local governments to floodplain management and to develop local governments' capacities to design, enact, and enforce the required floodplain regulations.

The state role in NFIP continues to evolve. However, Cigler and Burby disclose that state officials view the states as appropriate vehicles for providing flood abatement local technical assistance, planning and coordination activities. This is surprising given that in their survey, only 52 percent of local officials were aware of their state's NFIP assistance program (Cigler and Burby, 1991, p. 95).

Federal flood laws which called for a combination of structural and non-structural methods have been a mandate for state and local governments. But, as Cigler and Burby claim, little attention in floodplain management has been paid to developing the political will of the nation's elected local and state officials, the authorities who must deal with the flood hazard problem first.

## **Flood Mitigation**

It is the role of local governments to determine the kind of flood mitigation efforts they use to protect their communities and the options they choose. The choices made, the process of deciding, and the ultimate decisions made, all involve politics. Historically, structural flood control measures, like building levees and dams, were popular since they created jobs and were financed largely by the federal government.

Over time, flood prone areas protected by structural means have been heavily developed. Even if non-structural means would be more suitable for an area today, they are harder for elected officials to adopt because people already in the affected areas do not want to relocate, do not want to adopt more floodproof building code requirements, and do not want future development limited. As with land use planning efforts for other natural disasters (hurricane, earthquake), local elected officials face similar opponents to non-structural mitigation efforts. Non-structural methods often conflict with private property rights for homeowners, farmers, and developers alike.

Non-structural mitigation options include regulations, education, and a variety of financial incentives, as well as technical assistance or capacity-building tools. Examples include zoning and other land use regulations (restricting development in flood basins), elevation and other floodproofing of buildings, flood insurance, flood warning systems, land acquisition, permanent property relocation, and disaster preparedness and response planning.

**A Unified National Program for Floodplain Management** was prepared independently of the Galloway Report in 1993 (see below) and provided a conceptual framework that calls for managing floodplains as integrated systems of both human activities and natural functions. It has been highly praised by environmentalists and harshly criticized by property rights advocates, including many farmers. A growing property rights movement in the U.S. is attempting to end nearly all forms of land use regulation. Thus, the goals and objectives of the report may be difficult to implement.

Non-structural flood mitigation efforts also have complicated intergovernmental considerations. There is a clear mandate for a federal regulatory role in floodplain management, but under the U.S. constitutional system, the management of private land-use is the responsibility



of state and especially local governments. Local and state elected officials may decide not to implement floodplain management measures for several reasons.

1. They may feel that the federal government has no right to infringe on their governmental responsibilities.
2. They assume it conflicts with their constituents' beliefs (i.e., private property advocates).
3. They want to continue only structural flood mitigation measures which the federal government used to provide most of the funding for.
4. They may obey the spirit of the NFIP by enacting appropriate floodplain management measures, but may fail to enforce those measures believing their non-compliance may go undetected as they bow to pressures to develop in flood hazard areas of their communities.

Non-structural mitigation efforts have produced politically controversial debates at the federal level also. Cigler offers an example from 1994. A Senate bill, which incorporated the Unified National Program for Floodplain Management proposals, was blocked by Republican-led resistance in the summer of 1994. The defeated bill was a casualty of Republican efforts to derail Democratic-supported legislation in conjunction with advocates of property rights who view any measure to protect wetlands in general as a first step in taking additional farm land out of cultivation through unreasonable regulations. The kinds of buyouts used after the 1993 Midwestern floods were not made part of national flood policy in 1994 because there was great opposition to placing restraints on new flood control dams and levees. In addition, some federal lawmakers led opposition to the measure on behalf of some farmers who opposed adding new wetlands as a flood control measure.

Economic growth and the great political influence of development interests have combined to increase demand for more building within floodplains. The interests promoting sound disaster mitigation land management at the local level are, in relative terms, very weak. Overhead governments, such as the state and federal government, must add a counterweight to the development interests, but this is not easy for a variety of reasons (resistance to non-local, outside pressures; preservation of local land-use authority; political interference at higher levels of government by development interests, etc.)

Many protective land-use regulations are not enacted or enforced due to unresolved conflicts

between private property rights and local, state, and national interests in the flood problem. Attempts to resolve conflicts lead to costly litigation for all parties, including suits by FEMA's Federal Insurance Administration (FIA) against localities for not complying with NFIP.

Flood policy's future challenges involve harmonizing city-county relations; getting communities which share a watershed to cooperate and coordinate; moving functionally distinct municipal departments to promote flood mitigation (water, sewer, environment, public health, public safety, police, fire, permits & inspections, etc.). Inconsistency among state flood control programs remains a problem.

Even though floods are the most frequent type of natural disaster, each year, there tends to be less political intervention in the response and recovery process for flooding than for other natural disasters. This is in part because many floods are not considered major disasters. Schneider classifies floods as "normal" disasters, giving several reasons.

- The magnitude of the event (normal disasters usually do not produce severe or prolonged disruptions in the social or physical environments, i.e., communication and transportation accessibility);
- The frequency and recurrence of the event, which have made the American public more familiar and accustomed to normal disasters;
- Government officials are aware of and attuned to these events, and they have designed a response system with exactly these circumstances in mind.

Since the emergency management response process generally works as expected with floods, the need or desire for an elected official to intervene, or for media to criticize, is greatly diminished. An example is the flooding in South Carolina in 1990, as discussed Schneider.

Of course, not all floods are normal, and sometimes political intervention in the emergency management response to flooding does occur. An example is the 1993 flooding in the Midwest. The president appointed an ad hoc sub-group to his Floodplain Management Task Force to determine the major causes and consequences of the 1993 Midwest flood, to evaluate the performance of floodplain and watershed management programs; and to recommend changes in policies, programs and activities likely to achieve risk reduction, economic efficiency, and environmental enhancement in floodplains and watersheds. The Interagency Floodplain Management Review Committee released the report, "Sharing the Challenge: Floodplain

Management into the 21st Century," in July 1994. It was commonly referred to as the "Galloway Report."

The GALLOWAY REPORT examined the functionality of federal levees during the Great Midwest Flood of 1993. Its findings were controversial in that it praised the performance of federal levees during the flood but had little to add about the thousands of non-federal levees in the region, many of which failed during the flood. Federal levees are those built in whole or in part by the federal government. "Non-federal" includes state, local, special district government, or privately owned and managed levees which may be subject to federal regulation but are not owned by the federal government. By suspending judgment of the performance of non-federal levees, the Galloway committee seemed to be suggesting that "federal" structural flood mitigation works had performed well but that "private" structural flood control works had not, or at least were not worth reviewing.

The report recommended that many failed levees not be repaired so that they could buffer against future flooding. (This tactic proved beneficial when the areas flooded again in the 1995 Midwest floods.) This had important ramifications. Farmers (and others) whose properties had been protected from flooding up until the Great Midwest Flood of 1993 by private levees, now were left with no official guidance on whether or not to rebuild the failed private levees. A decision NOT to rebuild means that properties behind failed private levees would be exposed to much greater flood threat in the future. The Galloway committee left it up to the Army Corps of Engineers (in conjunction with the Soil Conservation Service) to decide which private levees warranted reconstruction.

In reviewing the aftermath of the Midwest floods of 1993, there was praise for FEMA's effort to RELOCATE towns frequently flooded by their adjacent rivers. Completely relocating a town may be politically controversial for several reasons.

- Historic preservationists may oppose it because relocation destroys the history of the town (the buildings, town squares, main streets, etc.).
- Private property advocates may oppose being ordered to move from their land, homes and businesses, some of which have been passed down for generations.
- Some may believe that more flood mitigation measures like bigger dams and more levees are the better solution to flooding than relocation.

The dilemma of relocation was part of the aftermath of the Midwest floods of 1993. It was politically controversial at first, but there was increasing agreement that the damage-rebuild-damage-rebuild cycle should wherever possible be terminated.

Many have complained that too few communities participate in, and too few homeowners buy, national flood insurance. Presumably, if flooding occurs in a community which is not participating in NFIP, "no federal financial assistance can be provided for the permanent repair or reconstruction of insurable buildings in Special Flood Hazard Areas" (U.S. FEMA, FIA 2/August 1987). Once a community's Special Flood Hazard Areas have been identified on a Flood Hazard Boundary Map or Flood Insurance Rate Map, that community has up to a year to comply with and join the NFIP. Failure to do so may mean that those seeking to build in a Special Flood Hazard Area will be prohibited from receiving Veterans Administration loans or other mortgages from federally regulated banks.

However, there is huge political pressure exerted after every flood disaster not to penalize communities or residents, the former for failing to join or comply with the NFIP and the latter for failing to purchase national flood insurance when it was available.

FEMA and the Small Business Administration (SBA) analyzed some 2000 claims arising from the 1993 Midwest flood and found that about half of the applicants with mortgaged homes in the floodplain did not have flood insurance. In 1993, the National Performance Review recommended that FEMA enforce existing requirements for mandatory flood insurance and urged the administration and the Congress to explore incentives to expand insurance coverage against most natural hazards (NPR 1994, p. 17 and Bipartisan Task Force Report 1995, p. 64).

The Midwest floods of 1993 changed how governments would allocate the costs of future flood disasters. Several important policy and administrative reforms have been made since the Midwest floods of 1993. In January 1995, FEMA officials announced changes in regulations as part of the implementation of a new 1994 law. Among the changes were new rules that converted the existing five-day waiting period to a 30-day waiting period (with limited exceptions) before flood insurance coverage becomes effective under a standard flood insurance policy. The U.S. Army Corps of Engineers has also amended some of its rules governing construction cost sharing. Under congressional mandate to reduce the non-federal share of flood

mitigation projects based on "ability to pay," the Corps established criteria for reductions in the non-federal cost share.

The cost of damages and recovery efforts from a flood disaster may enter the billions of dollars. The brunt of these costs are borne by the federal government and the property/casualty insurance industry. Cigler states that direct losses from floods cost approximately \$4 billion a year, and that at least 9.6 million households and \$390 billion in property are at risk from floods.

After the extreme Midwestern floods in 1993, Congress allocated 15 percent of the disaster aid for relocating people out of the floodplain. More than 7000 have moved, including at least one entire town, making it the largest post-flood relocation in U.S. history. Before the Midwest floods in 1993, \$4.5 million was budgeted for relocation; after the flood, another \$350 million was added, making this a pivotal turning point in U.S. flood policy (Cigler, 1996, p. 204).

Some evidence suggests that NFIP has been very effective in mitigating damage from floods; FEMA estimates that the floodplain management strategies and building standards required under NFIP prevent \$569 million in flood damages annually. However, there is no required special mitigative measures for properties that have incurred repeated flood damages of less than 50 percent of the value of the structure. As of 1993, repetitive loss structures, properties for which two or more insurance payments have been received above a specified amount, represented only about 2 percent of the properties covered by flood insurance policies but accounted for 52 percent of the claims paid and 47 percent of the dollars paid from the Flood Insurance Fund. If the NFIP fund runs empty, the fund may borrow up to \$1 billion from the U.S. Treasury (Bipartisan Task Force Report, 1995, pp. 63-64).

The federal government is using financial incentives or disincentives to hasten state and local implementation of flood hazard mitigation methods. The **Senate Bipartisan Task Force Report on Funding Disaster Relief** (1995) emphasized hazard mitigation through the use of incentives. Examples include federal income tax credits for investments to upgrade existing facilities and federal matching grants for building retrofit. The Report also made a number of budgeting proposals, such as requiring a three-fifths majority to approve emergency supplemental spending and more detailed written justifications by the president and Congress when enacting emergency supplemental appropriations. Budgeting proposals, if passed, would

likely facilitate interest in mitigation tools for reducing the costs of flood and other disasters. By making it more difficult for state and local governments to receive federal monies after a flood disaster, these levels of government may embrace more comprehensive flood management plans sooner than they would without such federal budgeting tactics.

The Federal Insurance Administration has sought to promote wider sales of national flood insurance since 1981 under a "Write Your Own" program which reinvigorates private sector insurance company involvement in the NFIP. The program invites all licensed property and casualty companies to enter into an arrangement with FIA to sell and service flood insurance under their own names.

The U.S. Army Corps of Engineers has undergone dramatic change in its role as primary builder of dams, levees, dikes, and other "hard" engineering flood mitigation structures. Currently, the Corps spends \$1.6 billion a year to maintain structures that it has built and \$1.2 billion to erect new levees and dikes. Of its \$41 billion budget, \$13 billion is now allocated for environmental projects (Cigler, 1996, p. 209). Floodplain management efforts are receiving more attention and funding, in part as an outcome of the Midwest floods of 1993 and 1995. The Corps' fastest growing spending category is for environmental projects.

National leaders expect state governments to induce their localities to make greater investments in all phases of floodplain management. To date, most states have been slow to respond. Increasing state disaster costs and less favorable federal-state, post-disaster cost sharing constraints, may give states and their localities a greater financial incentive to engage in flood hazard mitigation.

## Chapter 5

### Tornado and Severe Storms

Massive areas of the U.S. are vulnerable to tornadic activity and severe storms, and a variety of government agencies are responsible for providing public warnings for tornado and severe thunderstorm threats. However, there are serious technological and socio-political limitations that make tornado and severe storm preparedness and mitigation extremely difficult. Moreover, the national definition of "disaster" may affect state and local preparedness, response and recovery efforts for tornados and severe storms. Unlike earthquakes and hurricanes, tornados and severe storms do not automatically trigger presidential disaster declarations. Tornados have occurred in virtually all 50 states, but most in the central and eastern U.S. Coastal states are as vulnerable to tornado and severe storm damage as inland states are.

The United States experiences more tornado activity than any other country. The National Weather Service (NWS) considers tornados to be nature's most violent weather phenomenon. Some tornados have been clocked with wind speeds well over 200 mph. Maximum tornado winds are extremely difficult to measure because metering equipment is usually destroyed by the force of the winds themselves. Tornados have resulted in an average of 80 deaths and 1,500 injuries each year. For 1995, there were 30 tornado fatalities which was less than half of 1994's total of 69, and significantly lower than the 30-year average death toll of 73. The number of fatalities from tornados is in part attributable to tornado unpredictability and rapid speed of onset.

Tornados have touched down in all 50 states, but the areas at greatest risk are the Great Plains region east of the Rocky Mountains and the Midwestern states of Wisconsin, Michigan, Illinois, Indiana, and Ohio. The Great Plains area from Texas to Canada is dubbed "Tornado Alley" for the frequency of tornados that strike the area. Tornados cause more deaths east of the Mississippi River (higher population densities), and more damage west of it (endnote 1).

Table 1 contains the primary disaster incident category "flood and tornado." There is a separate "flood" primary incident category in the table already discussed in the previous chapter. The umbrella term "flood and tornado" means a tornado was the primary incident and flood may have been a coincident manifestation of the disaster or that flood and tornado together represent the primary incident. FEMA does have a "tornado" primary incident category. As before, we

are discussing primary incidents in Table 1. It must be understood that tornados may be secondary or tertiary disaster agents in other disasters. For example, many hurricanes spawn tornados as secondary agents of devastation. So the "flood and tornado" category captures some, but not all tornadic damage included in presidentially declared major disasters and emergencies.

Table 1 reveals that coastal states have received 71% of federal disaster relief (constant 1994 dollars) expended for "flood and tornado" primary incident declarations. This is not highly disproportionate given that coastal states are 60% of all states and 65% if coastal states and territories are combined (as they are in Table 1). Primary incident "flood and tornado" declarations for coastal states yield only 4% of total coastal federal disaster relief (constant 1994 dollars) and are 7.7% of all coastal state declarations for the 44 year period. Primary incident "flood and tornado" declarations for inland states yields a 10.7% share of total inland federal disaster relief (constant dollars) and are 8.6% of all inland state declarations for the same period.

Relatively speaking, "flood and tornado" in the context of this analysis is substantially equal for inland states and coastal states vis-a-vis declarations issued. Moreover, the share of federal disaster relief (constant dollars) attributed to "flood and tornado" primary incident declarations for coastal and inland states is similar. What is noteworthy is the 10.7% share of total inland federal disaster relief (constant dollars) stemming from "flood and tornado" primary incident declarations.

Table 2 notes that Mississippi, Alabama and Illinois (all coastal states) have won the largest number of "flood and tornado" primary incident declarations.

Severe thunderstorms are also cause for concern, especially because tornados and highly damaging winds are sometimes produced from them. THUNDERSTORMS affect relatively small areas when compared with climate events such as hurricanes and winter storms. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Nearly 1,800 thunderstorms are occurring at any moment around the world. Despite their small size, all thunderstorms are dangerous. Every thunderstorm produces lightning, which kills more people each year than tornados. Heavy rain from thunderstorms can result in flash flooding. Strong winds, hail, and tornados are also dangers associated with some thunderstorms. The National Weather Service reports that of the estimated 100,000 thunderstorms that occur each year in the U.S., only about 10 percent are classified as severe.



"Severe Storms" are a category of primary incident in the disaster declaration process. Table 1, as explained, presents all dollar amounts in 1994 constant dollar. Table 1 makes it clear that total federal disaster relief for primary incident "severe storms" (\$1.73 billion) actually exceeds total federal disaster relief for "flood and tornado" primary incidents (\$1.56 billion).

**In the matter of coastal vs. inland states, coastal states win a disproportionately larger share of federal disaster relief funding (84%) than do inland states for severe storms.** However, when it comes to the number of declarations issued for "severe storms" primary incidents, coastal and inland states have balanced shares (70%), with coastal states winning only 5% more than their proportional representation. Nevertheless, another primary incident category must be considered and that one is "Coastal Storm."

Table 1 shows that for the 9 "coastal storm" primary incident declarations, unsurprisingly all went to coastal states. If the \$102 million in constant 1994 dollar federal disaster relief for these declarations is added to the coastal "severe storm" primary incident federal disaster relief category, coastal state storm disasters yield about \$1.55 billion in federal relief for the interval studied. Total "storm damage" federal relief then jumps to about \$1.83 billion and the coastal state share of that amount is 84.7%.

Also, if the 64 coastal state "severe storm" declarations are combined with the 9 "coastal storm" declarations, coastal states jump to 72.3% of all "storm" declarations, an amount which begins to exceed its proportional share.

This pattern of coastal state predominance is even more pronounced if "snow/ice" primary incident declarations are considered. Table 1 shows that coastal states won 79% of all snow/ice declarations issued in the 44 year period. Since no territories have won declarations for primary incident snow/ice (all are in tropical or sub-tropic zones), the pool of coastal states stands at 30 or 60% of the 50 states. About \$1.17 billion in federal disaster relief (constant 1994 dollars) has been paid out on snow/ice primary incident declarations. Coastal states received 80% of this \$1.17 billion sum.

If "coastal storm," "severe storm," and "snow/ice" primary incident declarations are combined, there were 198 declarations or 15.2% of the total 1299 pool of declarations. Coastal states secured 150 declarations, or 75.6% of the 198 declarations of the pool. For these 150

declarations, coastal states received (again in 1994 constant dollars) about \$2.5 billion, or of the approximately \$3 billion spent in this pooled category. This means coastal states secured 83% of the constant 1994 dollar federal disaster relief funding expended for "coastal storm," "severe storm," and "snow/ice" primary incident disaster declarations issued from mid-1953 to mid-1997. **In other words, coastal states have won a disproportionately large share of declarations, and federal disaster relief, for the combined "storm-snow-ice" categories.**

The National Weather Service (NWS), the National Severe Storm Laboratory, and FEMA's Emergency Alert System, in cooperation with state and local emergency management agencies, shoulder much of the burden for providing public warning of tornado threat. Inadequate advanced warning time, wind vulnerable structures, and an unknowing public, may expose many to tornado threat. Public education, drills, practices, siren warnings, and feasible structural mitigation (there is no such thing as a perfectly windproof building) could all help in reducing the public's vulnerability to tornado. However, strong national, state, and local leadership are needed to advance these purposes.

Given the unpredictability and physical characteristics of tornados, there are few mitigation issues related to tornado-caused emergencies. Based on 1995 analysis from the National Weather Service, tornados killed more people in permanent and mobile homes than in any other locations. Some 77% of fatalities occurred in these domiciles.

One mitigation measure which would probably save lives, but is unrealistic to adopt is to limit the use of mobile homes. Many mobile homes cannot withstand the high winds associated with tornados. Despite the increased risk, the 5 to 6 percent of the population who live in mobile homes and the manufactured housing industry would aggressively fight any attempt to limit the sale or location of mobile homes. As a result, much of the federal government's tornado mitigation policy is based on a program of public education. Options that local municipalities may consider include building reenforced shelters in mobile home communities where residents may go to better protect themselves in the event of a tornado.

Three issues that Loran Smith considers most important in tornado policy are:

- 1) the degree of preparedness,

2) the definition of disaster, and

3) the amount of federal aid that should go to individuals, state, and local governments after a disaster.

Many state and local governments are not as prepared to meet the threat of tornados as they could be. Local elected officials have difficulty determining the costs and benefits of spending public funds on tornado preparedness measures. They often seriously discount the probability that a tornado will impact their jurisdiction.

Doppler radar is a technology that can increase the warning time for those in a tornado's path. Meteorologists rely on weather radar to provide information on developing storms. The NWS has strategically located Doppler radar equipment across the country. They are able to detect air movement toward or away from the radar. Early detection of increasing rotation aloft within a thunderstorm can allow life-saving warnings to be issued before the tornado forms. However, not all tornados are detectable or trackable on radar, Doppler or otherwise.

The increased use and coverage of Doppler radar by the National Weather Service and other organizations has done much to improve public warning time in advance of tornado strikes. Authorities claim that warnings to communities are now down to 10 minutes in advance of tornado impact. An ironic twist is that better tornado watches and warnings issued by federal agencies and by radio and television news organizations, have inadvertently alleviated some of the burden of emergency notification handled by local governments. If local governments do not maintain adequate tornado warning systems for their people as a consequence of over-dependence on tornado tracking by others, this may be a dereliction of their public responsibility.

Since tornado and severe storm disasters are of such low probability, they have low political salience outside of areas that have been recently hit. Thus, state and local officials have been justifiably weary of allocating funds to better prepare for the possibility of a tornado disaster. Measures that could be taken by local jurisdictions may include siren warning systems, building of permanent structures in the vicinity of mobile home communities, and supplying NOAA radios to residents. Many state and local elected officials have decided to perpetuate inadequate tornado preparedness measures because, in their minds, the risk of a touch down is simply not great enough to warrant doing more.

The NWS reports that on average 80 people are killed by tornados every year in the United States, and \$100,000,000 of property damaged is attributed to tornados. Most tornados are classified as WEAK tornados and account for less than 5 percent of all tornado deaths. About 70% of fatalities are from VIOLENT tornados, but only some two percent of all tornados are in this class. The Fujita Scale classifies tornado severity from 0 to 5 with F-5 tornados sometimes packing wind speeds greater than 300 mph.

L. Smith considers both the unlikelihood of a tornado and the cost of adopting measures like warning sirens. In 1980, the civil defense director of Kalamazoo, Mich., estimated that only 17 percent of the city's residents were within hearing range of city sirens. Despite this, and even though Kalamazoo had earlier that year suffered a tornado that killed five people, the city council opted not to appropriate money for additional sirens (L. Smith, 1991). Yet, many cities in "Tornado Alley" have adopted a network of warning sirens. This is only one means of warning the public however. NOAA radios may be a more suitable warning device for some.

Federal attention has been able to influence some tornado preparedness technology. After a tornado killed many parishioners attending Sunday services in an Alabama church in 1994, Vice-President Gore visited the site of the tragedy. In an expression of sympathy, he publicly lamented the lack of early radio warning. This gesture helped to move forward technological advances which now make it possible for specially designed radios to automatically turn themselves on with the broadcast of an emergency warning signal. Churches and other public facilities around the country are now acquiring these relatively low cost devices which may serve to prevent future tragedies similar to Alabama's.

The National Weather Service asserts that NOAA WEATHER RADIO is the best way to learn of warnings by its monitoring stations and units. The NWS continuously broadcasts updated weather warnings and forecasts to NOAA Weather Radios which are sold in many stores. The average range is 40 miles, depending on topography. The NWS recommends that people purchase a radio that has both a battery backup and a tone-alert feature which automatically turns the radio on whenever a tornado watch or warning is issued. The American Red Cross has purchased 25,000 NOAA Weather Radios using a foundation grant and the agency is in the process of providing these radios to all of its chapters and facilities nationwide. Distributing these radios and educating the public on radio use and listener response may be

more cost efficient and practical for local and state authorities in order to better protect their constituents from disaster.

Defining tornado damage as a "disaster" in official terms is often controversial and an object of political dispute. Congress tends to establish and re-establish federal disaster policy in response to statistically rare major natural catastrophes. In 1960, 1965, 1969, 1970, and 1974, Congress revised and expanded federal disaster policy specifically in response to major natural catastrophes. In doing so, Congress may have inadvertently made it possible for any community, even slightly affected by a tornado or weather event, to claim that it had been struck by a "major" disaster.

What may be defined as a disaster has ramifications at the state and local levels in the way that these elected government officials handle tornado disasters. Smith remarks that the trivialization of what constitutes a disaster has several important policy consequences (L. Smith, 1991, pp. 122-123).

1. Because a presidential declaration of a major disaster will bring about a major transfer of money, goods, and services that might otherwise have to be supplied by state and local politicians, communities and state governments are encouraged to highlight their losses and underestimate their resources. [Though federal agencies often participate in damage assessment and so may determine the veracity of claims made.]

2. The large number of disaster declarations has placed tremendous pressure on the disaster relief funds available, prompting FEMA to reduce its contribution to repair the infrastructure of state and local governments. This in turn, has angered many state and local leaders who complain that they are not receiving their "fair share" of federal aid funds.

3. The expanded definition of what constitutes a disaster undermines federal efforts to encourage state and local governments to adopt mitigation and preparedness plans, because it is assumed that federal relief aid may be used to rebuild or even improve communities struck by a tornado.

Other factors also play a part in determining the justification for a presidential declaration of major disaster or emergency. One such factor is the amount of insured and uninsured losses. If

a locality devastated by a tornado has a large portion of uninsured losses, federal and state help may be proven necessary. Correspondingly, a community whose tornado losses may be replaced or recovered through private insurance has less justification in proving declaration deservedness. For example, after a summer 1997 F-5 (maximum strength) tornado devastated Jarrell, Texas, the governor applied for a presidential declaration of major disaster but his request was turned down. Apparently, disaster management officials determined that 77 percent of the homes that were destroyed were fully insured, and this may have been the basis for the rejected request (From Dr. Rocky Lopes, Community Disaster Education, American Red Cross, 7-29-97 internet communication).

The media's portrayal of a tornado's impact on a region may also have a political influence on recovery efforts.

At the time of this writing, the NWS reported that WEAK TORNADOS accounted for some 69% of all tornados and less than 5% of tornado deaths. They last approximately 1 to 10+ minutes and have winds of less than 110 mph. STRONG TORNADOS accounted for about 29% of all tornados and nearly 30% of all tornado deaths. These may last 20 minutes or longer and have winds of 110-205 mph. VIOLENT TORNADOS accounted for only 2% of all tornados, but 70% of all tornado deaths. They may last over 1 hour and produce winds greater than 205 mph.

Critical issues in tornado disaster include effective forecasting, credible announcements of tornado watch and tornado warning, tracking the general path of sighted tornados, public evacuation in advance of tornado hazard, appropriate sheltering of evacuees, de-mobilization, emergency response to damaged areas, search and rescue operations, emergency medical services, utility repair, business and residential insurance against wind and rain damage, disaster relief from public sources, and long-term recovery efforts (endnote 2).

## Chapter 6 Earthquakes

This chapter explains the basis of U.S. earthquake policy, and California's impact on national policy. It considers some of the issues which surround both the Northridge earthquake of 1995 and the Loma Prieta quake in 1989. This chapter also examines some of the barriers faced in implementing earthquake mitigation and preparedness policies.

Earthquakes, like other disasters, sometimes overwhelm the emergency response and recovery capacity of individuals, businesses, and state and local governments. The human and economic loss inflicted by an earthquake and its consequences may be so great that tremendous help must be provided by people, businesses and governments outside the damage zone. This being the case, the problem of earthquake threat and destruction has been manifested in national policy and federal law. The federal government is expected to step in to provide basic humanitarian aid to the devastated areas.

**CATASTROPHIC EARTHQUAKE** is a seismic event or series of events causing great numbers of deaths and injuries, extensive damage, or overwhelming demand on state and local response resources and mechanisms. It has a severe impact on national security facilities and the infrastructures that sustain them. It also has a severe long-term effect on general economic activity. It also inhibits state, local, and private sector initiatives to begin and sustain initial response activities.

Many existing federal programs in place to serve purposes unrelated to disaster, have emergency provisions and disaster response capabilities that can be marshaled and coordinated to address earthquake aftermath. Also, the president can independently issue a major disaster declaration or can grant a declaration once a governor petitions for one. Clearly, earthquakes are a legitimate public policy problem in the U.S., but there remains tremendous variability in levels of earthquake mitigation and preparedness across the nation.

No American state is more prone to earthquake activity than California. That state is also the nation's most heavily populated and it is a coastal state with a very long coastline. The state's earthquake politics and policies have been carried forward in national earthquake policy. The state has a U.S. House of Representatives delegation numbering fifty-two, more than twelve

percent of the chamber. The state has enough political clout to influence national policy. As the nation's most populous state, it is often a trend-setter for the nation as a whole.

The U.S. seismic safety constituency is not strong politically or economically. There are vocal and active political and administrative officials who are worried about seismic safety. However, these leaders are scattered thinly in areas that have already experienced earthquake destruction. The general public and their political leaders have paid more attention to seismic safety over the past two decades, although much of this attention has been educational or symbolic.

The Earthquake Hazards Reduction Act of 1977, P.L. 95-124, as amended in 1990 by the National Earthquake Hazards Reduction Program (NEHRP) Reauthorization Act, P.L. 101-614, 42 U.S.C. 7701 et seq., provides the framework of national earthquake policy and FEMA is the lead agency charged with coordinating that program. Through NEHRP, FEMA works with other federal agencies [U.S. Geological Survey (USGS), National Science Foundation (NSF), and the National Institute of Standards and Technology (NIST)], the states, academia, and the private sector to minimize risk to life and property from future earthquakes. The primary goals are to make structures safer, better inform the public, press for better seismic mitigation. This entails:

- better understanding, characterizing, and predicting seismic hazards.
- improving model building codes and land-use practices.
- learning risk reduction through post-earthquake investigation and analysis.
- developing improved design and construction techniques.
- promoting the dissemination and application of research results.

NEHRP provides for research, planning, and response activities conducted within each of four specified agencies, and project grant programs funded through FEMA, USGS, and NSF. The program is currently funded at about \$100 million, of which \$50 million goes to USGS, \$28 million to NSF, \$20.5 million to FEMA and \$1.5 million to NIST. FEMA is the lead agency and has about \$4 million available annually for project grants (cooperative agreements) that are consistent with the approved work plan of each eligible state. The state matching requirement rises to 50 percent over a four year period and a share of federal-state funding must be used for mitigation activity.



There is a National Earthquake Mitigation Program Office within FEMA's Mitigation Directorate. This organizational location makes it clear that policy makers assume earthquakes are a natural phenomenon whose effects the government can prepare for and help alleviate. USGS produces earth science data, promotes warning of imminent earthquakes, and supports land-use planning and engineering design as well as emergency preparedness. NSF promotes siting and fundamental geotechnical engineering design, structural analysis (in part through the National Center for Earthquake Engineering Research). NIST and FEMA together work with state and local officials, model-building code groups, architects, engineers and others to be sure that scientific and engineering research flows into building codes, standards, and practices.

Studies conducted after the 1989 Loma Prieta quake in northern California concluded that local officials dealt satisfactorily with the immediate dangers of the earthquake, but were less successful in addressing long-term aspects of the relief effort (assisting residents in filing insurance claims, providing adequate housing, directing supplies to appropriate areas). Some local officials were not familiar with their responsibilities in the event of a disaster, and many did not know the roles of government agencies after disaster. Some local officials used improper channels in requesting assistance and in doing so impeded the functions of the intergovernmental response process (U.S. GAO, **Disaster Assistance**, 1991). FEMA's federal coordinating officer for Loma Prieta later said that local officials should have been included in the government's disaster preparedness and training exercises, which would have given them a better understanding of how the entire emergency response system works.

### Analysis

Table 1 discloses that from May 1953 through May 1997 there have been 17 presidential disaster declarations issued for earthquake. Fifteen have gone to coastal states and two to inland states. The same table shows that an astounding \$7.675 billion in federal disaster relief (via the President's Disaster Relief Fund) has flowed to coastal states. As before, dollar figures are in 1994 constant dollars. A paltry \$2.6 million in federal relief has gone to inland states experiencing declared quake damage. Table 1-A reports that there was only one turndown for earthquake, and that was a request by Pennsylvania, a coastal state.

FEMA figures reported in June 1997 indicate that the Northridge earthquake (DR 1008)

federal relief stood at \$5.6 billion and, since the books are still open in many program categories, that spending will continue to climb. As has been repeated throughout this study, other federal assistance programs outside FEMA and its Presidential Disaster Relief Fund are also added to federal spending totals for this disaster (and others).

Table 2, which depicts maximum declarations by incident type by state, illustrates that for earthquake, California received 8 declarations, Hawaii 3, and Oregon 2 in the interval studied. Alaska, Oregon, Idaho, and Nevada (to name a few) have single declarations for quake.

Table 3-C depicts in pie chart form federal disaster relief spending to coastal states, again in 1994 constant dollars and for the May 1953 through May 1997 interval. Earthquake represents the largest wedge of the pie at 28 percent. Hurricane is 26 percent and flood (primary incident only and excluding the "flood and tornado" category) is 25 percent. Table 4-C removes primary incident forms yielding less than one percent of federal relief spending. When this pie chart is examined, earthquake stands at 29 percent of federal disaster relief spending (1994 constant dollars) for May 1953 through May 1997.

Table 3-C-90 employs the same format to demonstrate federal disaster relief shares from January 1990 through May 1997. For seven and a half years of the 1990s, federal relief in 1994 constant dollars weighs in at 38 percent of all federal relief in the accounts studied. The Northridge earthquake, to date the federal government's most costly disaster [Hurricane Andrew is arguably more costly if public and private disaster spending is combined and comparison made], skews the earthquake cost data.

Table 3-I reports that inland state federal disaster relief for earthquake is less than 1 percent of the pie chart. The same finding is apparent in Table 3-I-90 for the January 1990 through May 1997 interval. According to Table 5-I-1, Idaho and Nevada are the only inland states to have won declarations for earthquake.

Before ending our review of earthquake disaster analytic findings it is important to inspect Tables 6 and 6-A. The Northridge earthquake struck in mid-January 1994. This disaster helped create a mammoth spike in federal disaster relief spending for the 1994 through 1996. If total annual federal disaster relief (1994 constant dollar) spending is divided by the number of declarations issued respectively by year, as is done in Table 6-A, it is again obvious that

Northridge contributed mightily to the spike in spending from 1994 through 1996. Long-term pay-out of federal disaster relief for infrastructure and building replacement/renovation will continue to add to federal disaster spending totals years into the future.

### Literature Analysis

Klebs & Sylves examined the Northridge earthquake providing a grassroots view of one FEMA inspector's experiences. Klebs' account illustrates the process by which FEMA conducts large scale recovery operations and they describe the human side of demanding and stressful disaster work. His work ascertained applicant eligibility for help under programs like EMERGENCY MINIMAL REPAIRS and INDIVIDUAL ASSISTANCE. Among the article's recurring themes are controversies surrounding homeowner earthquake insurance coverage, ascertaining fraud, the need to be fair and yet compassionate, use of automated palm-top computing technology to conduct paperless inspections, use of geographical information systems, and the indomitable spirit of most earthquake survivors.

The way in which federal, state and local governments address earthquake policy before a seismic event, can make a difference in the magnitude of need after an event. Moreover, when one level of government does not mitigate earthquake hazards, this has consequences for other governments. California, among other states, has the ability to push for strong federal disaster relief policies. Information exchange about the problem of earthquake mitigation, as well as selected demonstration projects funded by joint federal-state arrangements, would go far in getting earthquake reinforcement on the policy agendas of each level of government.

City administrators and public officials in California often face legal and political quandaries in the aftermath of an earthquake. California's local governments do not enjoy SOVEREIGN IMMUNITY and may be sued for mistakes they are proven to have made which cause harm, injury, private loss or commercial loss. For example, after the Coalinga earthquake, the state Seismic Safety Commission determined that Coalinga had weak, poorly enforced, building codes and lax building inspection. In turn, insurance companies sued some communities through SUBROGATION SUITS. Subrogation suits are filed by insurance firms against city governments, when those governments are demonstrated to have been negligent in fire and building code enforcement. The insurance firms seek cost recovery for claims paid out to private

property owners whose structures did not meet fire and building codes and which experience damage during the quake (Settle, 1988, p. 257).

NEGLIGENCE and PUBLIC DUTY DOCTRINE issues may also be a factor. In Coalinga, property owners filed class action suits against the city. Some property owners argued that their right to due process was violated when municipal authorities demolished their structures in the aftermath of the quake. In other words, had they been allowed a hearing before the demolition, they may have been able to prove to municipal officials that their structure was repairable. Some claims involved INVERSE CONDEMNATION (taking property from the rightful owner without just compensation).

Courts have ruled that state and local governments must sometimes pay landowners damages for zoning and other land use restrictions that reduce property value. However, state and local governments are sometimes liable if they did not stop certain development which takes place in hazardous zones, on the grounds that public authorities should have recognized the consequences of condoning such development (i.e., public duty doctrine). So in the first instance public officials are reluctant to promote disaster mitigation zoning because it opens them to claims alleging reduced property value. Yet, in the second instance, public officials are subject to lawsuits alleging that they should have curtailed development given their knowledge of a hazardous risk.

Since people tend to discount the risk and probability of earthquakes; earthquake mitigation has LOW POLITICAL SALIENCE in normal times. The structural alternatives in mitigation are often either demolition or reconstruction of existing structures, both of which are expensive and controversial.

Alesch and Petak provide an overview of the political history of earthquake mitigation in Long Beach and southern California in general. Their study depicts the political ebb and flow of quake mitigation and, explains the affect of counter forces like historic preservation, landlord resistance, and the opposition of retirees living on fixed incomes.

The article recounts the effects of the Long Beach earthquake on March 10, 1933. The disaster was responsible for 120 deaths and extensive building damage. Since half of the damaged buildings were of unreinforced masonry construction, a political movement for tougher building codes was launched in the quake's aftermath.

Since Long Beach's building codes could not be enforced retroactively, it was difficult to compel owners of existing structures to reinforce or rebuild their buildings. Long Beach City Council was able to require building fronts to be reinforced in 1950, on the pretense of protecting the public from their collapse. The next step came in 1959, when the council defined earthquakes as nuisances. This empowered local building officials to condemn earthquake hazardous buildings and force property owners to strengthen or demolish their structures.

A 1966 state court ruling for Bakersfield, CA, which imposed similar laws, determined that California cities were authorized to use public nuisance laws to condemn unsafe buildings vulnerable to earthquakes.

In a backlash response in 1969, local property owners launched organized opposition to nuisance laws based on the PUBLIC TAKINGS clause. In response, the Long Beach City Council's legal counsel recommended adoption of a uniform building code. The council resisted until after the San Fernando Valley quake in February 1971, which killed 60 people and caused the collapse of an immense number of unreinforced structures.

Many retirees, often with low incomes, also protested. Generally speaking this socio-economic group tends to oppose mandatory building codes which force landlords to undertake expensive earthquake retrofits of their rental properties. These people fear that their landlords will raise their rents and some surmise that they will have passed away long before the feared catastrophic earthquake strikes their residence. Another source of opposition often comes from historic preservationists. In particular, many preservationists in the Los Angeles area vehemently protested proposed demolition of seismically vulnerable old movie theaters.

It is important to know who the stakeholders are in political controversies involving seismic mitigation. For example, developers, preservationists, low income retirees, and existing property owners proved to be formidable opponents of seismic mitigation in Long Beach, while advocates of mitigation in government and the insurance industry possessed relatively limited power, except after major earthquakes. The use of building codes to require reinforced structures in earthquake prone areas represents a public good since they reduce the extent of structural damage and help to save lives.

Earthquake response and recovery may be excessively difficult for a locality to manage. In

the wake of immense costs and lack of necessary support systems, mayors may petition a state governor for a state disaster declaration. The governor in turn can petition the president for a presidential disaster declaration to alleviate the financial burden of earthquake recovery.

Earthquakes of even moderate magnitude have triggered presidential disaster declarations. As mentioned above, in 1983, Coalinga, Calif., experienced a moderate quake which caused extensive property damage but no loss of life. Owing to national media attention, the mayor of Coalinga was successful in convincing Governor Deukmejian and, in turn, President Reagan to grant Coalinga a state and presidential disaster declaration respectively. Settle's case study of "The Coalinga Earthquake" documents how the quake devastated downtown businesses and how the mayor of Coalinga skillfully used the media and his political influence to secure very substantial disaster relief aid from the federal and state government, which was then used to refashion and rebuild the downtown into a shopping plaza.

Another example of post-quake disaster rebuilding expense, which also spawned political controversy, stemmed from the costs of rebuilding Los Angeles area hospitals during the recovery from the Northridge temblor. FEMA contributes to disaster recovery costs, especially for improving health and safety facilities. In March 1996, FEMA announced that it would provide nearly \$1 billion in federal funds in a new mitigation approach to strengthen the structural integrity of four local hospitals damaged by the Northridge earthquake. This decision was made after a heated dispute between FEMA officials and California officials. Initially FEMA complained that California's post-quake building code changes, applied to public structures but waived for private structures, forced the rebuilding of many hospitals under the 90/10 federal/state share in effect for damage caused by the quake. FEMA originally argued that most of the hospitals did not need as much rebuilding as the new codes required. However, facing strong political opposition from top state officials and the embarrassment of opposing an albeit expensive mitigation effort, FEMA reversed itself and agreed to the extremely expensive hospital rebuilding effort.

Below is FEMA's announcement on the matter. "Through its seismic hazard mitigation for hospitals effort, FEMA offered more than \$831 million to Cedars Sinai Hospital, St. John's Medical Center, Los Angeles County-USC Medical Center, and UCLA Center for Health Sciences." These hospitals will receive more than \$947 million for the repair or replacement of

damaged facilities through a cost-share agreement between FEMA, the state of California and other local contributors.

FEMA Director James Lee Witt remarked that, "through comprehensive consultation with the state and the hospitals, FEMA provided the most cost-effective funding package that would ensure that these buildings will be able to operate after another major earthquake. This new mitigation effort is providing the means to repair or replace damaged buildings. More importantly, these funds will enable hospitals to build their facilities to stronger structural standards to withstand future earthquakes." By improving area hospital performance, the need to evacuate patients might be avoided and post-disaster operations would be improved since these facilities would serve victims when they need assistance most (FEMA, March 12, 1996 internet release).

## Chapter 7

### Structural Collapse and Failures

Structural collapse issues are extremely relevant in any study of coastal state disasters. Often the forces of nature are made more devastating by the failures of humans.

Structural collapse and functional failures seem to be on the rise in the U.S. They are attributable to such varying events as natural disasters, design and/or construction flaws, and even terrorist bombings (such as at the New York World Trade Center). Structural collapse and functional failures are addressed primarily by mitigation measures, and to a lesser extent by preparedness, rather than by response and recovery actions. The key levels of government involved are state and local rather than national. Important mitigation measures aimed at preventing structural failures are building codes and regulations, zoning laws, and land-use decisions. This section looks at the emergence of structural collapse as a matter of disaster policy. In doing so it focuses on examples of structural collapse and on the barriers to effective technical capability, problems of administrative resources, and the counter-pressures of economic growth and development.

Effective design, regulation, inspection, and enforcement combine to prevent disasters, but do not garner much positive publicity or political credit when collapses or failures DO NOT occur. They are simply taken for granted. When a structural collapse does occur, however, government regulation and the private construction industry are held accountable.

Effective disaster policy requires formal state and local action which identifies problem areas and addresses them to mitigate future disasters. Indeed, it is a critical component to successful emergency management. Despite that logic, an American aversion to regulations which constrain what owners can do with their property and strong pressures to "trade off long-term mitigation benefits against short-term recovery needs," make it difficult to find support for programs and policies that reduce risks. While much is known about hazard reduction and more is being learned after each disaster, there are serious questions about the willingness of communities to commit resources and to support regulatory programs to reduce risks to lives and property posed by structural collapse.

The establishment of building standards serves as an excellent example of this. Building



standards and codes serve as one of the oldest forms of government-mandated disaster mitigation. They have been implemented from a lessons-learned perspective in which structural and functional problems have taught people painful lessons over the centuries. Nevertheless, communities in the U.S. have generally been found to lack effective regulation and enforcement of building codes (although this is more true in certain areas of the U.S. than in others). As a consequence, there have been a few major structural failures and many minor failures in the United States. Natural disasters have also been more damaging than they might have been owing in part to the lack of effective standards and enforcement. In other words, the inadequacy of regulation and enforcement has cost thousands of human lives and billions of dollars in property losses.

Structural failures occur when a structure loses its ability to perform its intended functions because of lack of maintenance, design or construction errors, a natural disaster, or even terrorist activity. Regardless of the cause, it is important to differentiate between two types of structural failures: structural collapse and functional failures.

FUNCTIONAL FAILURES occur when a structure does not collapse but lacks the capacity to perform one or more of its intended functions. Plumbing, sanitation, heating, and electrical problems represent just a few examples. Functional failures do not normally constitute a danger to human life and are amenable to correction. A STRUCTURAL COLLAPSE, on the other hand, occurs when part or all of a structure comes apart or undergoes large and permanent deformation. As a result, it loses all capacity to perform intended functions. Although there are many more functional failures than collapses, the latter are more dramatic and receive greater media coverage because they usually involve death and injury.

Structural policies to avert structural collapses and functional failures have not been crisis-reactive. Most structural policies, in fact, are intended to provide an engineered REDUCTION IN RISK, even if they involve greater economic costs than monetary benefits. Moreover, most of these policies are quite rational taking into account many technical, social, administrative, political, legal, and economic factors. Also important is that while the federal government is involved, structural mitigation and preparedness procedures are implemented at the state and local level via building codes and zoning ordinances.

A **BUILDING CODE** is a series of standards and specifications designed to establish minimum safeguards in the erection, renovation, and construction of buildings. These safeguards are intended to protect persons who live and work in buildings from hazards and to constitute regulations to further protect the public's health and welfare. Building codes usually deal with standards for building plumbing, electrical, heating, safety, sanitation, lighting, ventilation, fire prevention, etc. The primary reason for their enactment by cities and counties is for **PUBLIC SAFETY**. Cities and counties either write their own codes or adopt codes suggested by various national associations. Normally, localities adopt some, but not all, of the standards suggested in the model codes.

**ZONING ORDINANCES** are also closely linked to building codes. While building codes are used as a mitigation mechanism to prevent structural failures, zoning ordinances are used to contain risk. Zoning ordinances deal with the types of buildings that can be built in certain areas. They not only regulate the types of structures that may be built, but they also help control safety considerations, such as the height of buildings in relation to the environment, the size and depth of structural foundations, and an array of other factors dealing with structural safety.

Although efforts to avert structural collapse and functional failure are promoted primarily by the desire for public safety, other factors enter into the issue as well. Another factor which contributes to mitigation is the increasing number of, and monetary claims involved in, **LIABILITY LAWSUITS**. Fear and concern about liability lawsuits alleging dereliction of public safety obligations, have impelled government and building professionals to be more concerned with structural failure than they might otherwise have been. More to the point, better building safety stems in part from fear of bankruptcy by entities judged liable and by crippling insurance premiums. Owing to the impact recent major disasters have had on insurers, the U.S. insurance industry strongly endorses disaster mitigation efforts, many of which are aimed at structural reinforcement and building safety.

Yet, despite the growing support in favor of mitigation efforts such as building codes and zoning ordinances, analysis reveals that such efforts are inadequate. In effect, current regulation and enforcement mechanisms are not as effective as they could be. This is largely a consequence of opposition to government policies which allegedly restrict personal freedom and or hamper local economic growth and development. In addition, a lack of technical expertise and

administrative resources on local levels also inhibit the effective regulation and enforcement of mitigation mechanisms. Hurricane Hugo (1989) and Hurricane Andrew (1992) are offered as examples of the problems involved in effective mitigation efforts.

### HURRICANE HUGO (1989)

One study conducted in the aftermath of Hurricane Hugo in 1989 reported that South Carolina had no statewide building code and that local adoption was optional. State law in 1972 had permitted counties, cities, and towns to mandate conformity with the current Standard Building Code and the National Fire Protection Association Standards. Those jurisdictions that adopted the standards were also required to create permanent building departments with at least one administrator. Weak building codes actually made South Carolinians more vulnerable to hurricane devastation.

When Hurricane Hugo struck, however, only about half of the cities and a third of the counties had adopted the Standard Building Code. Moreover, while the 1972 law had created a state agency to oversee and facilitate the adoption of local codes, approve modifications, and hear appeals, the agency had been given no enforcement authority over local codes. The agency's primary role was in designating responsible building officials for state buildings and schools.

There were also concerns about nonconformity with seismic design standards, poor coastal construction techniques, noncompliance with coastal wind standards, and poor design standards for manufactured housing. A 1993 study on building code enforcement found that, while larger cities had building codes, enforcement was usually extremely weak. The study disclosed that, frequently, only one of the local building inspectors had an engineering degree and most were political appointees with little training other than what they received on the job. In addition, building codes were often so newly adopted that few buildings conformed to current standards and the most vulnerable buildings were not yet identified.

In the wake of Hurricane Hugo some communities suspended enforcement of building codes, except in cases of serious structural damage, to speed the repair of needed housing. This was done because the normal administrative issuance of permits and monitoring of construction would have overwhelmed the available staff in South Carolina. In some counties, the licensing of contractors was substituted for inspection of repairs.

The 1993 study also revealed that elected officials and the public remained unconvinced of the need for better disaster mitigation. Investigation of public policy actions in South Carolina concluded that there had been a strong political opposition to mandatory state building codes in the 1980s and that the experience of Hugo did not overcome the funding and political concerns of local officials. As an example, a proposed state mandated building code, absent state funding for code enforcement, failed in the South Carolina Legislature.

#### HURRICANE ANDREW (1992)

Inquiries after Hurricane Andrew struck south Florida revealed that the region's building codes were among "the toughest in country." Regardless, damage caused after Hurricane Andrew was significant. The problems cited in this case were poor construction, poor building code enforcement, and wind speeds in excess of the expected 120 mph maximum. In addition, manufactured housing (such as trailers and mobile homes) did not meet federal construction standards, often failing in winds as low as 80 mph despite a standard of 110 mph.

Retrofitting, better siting, and other mitigation actions were recommended to reduce vulnerability to future disasters. As Dr. Robert Sheets, Director of the National Hurricane Center, pointed out in a 1994 conference, the larger problem was the style of many of the homes. Many were two- or three-story, wood-framed homes inappropriate for south Florida. Large cathedral ceilings, double doors opening inward rather than outward, and other design choices offered little resistance to wind and were particularly vulnerable to heavy wind gusts.

The Hurricane Andrew experience also offered a painful lesson concerning mobile homes. As many as 18,000 mobile homes were damaged or destroyed in south Florida and Louisiana during the Hurricane. Clearly one of the problems was that some mobile homes were only required to hold up under 80 mph winds and Andrew's winds were in excess of 160 mph. As a result, new federal standards were adopted in 1994 requiring that new mobile homes sold in Hawaii and 25 counties on the coast of Alaska, Louisiana, Florida, and North Carolina (hazard-prone areas) be built to withstand 110 mph winds. U.S. Housing and Urban Development officials estimate that the cost of this measure will raise the costs of mobile homes. They estimate that the 110 mph standard will increase prices \$1,200 to \$1,500. If the additional cost to manufacturers is passed on to consumers, the 110 mph standard may raise prices anywhere from \$5,500 to \$6,000.

Another frequently noted point that is made concerns the importance of building codes. Building codes are crucial to developing effective mitigation strategies: they need to be technically sound and properly enforced. Perhaps more telling is the perceived need to conduct research on how to overcome public official and public opinion resistance to mitigation programs. The National Research Council concluded that: "Building codes should be a central part of a mitigation strategy for new construction. Barriers to the adoption and enforcement of modern codes should be identified and strategies developed that include incentives and other mechanisms to overcome community and industry resistance."

The National Research Council also advocated that:

1. The federal government and professional organizations assume responsibility for providing financial and technical assistance to local and state authorities;
2. Land-use planning (zoning ordinances) be emphasized to assure that building is effectively regulated in hazard-prone areas;
3. All government financed or insured structures be required to conform to appropriate codes;
4. Mitigation training be supported by the federal government;
5. Hazard-specific research be directed to developing new mitigation strategies to strengthen existing buildings and to make new buildings safer; and
6. More and better information be provided to communities and businesses to encourage support for mitigation measures.

The issue of building codes is getting more and more attention in the face of mounting disaster losses. Hurricane Andrew alone represented more than \$15.4 billion in losses to the insurance industry, with much of the loss due to property damage that could have been mitigated if building codes in south Florida had been adequately enforced. There is also considerable interest in enacting more effective building codes to further reduce damage due to disaster.

In addition to concerns for general public safety, there has been a clear indication that the

insurance industry is also interested in reducing exposure and liability, or at least defining it accurately. Some companies stopped issuing residential property insurance in south Florida following Hurricane Andrew, suggesting their considerable concern about exposure and liability. In short, insurance companies want to know about the appropriateness of building codes and the effectiveness of their enforcement. Some insurance companies may threaten to discontinue selling insurance if they are not allowed to charge premiums sufficiently large enough to cover the risks they incur. There will always be, however, some firms willing to issue policies despite the risk of failure in major disasters. Catastrophic events, such as Hurricane Andrew, can force some companies into bankruptcy and leave policyholders without coverage for their losses. This would entail greater personal and governmental liability.

Despite these concerns of public safety, and liability/exposure, strong barriers still confront the enactment and enforcement of effective building codes and zoning ordinances. These barriers involve technical, administrative, economic, and political factors that hamper mitigation efforts.

#### BARRIERS TO MITIGATION MECHANISMS

Henry Quarantelli points out in the U.S. Report on the International Decade for Natural Hazard Reduction (1994), that "the stringency of building codes, zoning ordinances, and other hazard abatement regulations also appears to depend more on economic and political pressures than on technical standards of community safety." The problem is how to provide local officials with state and federal fiscal and technical resources and, at the same time, encourage local action to reduce hazards.

Two of the problems involved in enacting and enforcing proper building codes is **TECHNICAL CAPABILITIES** and **ADMINISTRATIVE RESOURCES**. From a technical and administrative standpoint, it is important to recall that building codes are enforced and administered on a local level. Many localities lack the financial means necessary to employ a sufficient number of technically-trained inspectors and administrators. Some local governments have the financial means but do not choose to adequately fund and implement this public responsibility. Inspectors and administrators are often low-skilled and low-paid employees who are over-worked and under-trained. In addition, those positions are often filled by political

appointees who have no experience other than what they get on the job. In both hurricanes investigated, a lack of technical capabilities and administrative resources clearly hampered the effectiveness of building codes.

Although in some measure it is a question of administrative and fiscal capacity, it is also a question of political capacity. The South Carolina case demonstrated that there are strong state and local interests who oppose codes, regulations, and plans that might raise the costs of doing business, increase taxes, or limit use of private property. Such examples address the important political factors of PERSONAL FREEDOM and ECONOMIC GROWTH AND DEVELOPMENT.

Since building codes and zoning ordinances are issues of local government jurisdiction, they are greatly influenced by local officials, local interests and local needs. Most prominent of these are personal freedom and economic growth/development. The issue of PERSONAL FREEDOM is largely tied in with PUBLIC OPINION and PRIVATE PROPERTY. Building code and zoning ordinance efforts are tempered by traditional American opposition and resistance towards national planning and regulation. The American public does not want the government telling them what they can or cannot do with their property. Often the public sees these measures less as preventive efforts to reduce the impacts of disasters and more as government intrusions and restrictions on personal freedom.

Perhaps the most powerful barrier, however, is the interest of economic growth and development. Economic growth and development imposes a number of pressures on builders and developers (holding down costs by cutting corners, finishing work on time, designing for the convenience and aesthetics of the building's ultimate users, etc.). Moreover, elected officials and even zoning and building officials, are also pressured by the need for economic development and augmented tax bases in their jurisdictions. The situation is then one in which elected local officials bear the burden of regulating building codes and zoning ordinances among the same groups that provide them with votes, campaign contributions, economic development and local employment. In this manner, economic growth and development pressures and interests hamper the enactment and enforcement of building codes.

Though events such as Hurricane Hugo and Hurricane Andrew have brought the issue of

standards and enforcement to public attention, it is still uncertain whether that lesson has been learned in the U.S. As mentioned, powerful barriers remain in the path to enacting and enforcing building codes and zoning ordinances, especially at the local level. In that regard, state action and possibly even federal intervention to mandate and standardize building codes would appear easier than local action. Moreover, with some fiscal support from the federal and state governments, at least some of the problems in enforcing and administering could be overcome as well. Whether more fiscal inducements would help public officials overcome the political opposition of those who would trade improved community safety for economic growth and development, is another issue entirely.

A relatively comprehensive approach to disaster mitigation through building codes might include the following actions:

1. Increasing the effectiveness of building standards through the National Flood Insurance Program and for seismic risk areas through a national earthquake insurance program;
2. Encouraging the adoption of appropriate state and local building codes in all communities, regardless of the risk of flooding or earthquake;
3. Encouraging a broadening of the emergency management role in local and state governments to include assistance to public works, building, and other departments with responsibilities for hazard mitigation; and
4. Increasing the capacities of state and local offices to enforce building codes, including the capacities to assess the code compliance of exotic designs, new technologies, and new materials.

There are a great many manmade structures besides buildings which may be subject to collapse. For example, bridges, though subject more to functional than structural collapse, pose a serious problem for the U.S. (50 percent of U.S. bridges 20 feet or longer are in need of repair.) Dams and roads are other examples of manmade structures that are prone to structural collapse and functional failure.



## Chapter 8 Conclusion

This research chronicled the increasing number of disasters and emergencies in coastal zone states, confirmed the dramatic increase in the costs of disasters, provided coastal state officials with a 44 year record of their (and other) state's experience with disaster, and surveyed within the format of presidential disaster declarations the disaster experience of coastal states and to a limited degree their counties. U.S. commonwealth and trust territories were included in the study. This will add to our knowledge of insular disasters and emergencies.

Unfortunately the study could not take into account human and environmental impacts of disaster loss, the significance of duration of incident period and the closing date for disaster assistance programs on each event, and could only offer a modest long-term overview of disaster experience both at state and county levels in coastal zone jurisdictions.

Hypotheses which were tested include:

1. Coastal zone states receive disproportionately more presidential disaster declarations (all types) than non-coastal states, with control for population and land area.

To test this with control for population it is necessary that territorial island states be omitted. This is because the relatively small populations combined with huge hurricane or typhoon federal disaster assistance skews the findings. In other words, the island jurisdictions (with exception of Hawaii) are small area, densely populated jurisdictions which produce mammoth per capita federal relief totals. Hawaiian and territorial inhabitants are often unable to evacuate before a typhoon or hurricane makes landfall. They must shelter in place or find public shelters.

It is also important to restrict analysis to the decade of the 1990s, using the 1990 Census and only January 1990 to May 1997 cases. The per capita average for coastal states and Hawaii, excluding territories, is \$52.40 as tabulated from Table 7. The same figure for inland states is \$52. Thus, the hypothesis is not confirmed in per capita figures if territories are excluded. Ironically, if territories are included in the coastal state group, the coastal per capita average is \$331, which is far more than inland's \$52 per capita average and in this condition the hypothesis is confirmed.

However, if total federal relief (1994 constant dollars) is considered on a spending per square mile basis, there are \$184,831 per square mile spent in coastal states and territories to only \$5,497 spent for inland states. On this scale coastal states do overwhelmingly better than do inland states.

Federal spending for each coastal jurisdiction divided by each jurisdiction's population density yields a grand average of \$4,742,452 for coastal states. The same measure for inland states is \$3,385,348. This suggests that on this scale coastal states are still collecting relatively more federal constant dollar disaster aid than are inland states, but the gap is smaller between the two.

It is interesting to consider extreme states in Tables 7 and 7-A. Hawaii tops all per capita federal constant dollar disaster relief for January 1990 to May 1997 with \$252. The next highest coastal state is California with \$226 and Florida rings in with \$163 after that. For inland states, North Dakota tops all per capita federal constant dollar disaster relief for the same interval with \$184, owing largely to the Red River flood disaster of 1997. South Dakota follows with \$143 and Iowa with \$114, also due to major flooding in the 1990s.

2. Coastal zone states receive disproportionately more presidential disaster declarations for major disaster (first) and emergencies (second) than non-coastal states, with control for population and land area.

Since emergencies are only about 10 percent of the pool of declarations, it made little sense to differentiate between emergencies and major disasters in the declarations. It is important to consider total number of declarations coastal vs. inland.

With 261 declarations in the period of the 1990s (1/90-6/97), the 39 coastal jurisdictions averaged 6.7 declarations. With 98 declarations in the same period, the 21 inland jurisdictions average only 4.7. On this narrow range, coastal states do better than inland states.

Table 8 indicates that total U.S. land area is about 3.8 million square miles. Inland states including District of Columbia cover 1,497,369 square miles. Coastal jurisdictions occupy 2,295,206 square miles. Dividing the 261 declarations of coastal states into coastal state land area yields 1 declaration for every 8793 square miles parcel. Correspondingly, for inland states

and their 98 declarations for the 1/90-6/97 period, if 98 is divided into inland total land area the outcome is 1 declaration for every 15,279 square mile parcel. Awkward as this may seem, it does stand as evidence that coastal states receive more declarations per square mile than do inland states. This is true even if territories are excluded.

3. Coastal zone states receive disproportionately more federal disaster relief assistance than non-coastal states, with control for population first, land area second, and both population and land area third.

This was discussed above, but bears repeating. For the interval 1/90-6/97 coastal state per capita federal disaster relief is a little over \$52, if territories are excluded. Inland state per capita federal relief in the same units is also \$52, so no bias exists either way. However, the incorporation of territorial disaster relief skews per capita relief to \$331, thus confirming the hypothesis under these conditions.

For the interval 1/90-6/97, coastal states received \$184,831 of federal relief (1994 constant dollars) p/sq mile while inland states secured only \$5497 p/sq mile. The hypothesis seems confirmed on the land area score.

For the same interval, coastal states in terms of population density divided into federal relief dollars per jurisdiction summed and averaged yields \$4.7 million. The same for inland jurisdictions yields \$3.3 million. This shows a measureable bias but smaller gap than for land area.

4. Coastal zone states experience more flood disasters which earn presidential declarations than do non-coastal states, when controlling for population and population rank and when controlling for land area.

Table 1 shows that coastal jurisdictions (including territories) won 368 declarations for primary incident flood. Inland jurisdictions won 260 in the same category. About 58.6% of all flood declarations went to coastal jurisdictions, when coastal state jurisdictions are 3/5ths (60%) of all states and when coastal states and territories comprise 65% of all U.S. states and territories. On straight proportions, coastal states do NOT win a disproportionate number of primary incident flood declarations. It is clear that this could not be true even with control for population

since coastal states hold only about 40 million people, or about 16% of the 1990 U.S. population. Population rank and flood declarations are uncorrelated and running opposite the hypothesis.

5. For coastal zone states as a group, ocean shoreline counties are more likely to be included as disaster declared counties in presidential declarations than are inland or estuarine counties in the same state, with control for county population and county land area.

Based on ArcView map reading this would only appear valid for California, the Gulf Coast and the southeastern Atlantic only to Virginia. Control for county population and area was beyond the capacity of this project, though mapping would suggest that even were these controls added, coastal counties would NOT (except in the regions mentioned above) stand out as more declaration prone.

6. A greater percentage of gubernatorial requests for presidential declarations will be approved for coastal states, than for non-coastal states, with control for population and land area. The assumption is that coastal states, owing to greater disaster experience, are better able to fashion and expeditiously file declaration requests than are relatively less disaster experienced non-coastal states.

With 444 turndowns (Table 5-C-2) for 31 jurisdictions (TT assumed to be imbedded among Pacific trust territories), rejection average is 11.3 for coastal jurisdictions. For the 21 inland jurisdictions there were 198 turndowns in the same interval. This averages to 9.4 per jurisdiction. This refutes the hypothesis posed. Let's take out territories and the District of Columbia and ask the same question. Inland states then total 20 and experience 197 rejections yielding 9.85 rejection average for inland jurisdictions. Coastal states then total 30 and turndowns drop to 428. By dividing coastal states into coastal state turndowns it is obvious that there is a 14.26 rejection average for coastal jurisdictions. So again, coastal states are not blessed with lower turndown rates but rather with higher turndown rates. Little is gained in controlling for population or land area since the hypothesis is unconfirmed regardless.

7. Coastal states are more likely than non-coastal states to receive a disproportionate share of federal infrastructure (Public Assistance) repair and replacement funds, with control for population and land area differences, owing to greater infrastructure-damaging disaster experience in coastal states. The same hypothesis may be tested for coastal state counties based on format of hypothesis #5 above.

This proposition was impossible to test because the vast majority of disaster declarations include both Public Assistance (PA) and Individual Assistance (IA). The pool of PA only declarations was too small to permit generalizability or coastal vs inland comparisons.

8. Coastal states are more likely than non-coastal states to experience a greater variety of different types of disaster incidents, with control for population and land area differences.

This hypothesis appears quite valid given the findings of the data. Each region's state primary incident pie chart analysis seems to confirm that coastal states experience a wider variety of disasters than do inland states. Some of this is because coastal states are generally more vulnerable to hurricanes than are inland states. Moreover, the category "coastal storm" primary incident can only be held by coastal states (as no coastal storm requests have ever been approved for inland states, despite two requests). This artificially adds another category for coastal states augmenting the variety of disaster types they are likely to experience.

However, there are many legitimate reasons why coastal states experience a wider variety of disaster incident types than do inland states. Weather extremes along coastlines and along the shores of the Great Lakes produce an array of hazard threats. Lake effect snow in Michigan, Ohio, western Pennsylvania and western New York has been the source of many snow emergencies. The combination of relatively high population densities, urbanized settlement, industrial concentration, elaborate and complex infrastructure development, all compounded by immense development along coastlines, has exposed more people and property to disaster threat in coastal states.

9. Per capita federal disaster relief assistance is greater for coastal states than non-coastal states, with control for population and land area, owing to relatively greater disaster devastation and frequency in coastal states.

This was discussed twice above. However, coastal states AND territories DO receive more per capita federal disaster relief than do inland states. Clearly coastal jurisdictions do experience more declarable disasters but they also contain dense populations, especially in the territories. Remember, if territories are omitted, coastal and inland states are almost identical in terms of per capita federal disaster relief, at least for the decade of the 1990s.

10. U.S. commonwealth and trust territories are likely to have measurably greater per capita federal disaster relief costs than coastal states first, non-coastal states second, and all 50 states third, owing to greater hurricane and typhoon vulnerability.

This proposition was easily confirmed, though few Americans realize how much they assist U.S. territories and commonwealth partners after major disasters. Most of the trust territories and commonwealth nation's eligible to receive presidential declarations of major disaster or emergency are extremely land poor and densely populated given their land area. On top of this, Puerto Rico and the U.S. Virgin Islands are often in the paths of Atlantic hurricanes, more so than even the most vulnerable Atlantic and Gulf states. Moreover, typhoons seem to strike the Pacific territories and commonwealths almost bi-annually. American Samoa, Micronesia, the Northern Marianas, the Marshall Islands and the Republic of Palau show huge per capita federal disaster relief, as do Puerto Rico and the U.S. Virgin Islands. Federal disaster relief has become a form of "foreign aid," justly deserved and generally appreciated by recipients.

11. The longitudinal increase in gubernatorial requests for presidential declarations of all disaster types will be greater for coastal states than for non-coastal states.

Table 6 graphically and convincingly confirms this hypothesis in terms of federal disaster relief spending over time. It is unclear however whether coastal state governors will make disproportionately more requests for presidential disaster declarations than their inland counterparts.

12. Correspondingly, the longitudinal increase in federal disaster relief costs under presidential declarations of all types will be greater for coastal states than for non-coastal states.

It is necessary to consider 11 and 12 together. There has been a measurable "ramp up" in governor requests for presidential declarations of major disaster and emergency, regardless of whether governors are from coastal or inland states. There are several reasons for this. The Stafford Act of 1988 gave the president more latitude in determining what is or is not a disaster. There appears to be a legitimate rise in the number of mega-disasters (major hurricanes, earthquakes, floods, etc.) and a parallel rise in the number of smaller garden variety disasters. Governors and their states are getting better, more professional, and faster at assessing damage and making requests for presidential declarations. State officials have recognized that both the

Bush and Clinton administrations have been more reluctant than either the Carter or Reagan administrations to turndown gubernatorial requests for major disasters or emergencies. An additional force, though one that is difficult to measure, is the impact of high speed television (often real-time) news coverage of disasters or emergencies. In the past many events which would have been only local news are now portrayed as national news by the major networks. This tempts governors to seek declarations for marginal events and it induces presidents to be receptive to those requests, often for political reasons.

The graphs displayed in this report make it clear in almost every case that coastal state federal disaster relief is on the rise and following a steeper curve than inland states are on. However, the rise is not constant every single year owing to variability in disaster frequency from year to year. One remarkable surprise in the findings was that even in the year of the Great Midwest flood of 1993, a calamity impacting more inland than coastal states, coastal states won more federal disaster relief for primary incident flood than did inland states. Admittedly, Illinois, Indiana, Wisconsin and Minnesota (each impacted by the Midwest flood) are classed as coastal states. Yet Iowa, Missouri, Nebraska, Kansas, South Dakota and North Dakota arguably took the brunt of Great Midwest flood devastation.

#### Application of Results

By understanding and using the disaster record of coastal and insular areas, public officials will have a better appreciation of the need to protect coastal inhabitants, resources, and properties. It will also elucidate policy process information which may help governors and other officials better grasp reasons why disaster declarations may be turned down by the president. Such information may save coastal states from repeating earlier disaster declaration request mistakes and it may demonstrate circumstances in which states and counties affected by disaster agents can expect federal assistance. For example, about thirty disaster requests involve fishing losses. Most are approved, but many have been turned down. My study provides comparative evidence regarding these events and it explores factors influencing approval or turndown decisions. Ultimately, this work will educate coastal area authorities and their residents apprising them of their area's disaster experience and vulnerabilities.

These results will be circulated to coastal zone state governors, environmental managers, and

emergency managers in the National Governors Association, the National Emergency Management Association, the National Coordinating Council on Emergency Management, and the Coastal Conservation Association. Journal publications of the findings of this research will be produced. In mid-August 1998 tabular findings of this research were presented to the Aspen Institute's Global Climate Change Committee, composed largely of NOAA meteorologists and climatologists.



## **Appendix 1: Federal Emergency Management**

The U.S. FEDERAL EMERGENCY MANAGEMENT AGENCY was created in 1979 to provide a single point of accountability for all federal activities related to disaster mitigation and emergency preparedness, response, and recovery. Analysis reveals that original objectives, organizational make-up and missions of FEMA are imbued with a variety of significant political factors.

Early administrative history reveals that disaster assistance and relief activities moved from the Housing and Home Finance Administration in 1951 to Federal Civil Defense Administration in 1953 to the Office of Civil Defense and Mobilization in 1958 to the Office of Emergency Planning (later renamed the Office of Emergency Preparedness) in 1961. Finally in 1973, disaster relief was divided amongst three agencies, the Federal Disaster Assistance Administration, the Defense Civil Preparedness Agency, and the Federal Preparedness Agency.

In August of 1977, President Carter asked the reorganization staff at the Office of Management and Budget (OMB) to make a comprehensive review of the matter. The reorganization team concluded that:

"...the present Federal structure for preparing for, responding to, and recovering from the effects of major emergencies is in disarray. The study group identified many serious deficiencies: low visibility for emergency planning; duplication of programs and contracts at the state and local level; confusion over jurisdiction and responsibilities; lack of accountability below the Presidential level for policymaking and needed management improvements" ("Reorganization Plan No. 3 of 1978," the Committee on Government Operations, Washington D.C., 1978).

FEMA was established in response to these findings and recommendations. Federal disaster assistance programs were to be unified and refashioned through Reorganization Plan No. 3. Executive Order 12148 (1979), issued by President Carter following congressional acceptance of Reorganization Plan No. 3, delegated most of the authority granted to the president under the Disaster Relief Act of 1974 to the Director of FEMA. The following functions were transferred to FEMA: CIVIL DEFENSE, certain elements of NATIONAL EMERGENCY PREPAREDNESS, FIRE PREVENTION & ASSISTANCE, DISASTER RELIEF, FLOOD

INSURANCE, EMERGENCY BROADCAST & WARNING, EARTHQUAKE HAZARDS REDUCTION and DAM SAFETY. Some functions, however, were not transferred to FEMA, most notably the DISASTER LOAN PROGRAMS operated by the Small Business Administration (SBA) and the U.S. Department of Agriculture's (USDA) Farmers Home Administration.

The four principal objectives that were identified by President Carter in a message accompanying Reorganization Plan No. 3 were the:

1. Establishment of a SINGLE ENTITY (FEMA), headed by an official directly responsible to the president, that would serve as the sole federal agency responsible for anticipating, preparing for and responding to major civil emergencies;
2. Development of an effective CIVIL DEFENSE system, integrated into the programs and operations of nonfederal entities, to improve communications, evacuations, warnings, evacuations, and public education efforts to prepare citizens for a possible nuclear attack as well as for natural and accidental disasters (an ALL HAZARDS approach);
3. Reliance of federal agencies to undertake emergency management responsibilities as extensions of their regular missions and on FEMA to coordinate these resources; and
4. Inclusion of federal HAZARD MITIGATION activities, linked with state and local activities, with decision-making about preparedness and response functions.

Examination of the initial functions transferred to FEMA and the original objectives placed on the agency reveals the origin of a number of political issues and debates that continue today. First, the establishment of FEMA did not fully consolidate all disaster and emergency functions and programs residing at the federal level. As mentioned above, certain functions, such as the disaster loan programs of the SBA and the USDA, were not transferred to FEMA. Consequently, some competition between federal agencies with disaster and emergency jurisdiction continues to this day.

The formation of FEMA also spotlighted the significance of HAZARD MITIGATION & PREPAREDNESS and gave impetus to a PROACTIVE, rather than a REACTIVE, approach to

emergency management. Instead of merely doing disaster recovery work, emphasis was placed on keeping people out of hazard-prone, high-risk areas through instruments such as zoning laws, building codes, and land-use regulations. In effect, FEMA was challenged to encourage or induce local officials and individuals to adopt mitigative policies. Mitigation work opened up a perennial, highly political issue between FEMA and local officials, developers, and citizens. While federal officials and FEMA attempt to get communities to proactively protect themselves through hazard mitigation activities, local officials, developers and citizens often try to circumvent measures they consider restrictive and financially burdensome.

## FEMA MISSIONS

The following Executive Orders (E.O.) and laws provide both the statutory foundation for FEMA and are largely responsible for its organization and structure.

- E.O. 12148, Federal Emergency Management
- E.O. 12656, Assignment of Emergency Preparedness Responsibilities
- E.O. 12919, National Defense Industrial Resources Preparedness
- National Security Act of 1947
- Defense Production Act of 1950, as amended
- Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended
- Presidential Decision Directive-39 (On U.S. terrorism policy)

FEMA is a rather small independent agency with a full-time workforce of about 2600, but with a capability to mobilize personnel from a disaster reserve force in times of emergency. FEMA promotes disaster mitigation, preparedness, response and recovery activities through its work with state and local emergency managers. The agency also advances comprehensive, all-hazards emergency management activities.

FEMA is headed by a Director appointed by the president and the agency reports directly to that office. At this writing, FEMA's director is James Lee Witt. He sits on the Cabinet and enjoys easy access to President Clinton. As a result of his many years working in state and local emergency management, Witt was well aware of the agency's strengths and weaknesses before he was appointed Director. Witt testified that it was his aim to renew and reinvent FEMA at his Senate confirmation hearings on April 6, 1993. His first step in renewing FEMA was to give it a clearer mission statement:

"The mission of the Federal Emergency Management Agency is to provide the leadership and support to reduce the loss of life and property and protect our institutions from all types of hazards through a comprehensive, risk-based, all-hazards emergency management program of mitigation, preparedness, response, and recovery." [U.S. Office of the Vice President (Al Gore), "Accompanying Report of the National Performance Review (NPR): FEMA," Washington, D.C., September 1993, Government Printing Office, p. 25.]

FEMA's specific MISSION GOALS are to:

- (1) Create an emergency management partnership with other federal agencies, state and local governments, volunteer organizations, and the private sector to better serve customers;
- (2) Establish, in concert with FEMA's partners, a national emergency management system that is comprehensive, risk-based, and all-hazards in approach;
- (3) Make hazard mitigation the foundation of the national emergency management system;
- (4) Provide a rapid and effective response to, and recovery from, disaster; and
- (5) Strengthen state and local emergency management.

As a consequence of its legislated mission, FEMA is tasked with responding to any accidental, natural, or conflict induced hazard or threat which causes or may cause substantial injury or harm to the population or substantial damage to, or loss of, property. In effect, it embodies an ALL-HAZARDS APPROACH to emergency management.

By early 1995, Witt's vision for FEMA was to strive for a "Partnership for a Safer Future for America." That partnership was to include the universe of FEMA stakeholders. The vision called for an informed public dedicated to protecting their families, homes, workplaces, communities and livelihoods from the impacts of disasters. Builders and developers would construct hazard-resistant structures located out of harm's way. Governments and private organizations would set forth plans, compile necessary resources, and rigorously train and exercise for disaster responses. Communities would prepare and plan for recovery and reconstruction BEFORE disaster strikes.

Central to Witt's vision was an increased emphasis placed on MITIGATION ACTIVITIES. FEMA had housed a collection of modest mitigation programs prior to Witt's regime, but Witt made mitigation the foundation of emergency management and the primary goal of the agency. The reasoning is that mitigation activities and strategies may substantially reduce the impact of disasters and, in some cases, prevent disasters altogether. FEMA now allocates up to 15 percent of all disaster assistance funds in a declared disaster to state and local long-term mitigation efforts. FEMA officials have gone on record as saying:

"Mitigation must become a recognized national priority. Although mitigation makes good sense, often it is not a priority for communities. Establishing mitigation as a primary foundation for emergency management will decrease demands for response to disasters. Buildings, homes, and infrastructure that are built better, withstand hazards better. This means less destruction, less loss of life, less personal and economic hardship. This also means a reduction in outlays for disaster assistance by federal, state, and local governments for rebuilding communities and businesses." [U.S. Federal Emergency Management Agency, National Performance Review Report, Washington, D.C.: U.S. Government Printing Office, September 1993.] Regardless of the statement, there is irrefutable evidence that the costs of disasters since 1989 have risen dramatically. Moreover, "the jury is still out" on whether mitigation will decrease demands for federal response to disasters.

Through highlighting mitigation efforts and securing more program resources, FEMA can substantially enhance its capacity and presence in intergovernmental relations on a continuous basis, rather than merely after a disaster. Whether such invigorated FEMA mitigation efforts will produce adequate state and local responses, however, is a highly charged political issue. Local officials sometimes rationalize that they have little to gain from mitigation efforts if in the event of a disaster, the state and federal governments will pay for a the lion's share of their local disaster losses. Moreover, mitigation efforts have to compete with the far more alluring concerns of economic growth and development on the local level. With local officials, developers, and citizens often viewing mitigation efforts as restrictions on personal freedom and financially costly, mitigation efforts are bound to remain a politically charged issue.

## FEMA ORGANIZATION

For the most part, FEMA is organized functionally on the four phases of emergency management: mitigation, preparedness, response and recovery. Specifically, FEMA comprises five directorates: MITIGATION; PREPAREDNESS, TRAINING AND EXERCISES; RESPONSE AND RECOVERY; OPERATIONS SUPPORT; and INFORMATION TECHNOLOGY SERVICES. It also includes the U.S. Fire Administration and the Federal Insurance Administration.

FEMA is geographically divided into 10 standard Federal Regions and each Regional Office of FEMA is directed by a politically appointed Regional Director. FEMA's jurisdiction covers all 50 states and the District of Columbia. Other jurisdictions eligible to request presidential declarations of major disaster and emergency are: the trust territories of American Samoa, Guam, and the Virgin Islands; and, the commonwealths of Northern Mariana Islands and Puerto Rico. Under a Compact of Free Association (1995), the Federated States of Micronesia and the Republic of the Marshall Islands now function as independent nations and may no longer apply for presidential disaster declarations, as they were allowed to do (and did) from 1953 to 1995. Also noteworthy is the 1994 decision of the Republic of Palau, which also won presidential disaster declarations in the past. It agreed, in exchange for a \$15 million grant from the U.S., to end its eligibility to request presidential disaster declarations. (Source: phone interview with Roy Kite, FEMA EMI, July 31, 1997.)

State officials count on the FEMA regional office in their area to support on-going federal-state emergency management projects, and FEMA regional personnel are made available to help in damage assessment after a disaster. Ordinarily, states and localities are expected to perform a pre-assessment of damage before the state asks FEMA's regional director to undertake with them a PRELIMINARY DAMAGE ASSESSMENT (PDA). PDAs are comprised of federal, state, and local officials with a designated federal leader. Once all parties come to agreement on the PDA, it is submitted to the FEMA region office.

Thus, the regional offices play a crucial role in federal/state emergency management relations. In addition to engaging in routine operations, FEMA regional directors upon receipt of a governor's request and upon completion of a damage assessment, prepare a REGIONAL SUMMARY, REGIONAL ANALYSIS AND RECOMMENDATION. The regional summary contains only factual information while the regional analysis and recommendation contains opinions and recommendations for the president.

Examination of FEMA's missions and organization reveal that a significant amount of coordination is required for effective emergency management. FEMA's COORDINATING ROLE refers to its relations with different levels of government and various agencies in conducting emergency management. FEMA's primary purpose is to provide assistance to state and local governments in saving lives and protecting property and public health and safety for all types of emergencies. It also, however, directs or coordinates federal agency disaster response.

Currently, FEMA provides funding, guidance and training to state and local emergency management organizations through its regional structure. Its central relationship with states and localities is primarily through the medium of PERFORMANCE PARTNERSHIP AGREEMENTS (PPA)/COOPERATIVE AGREEMENTS (CA) with state Offices of Emergency Management. The PPA/CA provides a means to pass funds through to state Offices of Emergency Management and from them funds go to local Offices of Emergency Management. PPA/CAs are analogous to contracts. The PPA is a partnership document of both FEMA and the states regarding goals and objectives. States use the partnership to develop their own objectives and in turn, many of these objectives may come to shape FEMA's own goals and objectives. For example, PPA/CAs can emphasize mitigation efforts. State and FEMA officials come to mutual agreement regarding expected state level outcomes given FEMA funding support.

FEMA's success or failure in meeting its duties rests largely and directly on its ability to coordinate and harmonize the disaster-related work of other federal agencies. Although FEMA possesses authority, funding and limited assets that enable it to do some work independently, it must depend on other federal departments and agencies to provide additional resources to ensure a complete federal response. In the event of a presidentially declared disaster, a MISSION ASSIGNMENT may be issued to a federal agency by the FEMA Director, Associate Director, or Regional Director.

A MISSION ASSIGNMENT is a work order given to a particular agency that directs completion by that agency of a specified task and cites funding, other managerial controls, and guidance. In effect, these assignments represent FEMA's role in coordinating a complete federal response to a disaster. This term is also significant because it denotes how other federal agencies, besides FEMA, engage in disaster recovery work through drawing from the President's Disaster Relief Fund.

As both the PPA/CA's and MISSION ASSIGNMENTS indicate, a web of well-maintained political and administrative relations with customers, state and local emergency managers, and federal agency partners is essential to the attainment of FEMA's goals and objectives. An excellent example of this is FEMA's governmental and interagency coordination work through the Federal Response Plan.

### Federal Response Plan

The FEDERAL RESPONSE PLAN (FRP) demonstrates much about the political and administrative environment of U.S. disaster management. It manifests the framework for planning and conducting interagency response, recovery and mitigation activities in presidentially declared disasters. The FRP's purpose is to integrate capabilities of federal departments and agencies for a coordinated federal response to disaster, so as to provide emergency assistance to save lives and protect property and public health and safety for all types of emergencies.

Hurricane Hugo in 1989 revealed the need for such a comprehensive federal response program. Criticism of disaster relief efforts in response to Hurricane Hugo gave impetus to the creation of the Federal Response Plan of 1992, which is now the basis of federal mobilization aimed at helping states and localities respond to all types of disasters. The Federal Response Plan of 1992 represented a cooperative agreement between 26 federal agencies and the American Red Cross. The Federal Response Plan:

1. Serves as a blueprint to coordinate and mobilize resources in disaster and emergency circumstances;
2. Provides greater detail concerning the roles and activities of different federal agencies during large-scale natural disasters;
3. Groups together the different types of emergency assistance available to public organization and private citizens and identifies a lead agency for each of these types of assistance;
4. Specifies a process in which the resources of the federal government can be deployed more quickly and efficiently.



The Federal Response Plan takes effect when states and local governments are overwhelmed by a disaster and the state governor requests, and the president determines that "an emergency exists for which the primary responsibility for response rests with the United States."

In presumed disaster or emergency circumstances, the governor of the affected state must determine whether the magnitude of devastation warrants the request of a presidential disaster declaration. The president, advised by FEMA, must be convinced by evidence that the event warrants federal assistance. This help supplements the efforts and available resources of the affected state(s), local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering. The Federal Response Plan establishes the basis by which federal resources will be organized and employed to support impacted state and local jurisdictions.

Currently, the FRP includes 28 departments/agencies and the American Red Cross, each of which are assigned primary and support roles to provide federal resources to augment the efforts of local and state governments in responding to a disaster or emergency. The FRP incorporates the Incident Command System (ICS) approach to organizing the federal interagency response teams. The FRP can be viewed as an action plan to support this organizational structure.

The FRP also is linked to other major federal emergency plans to ensure a consistent and coordinated response to any event which necessitates federal disaster or emergency assistance. A single Federal Coordinating Officer (FCO) is assigned to direct federal response to the disaster. The FCO is appointed by the president and reports to the president through the director of FEMA.

The FEMA Regional Office dispatches an Emergency Response Team (ERT) and establishes a Federal Disaster Office.

The FRP is organized into 12 Emergency Support Functions with a lead agency responsible for each:

1. Transportation----- DOT
2. Communications----- NCS
3. Public Works and Engineering-- DOD
4. Fire fighting-----USDA

- 5. Information and Planning-----FEMA
- 6. Mass Care----- Red Cross
- 7. Resource Support----- GSA
- 8. Health and Medical Services--- HHS
- 9. Urban Search and Rescue----- DOD
- 10. Hazardous Materials----- EPA
- 11. Food-----USDA
- 12. Energy----- DOE

**Supporting Functions:**

- o **Financial Management**
- o **Public Information**
- o **Congressional Relations**

The Emergency Support Functions in the Federal Response Plan describe essential resources which departments and agencies can provide to augment local and state emergency response. These resources are provided under statutory authority or by mission assignment from FEMA.

To facilitate obtaining resources through an Emergency Support Function, FEMA coordinates with the primary agency to validate the requirement and provide the needed resource. Support agencies may also provide resources under mission assignment. FEMA may also mission assign any agency to provide a unique or specialized resource.

When is the response plan implemented?:

(1) In anticipation of a significant event (such as a hurricane) judged likely to result in a need for federal assistance.

(2) In response to an actual event, such as an earthquake, which requires federal disaster or emergency assistance.

(3) In response to a request by a Governor to the President for Federal assistance to his/her state.

(4) As the result of a major disaster or emergency declaration by the President.

After a Presidential Disaster Declaration has been issued several types of federal disaster assistance become available. Under disaster or emergency circumstances, states receive from FEMA a match supported subsidy (75/25) to provide supplemental assistance to individuals and families adversely affected. This is defined as Individual Assistance. Some forms of individual assistance are managed exclusively by FEMA. Others, such as loans to businesses, are managed by the Small Business Administration, or farm loans by the U.S. Department of Agriculture.

#### INDIVIDUAL ASSISTANCE

- **Temporary Housing**
- **Grants**
- **Small Business and Farm Loans**
- **Disaster unemployment and job placement assistance**
- **Social Security, Veterans and Tax assistance**
- **Crisis Counseling**

Types of aid customarily available are:

- Rental payments for temporary housing for those whose homes are unlivable. Assistance is available for up to 18 months depending on need. (FEMA funded and administered program.)
- Grants for making minor repairs to primary residences that are habitable or to make them habitable (FEMA funded and administered).
- Grants ranging from several thousand dollars to a maximum of \$12,900 to help meet serious disaster-related needs not covered by insurance or other Federal, State, or charitable aid programs. (FEMA funded at 75 percent of total eligible costs, State administered.)
- Low-interest loans at 4-8 percent to cover uninsured private and business property losses. Loans are available up to \$200,000 for primary residence; \$40,000 for personal property, including renter losses; and \$1.5 million for businesses. (Funded and administered by the U.S. Small Business Administration [SBA].)
- Loans up to \$1.5 million for small businesses that have suffered disaster-related cash flow problems and need funds for working capital to recover from the disaster's adverse economic impact. This loan, in combination with a property loss loan, cannot exceed \$1.5 million. (Funded and administered by the SBA.)
- Loans up to \$500,000 for farmers, ranchers and aquaculture operators to cover

production and property losses, excluding primary residence. (Funded and administered by the Farmers Home Administration, U.S. Department of Agriculture.)

- Income tax assistance for filing casualty losses. (Administered by the U.S. Internal Revenue Service.)
- Advisory assistance for legal, veterans' benefits, and social security matters.

FEMA also provides PUBLIC ASSISTANCE to state and local governments or certain private, not-for-profit organizations, on a 75/25 cost sharing basis, to help restore public services and to provide infrastructure support.

## PUBLIC ASSISTANCE

### o Debris Clearance

### o Repair, restoration or replacement of:

- water control facilities
- roads, streets, bridges
- public buildings and equipment
- public utilities
- communications systems
- recreational facilities, equipment and parks

### o Direct costs of local government disaster response

Types of Public Assistance include:

- Costs associated with Debris Clearance.
- The repair, restoration or replacement of water control facilities (such as dams, levees, drainage channels, shore protection devices, and pumping stations).
- The repair of non-federally supported roads, highways and bridges.
- The repair or restoration of public buildings and equipment (such as fire stations and fire fighting equipment).
- The repair or restoration of public utilities (such as electric, gas, or water utilities).
- The repair or restoration of parks, and recreational facilities and equipment (such as playground equipment, swimming pools, boat docks and piers, bath houses, tennis courts, picnic tables, golf courses, and some tree and landscape features).

FEMA also is empowered to fund the Hazard Mitigation Assistance program. A state is

allowed to receive a sum equal to 15% of its federally declared disaster's public assistance costs. This helps state, local and other eligible parties lessen or avert the threat of future disasters through funding projects aimed at reducing or eliminating future disaster vulnerability.

## **Appendix 2: States & Territories and Disaster**

While everyone is aware that the U.S. has fifty state governments, many are unaware that other jurisdictions are assumed to have state status for official purposes. The District of Columbia, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands, all engage in emergency management and are eligible to apply for federal disaster relief under conditions which apply to states. Until 1995, the Republic of Palau, the Federated States of Micronesia, and the Republic of the Marshall Island were also eligible to apply for and did in fact receive presidential declarations of major disaster or emergency. The (Panama) Canal Zone was until the late 1970s a U.S. territory, though it never received a presidential declaration of major disaster or emergency.

Each of the 50 states and each American trust or commonwealth territory has a state emergency management organization. The table below lists the names of all 50 state emergency management organizations as they were in 1996.

In some states, emergency management is conducted by an independent agency reporting directly to the governor's office. In other states, the agency or organization may be located in the military department, the adjutant general's office, the department of public safety, or in some other office. Some emergency management offices are located within the management structure of the governor's staff offices.

## STATE EMERGENCY MANAGEMENT AGENCIES

State	Emergency Management Agency
Alabama	Emergency Management Agency
Alaska	Division of Emergency Services
Arizona	Division of Emergency Management
Arkansas	Office of Emergency Services
California	Office of Emergency Services
Colorado	Division of Local Government
Connecticut	Office of Emergency Management
Delaware	Emergency Management Agency
Florida	Division of Emergency Management
Georgia	Emergency Management Agency
Hawaii	State Civil Defense
Idaho	Bureau of Disaster Services
Illinois	Emergency Management Agency
Indiana	Emergency Management Agency
Iowa	Division of Emergency Management
Kansas	Division of Emergency Management
Kentucky	Disaster and Emergency Services
Louisiana	Office of Emergency Preparedness
Maine	Emergency Management Agency
Maryland	Emergency Management Agency
Massachusetts	Emergency Management Agency
Michigan	Division of Emergency Management
Minnesota	Division of Emergency Management
Mississippi	Emergency Management Agency
Missouri	State Emergency Management Agency
Montana	Disaster & Emergency Services
Nebraska	State Civil Defense Agency
Nevada	Division of Emergency Management
New Hampshire	Governor's Office of Emergency Management
New Jersey	Office of Emergency Management
New Mexico	Division of Emergency Management
New York	State Emergency Management Office
North Carolina	Division of Emergency Management
North Dakota	Division of Emergency Management
Ohio	Emergency Management Agency
Oklahoma	Department of Civil Emergency Management
Oregon	State Police
Pennsylvania	Emergency Management Agency
Rhode Island	Emergency Management Agency
South Carolina	Emergency Preparedness Division
South Dakota	Division of Emergency Management
Tennessee	Emergency Management Agency
Texas	Division of Emergency Management

<b>Utah</b>	<b>Comprehensive Emergency Management</b>
<b>Vermont</b>	<b>Division of Emergency Management</b>
<b>Virginia</b>	<b>Department of Emergency Services</b>
<b>Washington</b>	<b>State Emergency Management Agency</b>
<b>West Virginia</b>	<b>Office of Emergency Services</b>
<b>Wisconsin</b>	<b>Division of Emergency Government</b>
<b>Wyoming</b>	<b>Emergency Management Agency</b>

How a state emergency management agency is organized and where it sits within the bureaucratic hierarchy of state organization, is significant. Many studies of state organization have concluded that "stand-alone" agencies, independent of broad holding company-type departments, usually have more political clout and a stronger professional identity. Another important indicator of agency political power is support of, and access to, the governor. Clearly, state agencies with close organizational links to the Office of the Governor usually have greater capacity to help marshal and coordinate state emergency and disaster assistance. Their proximity to the governor, a critical seat of state political and managerial power, affords a high organizational profile.

In general, state emergency agencies, like their local counterparts, are expected to be organized effectively, and should possess well-maintained emergency plans, facilities, and equipment. To become and remain eligible for federal financial assistance, each state must manage a state emergency management program that complements and promotes local emergency management.

#### Emergency Roles of Governors

Governors, as executives, possess emergency powers applicable to disasters or emergencies within their respective states. They have at their disposal state emergency management agencies, other state agency assistance, and their state's National Guard (along with reserve and active duty forces made available by the president, if needed).

A recent survey conducted by the National Emergency Management Association [NEMA] revealed that in virtually all states "the governor is the responsible authority for issuing a state disaster declaration or initiating a state response" (NEMA, 1996). In most states, a declaration of emergency or disaster by the Governor is sufficient to trigger state expenditures for disaster relief and emergency assistance. In many states this declaration activates the state emergency response plan.



The NEMA survey claimed, "The Governor's pivotal role during disasters has an impact on the location and direction of the state emergency management function. A 1995 policy paper issued by the National Governors' Association, recommends that the individual responsible for the state's emergency management program have direct access to the Governor" (National Governors' Association, *HR-30 Emergency Management* (1995), section 30.2, p. 12). A review of the structure and location of state emergency management agencies revealed that in 44 states the director of emergency management is appointed by the Governor. Although placement of the agency varies by state, the emergency management director reports to the Governor in 19 states, the adjutant general in 19 states, and the secretary for public safety in six states.

In most states, the governor and the state emergency management director rarely work face-to-face. Usually someone on the governor's staff acts as a go-between. However, that staffer often has many responsibilities besides emergency management. This sometimes makes it difficult for state emergency management directors to influence or advise their governors on matters of policy affecting disaster management.

#### General Powers of Governors

The authority which a governor has is defined by the state constitution, and state constitutions vary considerably both in substance, specificity, and length. A Governor, or Acting Governor, is the chief executive of the state.

1. Most governors have considerable powers of appointment, both in appointments to executive agencies and to judicial positions.
2. Some, but not all, governors have powers of executive reorganization.
3. Many governors can veto entire bills passed by the state legislature, or they can use an "item veto" to invalidate only those provisions of bills which they do not want enacted into law. A few governors possess amendatory veto powers which enable them, in certain circumstances, to re-write passages in legislation before signing them into law.
4. Most governors prepare executive budgets which are submitted to the state legislature for review and approval.
5. Most governors are restricted to two successive terms of office.

In the case of appointive powers, it is highly probable that governor's who appoint their state emergency management directors are likely to work more closely with them before, during and

after disasters. If emergency management directors are appointed by others (state adjutant general, the state legislature), they may not have a good working relationship with the governor and they may not feel accountable to the governor.

Powers of reorganization and veto powers are relevant to emergency management in the sense that these are instruments which governors may use to emphasize or de-emphasize state emergency management. Veto powers, especially over budget legislation, may be used by governors to influence the flow and amount of resources a state dedicates to emergency management activity. When governors prepare executive budgets, they are indicating programs and purposes they want to assign priority. This too has a major impact on state emergency management. Decisions a governor makes about state emergency management often involve political factors (i.e., jurisdictions and areas to be provided public works disaster mitigation projects, areas to receive state funds for infrastructure replacement, urban-suburban-rural distinctions in apportioning emergency management training and education resources, etc.)

If governors do not face state term limits, they may come to amass tremendous political power. Whenever a governor faces a term limit and is in his or her final term of office, they tend to lose a degree of political power. This is sometimes consequential in state emergency management. Strong governors are able to fend off state legislative interference and may be able to more easily assume temporary emergency powers. Weak governors may discover that their political rivals are trying to arrest emergency managerial control from them.

### Governors and Declarations

Governors also play a key role in the presidential declaration process. When a disaster strikes, local authorities and individuals request help from private relief organizations and the from state government. If assistance is beyond their capability, the governor requests a Presidential Declaration of Major Disaster or Emergency. The governor submits an official request to the president through the FEMA Regional Director asking for federal assistance under the Stafford Act.

Usually a governor will first consult with the state Office of Emergency Management. Then, if state personnel were not involved in the local damage assessment, the governor will initiate a state-level damage assessment. Or, if it appears that the problem is beyond state and local

response capacity, the governor can ask FEMA to join state and local personnel in conducting a Preliminary Damage Assessment.

If warranted, the governor will then issue a State Declaration of Disaster, typically through an executive order or proclamation. The order usually describes the nature of the emergency, where it occurred, and the authority under which the governor makes the declaration.

If the governor decides that the disaster is overwhelming state response capability, then he or she may request a Presidential Declaration of Major Disaster or Emergency.

State legislatures are also participants in emergency management, though their roles are seldom examined or understood.

First and foremost, state legislatures propose, enact, and amend state laws which intrinsically involve matters of emergency management. State lawmakers empower state administrative agencies to undertake emergency management functions and to implement emergency management-related programs. As elected political representatives, state lawmakers have every incentive to meet the needs of their constituents and the needs of the interests which helped them win office. State legislators may hold state emergency managers accountable for their actions. Legislative hearings are often a means by which state lawmakers investigate administrative activity, supervise and oversee agency operation, seek information on agency budget requests, conduct audit functions of state programs, and publicize mismanagement or highlight the need for reform. Political issues permeate many of these proceedings and much state legislative activity.

Second, state legislatures provide the funding for state programs. A recent NEMA Report (1996) reveals that legislatures in 24 states directly appropriate funds for specific incidents after each major disaster occurs. This is an important responsibility often entailing considerable political negotiation regarding how much money will be made available and where the funds will come from to pay for the disaster. Eighteen states possess separate disaster funds (though not trust funds) and these monies are appropriated as needed to keep an adequate amount of money available at all times (i.e., this is generally referred to as a state's "RAINY DAY" fund). Only Alaska, California, and Florida (at this writing), have DISASTER TRUST FUNDS in which revenues from specified sources (i.e., a tax on insurance policies or a certain percentage of tax

receipts specified in statute) are deposited and used as needed for specified purposes. Some 12 states have more than one fund from which money may be drawn depending upon the type of disaster or emergency that has occurred. Seventeen states use other funding mechanisms for generating state funds for state programs or the non-federal share of federal programs. Some states use more than one mechanism, so the total number of states summed from each category of mechanism exceeds 50.

What is important in all this is that state legislatures are decisive in determining how prepared a state is for emergency and disaster, including how well prepared the state is to pay for disasters and emergencies. Since state legislators represent districts, rather than the entire state, they may sometimes see their areas of representation as either victims of disaster or as benefactors or donors to other areas of the state impacted by disaster. In the former instance, a legislator has every incentive to maximize state (and federal aid). The people they directly represent must be helped. In the latter instance, a legislator is pre-disposed to offer state aid (because he or she expects similar help when it is their constituents who are victims) but may do so on a cautionary basis. Needs have to be proven and justified, otherwise state resources may be redistributed unfairly or too excessively to the constituents of other legislators. Every disaster redistributes resources in some form or another, and the outcome of this redistribution is of great political importance (everyone wants to gain at someone else's expense, no one wants to be denied aid they believe they rightly deserve).

When it comes to state level emergency management, the chief responsibilities of state governments are (See NCSL endnote 3 as well):

- Enacting emergency management legislation, codes, regulations.
- Enforcing national laws (such as Title III of the Superfund Amendments and Reauthorization Act, dealing with preparing for and responding to hazardous materials incidents).
- Applying public administration skills to state-wide planning.
- Developing and maintaining programs addressing all four phases of the disaster life cycle.
- Assisting local governments in development and maintenance of emergency management responsibilities.
- Assisting local governments in disaster response.

Each respective state emergency management organization is responsible for developing and maintaining a State Disaster Operations Plan and a State Emergency Operations Center (EOC), from which civil government officials (state, federal, municipal, and county) exercise centralized direction and control in an emergency. The EOC serves as a resource center and coordination point for additional field assistance. Officials working through an EOC provide executive directives and liaison to state and federal authorities.

The State Disaster Operations Plan is an all-hazards document specifying actions to be taken in the event of natural disasters, technological disasters, civil strife or war. It identifies authorities, relationships, and the actions to be taken by whom, what, when, and where, based on pre-determined assumptions, objectives, and existing capabilities.

Note, that under the Stafford Act, state governments, along with local government and eligible private, non-profit organizations, may submit a project application or request for direct federal assistance under the PUBLIC ASSISTANCE PROGRAM. Considerable controversy often emerges over which organization or project is eligible to receive federal "public assistance" money. Political executives at the local level often apply pressure through the president, through members of Congress (especially through member's of the state's congressional delegation), or through appeals to federal administrative officials, all aimed at expediting public assistance funding in local disaster recovery.

Also, state and local governments assume major responsibilities for DAMAGE ASSESSMENT after disasters and emergencies. This is the process of determining the magnitude of damage and loss to individuals, businesses, the public sector, and the community resulting from a disaster or emergency. PRELIMINARY DAMAGE ASSESSMENT refers to the initial damage assessment performed by federal, state, and local representatives in disasters. PDAs help government officials determine the magnitude of loss and whether the need for federal disaster aid is justified.

As indicated above, governors play a key role in the DECLARATION PROCESS. When a disaster strikes, local authorities and individuals request help from private relief organizations and the state government. If assistance is beyond state capability, the governor requests a PRESIDENTIAL DECLARATION OF MAJOR DISASTER or EMERGENCY. The governor

submits an official REQUEST to the president through the FEMA Regional Director asking for federal assistance under the Stafford Act. Sometimes a governor's request is denied owing to an authorized presidential action and which is signed by the FEMA Director. This is officially referred to as a TURNDOWN.

The Bipartisan Task Force Report (1995, pp. 38-45) notes that within states, standing authority exists for the governor to take appropriate actions to ensure that a preparedness plan has been developed and that assistance is provided to stricken communities or areas. Many states have gone beyond those general statutory provisions governing emergency or disaster management to enact laws which include interstate mutual aid compacts, use of the National Guard, etc.

The Report reviews "State Expenditures." It recounts that each state receives federal assistance under the Stafford Act of 1988 and must provide a 25 percent match for federal disaster aid directed to the state, its localities, or to individuals. However, since 1985, 15 major disasters had all or part of the matching requirement waived by the president. The match for individual assistance cannot be waived. Little has been published documenting how states and localities pay their share of emergency management costs (An exception is the NEMA Report).

The Bipartisan Task Force Report highlights the role of the National Guard in response to disaster. Governors frequently activate portions of their respective state National Guards to help out in natural disasters. For example, from October 1, 1992 to September 30, 1993, National Guard units were mobilized to handle 148 natural disasters.

Waugh and Sylves outline many important aspects of state emergency management and they also critique state emergency management. They allege there is a creative tension between state emergency managers and their federal and local colleagues. State emergency managers carry a special obligation to help build and cultivate local emergency management. A symbiotic and cooperative relationship between state and local emergency managers is needed both before and after disasters. This chapter also examines, among other things, the matter of federal-state cost-sharing and proposals for reform, such as state disaster funds and deductibles to be paid by states to secure federal post-disaster assistance.

Another dimension of federal-state emergency management involves the DISASTER

**PREPAREDNESS IMPROVEMENT GRANT PROGRAM.** Under Section 201 of the Stafford Act, the program provides annual matching awards to states in amounts not to exceed \$50,000. These awards help states improve or update their disaster assistance plans and capabilities. Political officials at the state level must decide whether or not they want to apply for these awards and whether they are willing to pay the state match.

Each state maintains an **EMERGENCY OPERATIONS CENTER** from which civil government officials (state, federal, municipal, and county) exercise centralized direction and control in an emergency. The EOC serves as a resource center and coordination point for additional field assistance. It facilitates executive direction and liaison with state and federal officials, and considers and mandates protective actions. Each state employs an **EMERGENCY OPERATIONS PLAN** that is an all-hazards document specifying actions to be taken in the event of natural disasters, technological disasters, or nuclear attack. It identifies authorities, relationships, and the actions to be taken by whom, what, when, and where based on pre-determined assumptions, objectives, and existing capabilities.

**FEMA/STATE AGREEMENTS** are formal legal documents between FEMA and each respective state. Each contains the understandings, commitments, and binding conditions for assistance applicable as the result of the major disaster or emergency declared by the president. Each is signed by the FEMA Regional Director, or designee, and the Governor of the respective state. The **GOVERNOR'S AUTHORIZED REPRESENTATIVE** is the person empowered by the governor in the FEMA/State Assistance Agreement to execute, on behalf of the state, all necessary documents for disaster assistance and to evaluate and transmit local government, eligible private non-profit facility, and state agency requests for assistance to the FEMA Regional Director following a major disaster or emergency declaration.

States are integrally involved in hazard identification, hazard mitigation, and hazards analysis. States receive a variety of pre- and post- disaster grants from FEMA aimed at **HAZARD MITIGATION ASSISTANCE** and support of the **STATE HAZARD MITIGATION PLAN**.

Under disaster or emergency circumstances, states receive from FEMA a match supported subsidy to provide supplemental assistance to individuals and families adversely affected. This is defined as **INDIVIDUAL ASSISTANCE**. Some forms of individual assistance are managed

exclusively by FEMA. Recall that under PUBLIC ASSISTANCE mentioned above, supplementary federal assistance is provided to state and local governments or certain private, non-profit organizations, other than assistance for the direct benefit of individuals and families.

After a disaster or emergency the governor appoints a STATE COORDINATING OFFICER who acts in cooperation with the FEDERAL COORDINATING OFFICER to administer disaster recovery efforts. States also use a STATE EMERGENCY PLAN, which outlines state-level response to emergencies and disasters and sets forth actions to be taken by state and local governments, including those for implementing federal disaster assistance.

A scholarly, timely 50-state comparative study of emergency management thus far remains unwritten. The political importance of emergency management in any single state has much to do with how that state's emergency management agencies are organized, led, staffed, empowered, and funded.

A state's disaster history explains much about its current state emergency management. Also, the ability of state emergency managers to qualify for, and secure, federal program support and funding is another important factor. Finally, relationships between state emergency managers and their local counterparts are both administrative and political. These relationships help promote in a cooperative way, efforts to gain, keep and expand necessary authority and budget resources.

State emergency management offices used to get most of their funding from FEMA. Today they are expected to pay more of their share. More states have come to recognize the benefits of using state resources to promote emergency management as disasters and their associated costs become more prevalent. Moreover, the end of the Cold War and the abolition of civil defense programs has led to a dramatic reduction in "national security" backed federal funding of even dual use (civil defense and emergency management) state and local activities. Add to this gargantuan efforts of the federal government to balance its budget, and it becomes obvious that states and localities need to cover more of the costs of routine emergency management activities at their respective levels.

The funding that FEMA provides to the states, and through them to local jurisdictions, is in jeopardy. In recent time, several states have considered alternative funding arrangements, less



dependent on FEMA, for their emergency management operations. Alaska, California, and Florida now have disaster trust funds, as mentioned.

In the mid-1990s, FEMA began to fashion Performance Partnership Agreements (PPA)/Cooperative Agreements (CA) with the states. These agreements customarily required that at least two-thirds of the money FEMA provided under the PPA/CA had to be passed on by the state to their respective local political jurisdictions. Under current policy, PPA/CAs no longer require this. Consequently, today some states have decided to keep all of the funding themselves or have pared the pass-through amounts to well less than two-thirds. This has in some cases created tension and conflict between state EM offices and local EM offices, particularly because many local EM offices are abjectly dependent on the pass-through federal funds.

### **Appendix 3: Local Governments and Disaster**

In the U.S., local government is the heart of emergency management. Local governments assume primary responsibility for public safety, and so are the front-line public institutions which conduct the initial emergency response to a disaster or disaster threat. Local executives, elected (mayors) or appointed (city managers), usually are the lead authorities in charge of helping their jurisdiction confront the problem (unless another official is assigned that duty under law or ordinance). How local officials cope with and prepare for emergencies and disasters demonstrates their managerial competence and leadership ability, traits essential to winning and maintaining political office.

A LOCAL GOVERNMENT is any county, city, village, town, district or other political subdivision of any state, any Indian tribe, or authorized tribal organization, or Alaska Native village or organization, including any rural community or unincorporated town or village or any other public entity of a state or state political subdivision.

Local governments are responsible for developing and maintaining an Emergency Operations Plan. They plan, and when necessary, manage disaster evacuations. Localities are also responsible for providing emergency warning and emergency communication. Many local governments, manifesting sound emergency management, maintain a local Emergency Operations Center.

Local governments often possess substantial authority over land-use within their jurisdictions. This authority has a substantial impact on development and disaster mitigation activities. These are some common land-use powers.

BUILDING CODES are regulations adopted by a local governing body setting forth standards for construction, addition, modification, and repair of buildings and other structures for the purpose of protecting health, safety, and general welfare of the public. Local governments may impose sanctions for violations of their codes and ordinances.

STANDARDS represent codes, specifications, or rules required for the construction of facilities.

**SUBDIVISION REGULATIONS** are ordinances or regulations governing the subdivision of land with respect to such things as adequacy and suitability of building sites, utilities, and public facilities.

**ZONING** powers and zoning ordinances represent a form of police power that divides an area into districts and, within each district, regulates the use of land and buildings, height and bulk of buildings or other structures, and the density of population.

The political relevance of these powers is immense. Local officials entrusted with authority over these land-use instruments have the power to affect the economic growth of their jurisdictions (promoting new businesses, more jobs, expanded local tax base, etc). Correspondingly, these decisions involve judgments of disaster and hazard risk. Strong building codes may save lives and reduce property damage in the event of severe storms, strong winds, heavy snows, and flooding. Subdivision and zoning embodies responsibility for ensuring that new homes, offices, and industries are not sited in highly disaster vulnerable areas. Moreover, the nature of development and the mix and proximity of structures may have important consequences when emergencies and disasters do occur. Land use carries many opportunities to promote disaster mitigation, but often the political expedience of promoting economic growth at the expense of disaster mitigation is too tempting for authorities. Moreover, development interests often have significant political influence, particularly through the medium of campaign contributions to those seeking to win or maintain political office.

Beyond land use, local governments build, maintain, and improve infrastructure so essential to communities (i.e., bridges, roads, water systems, sewer systems, power systems, etc.) Often within their borders are dams, levees, river gauge monitoring systems, flood control works, etc. How these facilities and technologies are managed often has a profound impact on how well prepared a community is for disaster threat.

Local governments often manage sanitation, vector control, collection and disposal of toxic and pathogenic materials, regulation of underground storage tank operation, and more. These duties embody political issues as well as emergency management concerns.

Local governments often impose insurance regulations aimed at promoting public safety. Even matters as mundane as requiring smoke detectors and sprinkler systems represent local disaster mitigation activity.

## Local Governmental Structure and EM

Local EM offices, like state offices, are organized in a variety of ways: sometimes as an independent agency or office reporting directly to the chief executive, sometimes under an intermediary, sometimes organized within a Fire or Police department, or sometimes buried deep within a local public agency responsible for a variety of programs.

EM staffing varies widely from part-time, unpaid volunteers, through full-time volunteers, through part-time ill-paid positions, to full-time one person shops that are either poorly paid or well paid, to well staffed full-time organizations.

Form of municipal government structure is relevant in emergency management. Under the STRONG MAYOR form of local government, a mayor usually has extensive powers to appoint and dismiss top municipal officials without the need to first gain city council permission. The mayor also has many budgetary powers in the "strong mayor" system. The strong mayor system puts few restrictions on the number of terms a mayor may service in office. Strong mayor systems provide the opportunity for mayors to assume considerable command and control powers, especially under circumstances of emergency or disaster. However, partisan conflict may be pronounced in the strong mayor system.

Under the WEAK MAYOR form of local government, the mayor has many restrictions imposed on his or her work by the city council or other municipal authorities. The mayor may not be able to appoint many city department directors, may not be able to dismiss these directors, and may have only limited influence in preparation and execution of the budget. There may be restrictions on the mayor's ability to succeed himself or herself in office, sometimes the mayor is limited to a single term, sometimes two terms. Some domains of city administration may function independent of mayoral control (as authorities or special district governments, i.e., parking authorities, transit authorities, independent public school systems, etc.) Various local offices may be directly elected (i.e., Comptroller, Public Safety Director, Chief of Police, etc) which are otherwise mayorally appointed under the strong mayor system. Sometimes the weak mayor form of government fragments executive authority and may muddle or fracture coherent local emergency management. Local legislative bodies, city or county councils, retain primary political authority under many weak mayor systems.

Under the CITY MANAGER or manager-council form of local government, the city manager is appointed by the city council. City managers are not elected to office, but may hold much of the official power possessed by elected mayors. They are full-time professional administrators who work at the pleasure of the city council and who may be fired, sanctioned, or rewarded by the city council. They are accountable to the city council. They have limited powers of appointment but they exercise considerable influence in budgeting and program implementation. If there is a mayor at all in the city manager system, the mayor has purely ceremonial powers. The city manager and the mayor are two separate offices, the same person cannot occupy both posts at the same time. Partisanship is minimized in the city manager system and city managers are usually public administrators of the highest calibre. City managers are quite likely to understand and appreciate the importance of emergency management.

Under the COMMISSION form of local government each elected city council member heads a separate city department. One councillor heads the police department, another the fire department, another public works, another human services, another parks and recreation, and so on. Each council person has extensive appointment powers within his or her department, but each council person must compromise on matters of budgeting and general city administration with the other council people. There is no formal mayor, or the mayor has only symbolic authority. There is no professional city manager in this form of local government. There are few commission type local governments left in the U.S., and many of those which remain are likely to shift to another form, as many have already done. A key problem with this form is that by combining executive and legislative authority in the same job, department directors have an incentive to provide primary service to the local city district which elected them to office. Power is highly fragmented under the commission form and this does not bode well for the local agency coordination needed in emergency circumstances.

Waugh and Sylves examine the intergovernmental emergency management and discerns that "money" and "politics" are critical factors. Disasters carry political costs and benefits for affected communities. Local governments are essential constituencies of national emergency management. Local EM organizations are represented by the National Coordinating Council on Emergency Management (NCEM) [Address: NCEM, 111 Park Place, Falls Church, VA 22046. (703) 538-1795; (703) 241-5603 fax; NCEM@aol.com]

Executive officials at the local level include mayors, city managers, county executives, city and county councillors and commissioners. They are expected to demonstrate political responsiveness in disasters and emergencies.

When a major disaster strikes a community, often it quickly becomes obvious whether outside help will be needed or not. If it appears that outside assistance will be needed, a DAMAGE ASSESSMENT is necessary. Sometimes the damage is so significant that outside help is needed to conduct the damage assessment itself. If local authorities conclude that their jurisdiction is overwhelmed, they are empowered to declare an emergency and request state assistance.

In most jurisdictions the local elected government official declares an emergency through an orderly process defined by statute, ordinance, or some form of enabling legislation. The declaration usually describes the nature of the emergency, the areas impacted, and the authority the official invokes in making the declaration. Generally, guidelines will specify varying levels of activation and emergency according to the severity and extent of the disaster or emergency. Exact procedures vary from locality to locality. When local governments experience disaster their municipal (city, county, etc) authorities are expected, if possible, to conduct a damage assessment (mentioned above), deploy as many local resources as possible, and ask for help from surrounding jurisdictions and the state.

Among duties assumed by local elected or appointed executives are:

- Mobilize resources and transfer and direct emergency personnel for emergency management purposes,
- Require and direct evacuation of all or part of the population within a disaster area,
- Prescribe routes, modes of transportation, and destinations in connection with evacuation, and prohibit certain conduct in the disaster area,
- Commandeer or use private property,
- Suspend local statutes as necessary,
- Authorize emergency spending.

There are many important professionals active in the response phase of emergency management, and who work at the county or local level. Firefighters, police, and emergency medical service workers are especially important, though there may be rivalries between these services owing to their competition over jurisdiction and budget resources.

In any disaster it is important that response agency people have a clear understanding of their roles so they can effectively coordinate their efforts, use resources efficiently, and help disaster victims. No single agency can manage a disaster effectively. In the U.S. system, the response effort requires the resources and expertise of law enforcement, the fire service, emergency medical personnel, public health and public works, and many others.

Public information following a disaster is also critical. It is essential that local officials disseminate clear and accurate public information to a diverse population in a timely manner. The information must be in language and form that all people in a community understand. In other words, in areas or communities with non-English speaking populations, public information needs to be disseminated in the languages that are spoken in those communities. Another important but often misunderstood local government disaster role involves RUMOR CONTROL. It is imperative that facts about the disaster or emergency be made public and correspondingly, rumors, hearsay, and misinformation circulating amongst the public need to be repudiated by local officials.

People expect much of their governments during emergencies and disasters. They need reassurance that their local government is doing everything possible to help disaster victims. However, local citizens often hold a different view during normal times. In normal times disasters hold LOW POLITICAL SALIENCE both in the minds of local residents and in the minds of their elected representatives.

Disasters are by their very nature high-risk, low probability events. Their infrequency makes it difficult to justify expenditure of public money in view of seemingly more pressing, on-going public needs and issues. A corollary problem of issue salience within the realm of disaster policy is traditional American opposition toward, or resistance to, national planning and regulation (especially fears of federal zoning).

Despite the best efforts of governments and volunteer organizations at all levels, it is indisputable that in a major disaster, governments and volunteer organizations cannot immediately be everywhere at once, helping everyone who needs help. It may take many hours or even days for disaster services to begin to reach all those who need assistance. Thus, it is incumbent upon government to inform citizens of this state of affairs lest they be left with a false sense of security and fail to take those actions which would help them cope with a disaster.

It is vitally important to emphasize that local governments are central organizations in disaster damage assessment. They are key in every phase of emergency management. If local government public facilities are impacted by disasters or emergencies, local officials may prove that their jurisdiction is eligible for PUBLIC ASSISTANCE and MITIGATION PROJECT ASSISTANCE. Counties often initiate the process of requesting state and federal disaster or emergency assistance. Local governments also shoulder substantial burdens in providing EMERGENCY WARNING and RISK COMMUNICATION. Local governments often maintain an EMERGENCY OPERATIONS CENTER. Local governments plan, manage, and practice EVACUATIONS and supervise SHELTERING operations. A shelter is a facility to house, feed, and care for persons evacuated from a risk area for periods of one or more days. For the risk areas, the primary shelter and the reception center are usually located in the same facility. RECEPTION CENTERS are set up to register evacuees and to assess their needs. Some evacuees may be referred to shelters. Those who stay elsewhere provide addresses where they can be contacted.

INTERGOVERNMENTAL RELATIONS, is a term which describes the interaction of federal, state and local officials. This includes general purpose governments as well as special district governments. General purpose governments are cities, counties, towns, or other municipal jurisdictions which collect broad based taxes to pay for a wide variety of public services. Special district governments, usually hived off from cities or counties, customarily operate to provide one or two specialized services funded from an earmarked (dedicated) single tax or sometimes user fees. In modern usage, the term also encompasses the interaction of these bodies with groups and organizations of the non-profit and private sectors.

Many policy areas and programs in the U.S. are implemented through intergovernmental relations (i.e., environmental policy, disaster policy, housing policy, social welfare policy, unemployment policy, business regulation, etc.). For example, federal, state, and local representatives in disasters clearly beyond the recovery capabilities of state and local governments produce PRELIMINARY DAMAGE ASSESSMENTS of disaster losses. This information is shared and passed between officials at each level of government. Disputes sometimes arise over the matter of what is "clearly beyond" recovery capability. Considerable political and administrative negotiations may result.



A longstanding suspicion about the nature of intergovernmental interchange after disaster is that a "beggar-thy-neighbor" syndrome occurs. Local governments impacted by disaster have every incentive to exaggerate their scales of damage in order to maximize outside state and federal post-disaster aid. If local governments pay little or no matching money for each dollar of state and federal aid they receive, they have an incentive to detail every conceivable disaster loss eligible for state and federal assistance. States also have an incentive to maximize, if not exaggerate, their magnitudes of disaster loss. With 75/25 federal/state matching aid, 75 cents of every dollar of state disaster loss may be subsidized by federal assistance. When states share their matching burden with localities, sometimes 12.5% state and 12.5% local, the state government derives even greater gain. Since the federal government carries the bulk of financial burden in paying for the public costs of presidentially declared emergencies and major disasters, it is no surprise that FEMA officials are often highly suspicious of state and local estimates of disaster loss. They sometimes suspect that state and local government officials are conspiring to maximize federal disaster dollars dispatched to their jurisdictions.

It is in these interchanges that political factors often come into play. Mayors press governors for more state and federal aid. A governor, lamenting the high costs of a disaster and the state matching shares they must produce, sometimes receives permission to borrow from the federal government the money his or her state needs to pay its own match! At least one GAO Report indicates that states frequently fail to repay all or most of the federal money they have borrowed to cover their matching share. In catastrophic disasters, governors sometimes succeed in securing from the president a higher federal match (100 percent for Florida after Hurricane Andrew and 90 percent for California after the Northridge earthquake). Such a generous federal matching share is a tremendous stimulus for state and local loss estimators.

#### Intergovernmental Program Management

U.S. emergency management is based on SHARED AUTHORITY, not on a top-down command and control system. FEMA cannot tell states and localities what they must do in the emergency management arena. Instead, there is a bottom-up approach wherein local political subdivisions (i.e. cities, towns and counties) are responsible for emergency management. In the U.S., disasters are managed at the local level with the support of state government as needed, followed by federal government support. State and local governments have by history, tradition,

and their own laws, been delegated authority and responsibility for disaster response. The federal government comes to the assistance of a state government when it is overwhelmed by, or incapable of, addressing a disaster. The governor asks for assistance, and a presidential disaster declaration is granted.

Fragmented government is a political challenge for disaster managers. America has a highly decentralized, federal system which, under the U.S. Constitution, affords the national government a range of authority, with some powers reserved for the states under the 10th Amendment. In some policy domains (i.e., regulation of business, education, health care, prisons, etc.) the national and state governments share authority concurrently. Similarly, local governments, though legally vestiges of their respective state government, also are afforded certain powers under Home Rule provisions approved by their states, by each state's constitution, or through enabling statutes. Thus, the need for multi-agency and multi-jurisdictional coordination challenges emergency management work.

U.S. emergency management is by its very nature intergovernmental and intercommunity. The U.S. political and social system requires coordination and cooperation between and among levels of government as well as cooperation and coordination within a community in preparing for, and responding to, a disaster.

### Project Leadership

The single principal investigator on this project was Professor Richard T. Sylves. He earned his doctorate in Political Science at the University of Illinois at Urbana-Champaign in 1978. He is now a professor (full) in the Department of Political Science and International Relations at the University of Delaware and was recently appointed Director of his university's Environmental and Energy Policy graduate program. His work telephone is (302) 831-6057 (or 1943) and his home telephone is (302) 731-1888. The PI wishes to thank Dr. Inwhan Jung of the UD Center for Energy and Environmental Policy (CEEP) for his help in preparing ArcView region maps produced in this study. He also wishes to thank CEEP doctoral student Raymond Scattone for his tremendous help in conducting Excel97 tabular analyses. Mr. Kurt Grelak (BA '98, University of Delaware) provided extremely valuable early computing assistance before the inception of this project.

### Content Endnotes

(1) For up to the minute tornado statistics, the National Weather Service has tornado information at its website, <http://www.nws.noaa.gov/>. One of its tornado sections in particular is located at <http://www.nws.noaa.gov/er/mhx/tornt.htm>

(2) An excellent source of information about tornado disaster, as well as disaster in general, is the University of Colorado's Hazards Center website:

[www.colorado.edu/hazards/litbase/hazlit.htm](http://www.colorado.edu/hazards/litbase/hazlit.htm)

"Tornado-Associated Fatalities --- Arkansas, 1997," Morbidity and Mortality Weekly Report, Centers for Disease Control, May 16, 1997, Vol. 46, No. 19, pp. 412-416. Can be purchased through the Center for Disease Control internet site, or viewed free of charge on the internet, located at: <http://www.cdc.gov/epo/mmwr/preview/mm4619.html#article2>

"Tornado Disaster --- Alabama, March 27, 1994," Morbidity and Mortality Weekly Report, Centers for Disease Control, May 20, 1994. Vol. 43, No. 19, pp. 356-359. Can be purchased through the Center for Disease Control internet site, or viewed free of charge on the internet, located at: <http://www.cdc.gov/epo/mmwr/preview/mm4319.htm#TOC>

(3) The National Conference of State Legislatures is preparing a "Legislator's Guide to Emergency Management" expected for release in late 1997. [Contact Ms. Cheryl Runyon, NCSL, 1560 Broadway, Suite 700, Denver, Colorado or phone (303) 830-2200 to inquire about how to obtain a copy.]

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**Table 1 Coastal vs. Non-Coastal States By Type of Disaster Incident  
Number of Declarations\* and Federal Disaster Relief Spending\*\* from May 1953 to May 1997**

Type of Disaster	Abbr	Presidential Declarations			Federal Spending			Coastal Percent
		Coastal States	Non-Coastal States	Coastal Percent	Coastal States	Non-Coastal States	Coastal Percent	
Flood and Tornado	A	68	36	65%	\$ 1,105,103,913	\$ 451,694,072	71%	
Coastal Storm	C	9	0	100%	\$ 102,871,105	-	100%	
Drought	D	25	18	58%	\$ 145,552,127	\$ 120,647,279	55%	
Earthquake	E	15	2	88%	\$ 7,675,577,301	\$ 2,631,147	100%	
Flood	F	368	260	59%	\$ 6,795,592,722	\$ 2,944,804,031	70%	
Hurricane	H	92	2	98%	\$ 7,305,445,209	\$ 14,077,768	100%	
Typhoon	J	37	0	100%	\$ 737,178,709	-	100%	
Dam/Levee Break	K	1	1	50%	\$ 7,545,257	\$ 2,038,123	79%	
Mud Landslide	M	1	0	100%	\$ 4,785,660	-	100%	
Fishing Losses	P	4	0	100%	\$ 12,866,371	-	100%	
Fire	R	24	5	83%	\$ 511,098,583	\$ 11,247,332	98%	
Snow/Ice	S	77	20	79%	\$ 938,437,645	\$ 228,229,598	80%	
Tornado	T	72	40	64%	\$ 359,671,464	\$ 132,651,284	73%	
Volcano	V	3	1	75%	\$ 73,496,152	\$ 3,119,943	96%	
Severe Storms	W	64	28	70%	\$ 1,442,765,599	\$ 282,518,716	84%	
Toxic Substances	X	5	2	71%	\$ 47,363,510	\$ 353,410	99%	
Human Cause	Y	4	2	67%	\$ 322,825,230	\$ 35,601,815	90%	
Other	Z	12	1	92%	\$ 19,420,310	-	100%	
Total		881	418	68%	\$ 27,607,596,865	\$ 4,229,614,518	87%	
Grand Total			1299	combined		\$ 31,837,211,383	combined	

\*Presidential declarations for major disasters and emergencies.

\*\*Spending in 1994 dollars. Disasters which have occurred within the last 10 years still incur spending so dollar amounts are a snapshot as of May 1997.



**Table 1-A Coastal vs. Inland States By Type of Primary Disaster Incident with Approved Declarations\* and Turndowns,\*\* May 1953 to May 1997**

Type of Disaster	Coastal States			Inland States			
	Abbr	Decs	TDs	TD Percent	Decs	TDs	TD Percent
Flood and Tornado	A	68	18	21%	36	12	25%
Coastal Storm	C	9	7	44%	0	1	100%
Drought	D	25	12	32%	18	16	47%
Earthquake	E	15	1	6%	2	0	0%
Flood	F	368	157	30%	260	90	26%
Hurricane	H	92	12	12%	2	0	0%
Typhoon	J	37	5	12%	0	0	0%
Dam/Levee Break	K	1	0	0%	1	0	0%
Mud Landslide	M	1	16	94%	0	2	100%
Fishing Losses	P	4	7	64%	0	0	0%
Fire	R	24	14	37%	5	9	64%
Snow/Ice	S	77	66	46%	20	23	53%
Tornado	T	72	51	41%	40	19	32%
Volcano	V	3	2	40%	1	1	50%
Severe Storms	W	64	36	36%	28	17	38%
Toxic Substances	X	5	7	58%	2	0	0%
Human Cause	Y	4	7	64%	2	1	33%
Other	Z	12	26	68%	1	7	88%
<b>Total</b>		<b>881</b>	<b>444</b>	<b>34%</b>	<b>418</b>	<b>198</b>	<b>32%</b>

\*Presidential declarations for major disasters and emergencies.

\*\*Turndown means a Governor has requested a declaration for a disaster or emergency and has been turned down.

**Table 1-B Coastal vs. Non-Coastal States By Type of Disaster Incident  
Number of Declarations\* and Federal Disaster Relief Spending\*\* from January 1990 to May 1997**

Type of Disaster	Abbr	Presidential Declarations			Federal Spending			Coastal Percent
		Coastal States	Non-Coastal States	Coastal Percent	Coastal States	Non-Coastal States	Coastal Percent	
Flood and Tornado	A	27	11	71%	\$ 543,555,317	\$ 181,810,617	75%	
Coastal Storm	C	5	0	100%	\$ 46,383,532	-	100%	
Drought	D	2	0	100%	\$ -	-	0%	
Earthquake	E	5	0	100%	\$ 5,633,605,258	-	100%	
Flood	F	58	35	62%	\$ 2,125,169,448	\$ 1,060,915,890	67%	
Hurricane	H	25	1	96%	\$ 3,650,837,265	\$ 13,466,683	100%	
Typhoon	J	13	0	100%	\$ 422,150,572	-	100%	
Dam/Levee Break	K	0	0	0%	\$ -	-	0%	
Mud Landslide	M	0	0	0%	\$ -	-	0%	
Fishing Losses	P	3	0	100%	\$ 12,156,849	-	100%	
Fire	R	9	2	82%	\$ 407,021,494	\$ 5,927,046	99%	
Snow/Ice	S	43	16	73%	\$ 490,477,202	\$ 173,377,609	74%	
Tornado	T	10	6	63%	\$ 30,440,573	\$ 27,136,894	53%	
Volcano	V	1	0	100%	\$ 14,683,455	-	100%	
Severe Storms	W	55	25	69%	\$ 1,423,913,625	\$ 275,960,156	84%	
Toxic Substances	X	1	0	100%	\$ 2,085,575	-	100%	
Human Cause	Y	3	2	60%	\$ 9,136,926	\$ 35,601,815	20%	
Other	Z	1	0	100%	\$ 2,460,983	-	100%	
Total		261	98	73%	\$ 14,814,078,072	\$ 1,774,196,710	89%	
Grand Total			359 combined		\$ 16,588,274,782	combined		

\*Presidential declarations for major disasters and emergencies.

\*\*Spending in 1994 dollars. Disasters which have occurred within the last 10 years still incur spending so dollar amounts are a snapshot as of May 1997.

**Table 1-C Approved Disaster Declarations by Region and  
by Primary Incident Type, May 1953 to May 1997**

Type of Disaster	Abbr	Reg #1	Reg #2	Reg #3	Reg #4	Reg #5	Reg #6	Reg #7	Reg #8	Reg #9	Reg #10	Total
Flood and Tornado	A	0	0	1	34	27	24	13	4	1	0	104
Coastal Storm	C	5	1	1	1	0	0	0	0	1	0	9
Drought	D	2	8	6	4	3	3	3	6	5	3	43
Earthquake	E	0	0	0	0	0	0	0	0	12	5	17
Flood	F	36	40	67	81	76	98	62	50	66	52	628
Hurricane	H	15	17	6	35	0	17	0	0	4	0	94
Typhoon	J	0	0	0	0	0	0	0	0	37	0	37
Dam/Levee Break	K	0	0	0	0	0	0	0	1	1	0	2
Mud Landslide	M	0	0	0	0	1	0	0	0	0	0	1
Fishing Losses	P	1	0	0	0	0	0	0	0	1	2	4
Fire	R	3	0	1	0	0	3	0	0	16	6	29
Snow/Ice	S	13	11	17	18	17	5	3	7	1	5	97
Tornado	T	3	0	2	36	23	33	12	3	0	0	112
Volcano	V	0	0	0	0	0	0	0	0	2	2	4
Severe Storms	W	7	4	13	13	13	10	6	7	7	12	92
Toxic Substances	X	1	2	0	2	0	1	0	1	0	0	7
Human Cause	Y	1	2	0	1	0	2	0	0	0	0	6
Other	Z	2	0	0	2	1	0	0	0	4	4	13
		89	85	114	227	161	196	99	79	158	91	1299

**Key:** Reg #1=CT, ME, MA, NH, RI, and VT. Reg #2=NJ, NY, PR (Puerto Rico), and VI (Virgin Islands).

Reg #3=DE, DC, MD, PA, VA, and WV. Region #4=AL, CZ (Canal Zone), FL, GA, KY, MS, NC, SC, and TN.

Reg # 5= IL, IN, MI, MN, OH, and WI. Reg #6=AR, LA, NM, OK, and TX. Reg #7=IA, KS, MO, and NE.

Reg #8=CO, MT, ND, SD, UT, and WY. Reg #9=AZ, CA, GU (Guam), HI, MP (Northern Marianas), NV,

TT (Trust Territory), AS (American Samoa), FM (Federal States of Micronesia), MH (Marshall Islands), and

PW (Palau). Reg #10=AK, ID, OR, and WA.

**Table I-D Total Federal Disaster Relief Spending\* in 1994 Constant Dollars  
by Region and by Primary Incident Type, May 1953 to May 1997**

Abbr	Region #1	Region #2	Region #3	Region #4	Region #5	Region #6	Region #7	Region #8	Region #9	Region #10
A	\$ -	\$ -	\$ 20,760	\$ 463,048	\$ 406,051	\$ 245,599	\$ 138,347	\$ 107,860	\$ 175,133	\$ -
C	\$ 46,066	\$ 624	\$ 1,241	\$ 11,427	\$ -	\$ -	\$ -	\$ -	\$ 43,513	\$ -
D	\$ 534	\$ 14,786	\$ 6,316	\$ 2,079	\$ 103,594	\$ 10,478	\$ 26,975	\$ 81,320	\$ 18,859	\$ 1,259
E	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,392,973	\$ 285,235
F	\$ 313,318	\$ 1,323,026	\$ 1,608,801	\$ 937,492	\$ 834,972	\$ 684,035	\$ 1,012,056	\$ 500,983	\$ 1,846,640	\$ 679,074
H	\$ 160,751	\$ 2,138,919	\$ 93,219	\$ 3,947,306	\$ -	\$ 814,856	\$ -	\$ -	\$ 164,471	\$ -
J	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 737,179	\$ -
K	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,038	\$ 7,545	\$ -
M	\$ -	\$ -	\$ -	\$ -	\$ 4,786	\$ -	\$ -	\$ -	\$ -	\$ -
P	\$ 710	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,136	\$ 10,021
R	\$ 9,469	\$ -	\$ 5,189	\$ -	\$ -	\$ 5,136	\$ -	\$ -	\$ 451,939	\$ 50,613
S	\$ 110,494	\$ 251,306	\$ 143,974	\$ 216,520	\$ 189,028	\$ 54,729	\$ 130,161	\$ 39,334	\$ 14,689	\$ 16,432
T	\$ 25,097	\$ -	\$ 12,079	\$ 147,695	\$ 126,508	\$ 134,935	\$ 44,836	\$ 1,173	\$ -	\$ -
V	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 15,126	\$ 61,490
W	\$ 52,246	\$ 26,904	\$ 140,082	\$ 240,540	\$ 355,413	\$ 173,380	\$ 39,311	\$ 83,910	\$ 446,073	\$ 167,427
X	\$ 2,086	\$ 34,525	\$ -	\$ 10,795	\$ -	\$ 96	\$ 216	\$ -	\$ -	\$ -
Y	\$ 1,430	\$ 7,707	\$ -	\$ 313,688	\$ -	\$ 35,602	\$ -	\$ -	\$ -	\$ -
Z	\$ 873	\$ -	\$ -	\$ 4,969	\$ 2,191	\$ -	\$ -	\$ -	\$ 10,929	\$ 458
Tot	\$ 723,072	\$ 3,797,798	\$ 2,031,662	\$ 6,295,558	\$ 2,022,542	\$ 2,158,847	\$ 1,391,685	\$ 816,834	\$ 11,327,205	\$ 1,272,009

\*Federal Disaster relief spending is listed in thousands of 1994 constant dollars.

Key: Reg #1=CT, ME, MA, NH, RI, and VT. Reg #2=NJ, NY, PR (Puerto Rico), and VI (Virgin Islands).

Reg #3=DE, DC, MD, PA, VA, and WV. Region #4=AL, CZ (Canal Zone), FL, GA, KY, MS, NC, SC, and TN.

Reg #5= IL, IN, MI, MN, OH, and WI. Reg #6=AR, LA, NM, OK, and TX. Reg #7=IA, KS, MO, and NE.

Reg #8=CO, MT, ND, SD, UT, and WY. Reg #9=AZ, CA, GU (Guam), HI, MP (Northern Marianas), NV,

TT (Trust Territory), AS (American Samoa), FM (Federal States of Micronesia), MH (Marshall Islands), and

PW (Palau). Reg #10=AK, ID, OR, and WA.

Key: A=Flood and Tornado, C=Coastal Storm, D=Drought, E=Earthquake, F=Flood,

H=Hurricane, J=Typhoon, K=Dam/Levee Break, M=Mudslide, P=Fishing Loss, R=Fire,

**Table 2: FEMA Disaster Declarations  
By Primary Incident Type By State -  
MAXIMUMS ONLY, 1/1/53-6/15/97**

Primary Incident Type		State(# of declarations)	
Cd	Code Description	Coastal States	Inland States
A	Flood + Tornado	Mississippi (11) Alabama (9) Illinois (10) Texas (7)	Oklahoma (7) Arkansas (7)
C	Coastal Storm	Massachusetts (2) New Hampshire (2)	
D	Drought	Virgin Islands (3) New Jersey (2) Puerto Rico (2) Virginia (2)	Vermont (2) West Virginia (2)
E	Earthquake	California (8) Hawaii (3) Oregon (2)	
F	Flood	California (33) Texas (30) Washington State (23)	West Virginia (22)
H	Hurricane	Florida (12) Louisiana (9) North Carolina (9) Texas (8)	
J	Typhoon	Trust Territory (9) Guam (7) Micronesia (6) Northern Marianas (6)	
K	Dam/Levee Break	California (1)	Colorado (1)
M	Mud/Landslide	Ohio (1)	

**FEMA Disaster Declarations  
By Primary Incident Type By State -  
MAXIMUMS ONLY, 1/1/53-6/15/97 continued**

Primary Incident Type  
Cd Code Description

State(# of declarations)  
Coastal States      Inland States

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P	Fishing Losses	Maine (1) Oregon (1) Washington State (1) California (1)	
R	Fire*	California (14) Alaska (3)	
S	Snow/Ice	New York (8) Florida (5) North Carolina (5)	
T	Tornado	Texas (12) Mississippi (10) Alabama (5)	Arkansas (10) Oklahoma (8)
V	Volcano	Hawaii (2) Washington State (1)	Idaho (1)
W	Severe Storms	Alabama (5) Illinois (4) Maine (4) Oregon (4) Pennsylvania (4) Washington State (4)	
X	Toxic Substances	New York (2)	
Y	Human Cause	Florida (1) New York (1) Rhode Island (1) Puerto Rico (1)	Oklahoma (1)
Z	Other	(8) various states	

\*Fire denotes urban or urban/wildfire interface and does not refer to FSA Fire Suppression Actions of FEMA.

**Table 2-A Presidential Approved Declarations and Turndowns of Major Disasters\* and Emergencies\*\* by Administration,\*\*\* May 1953 to May 1997**

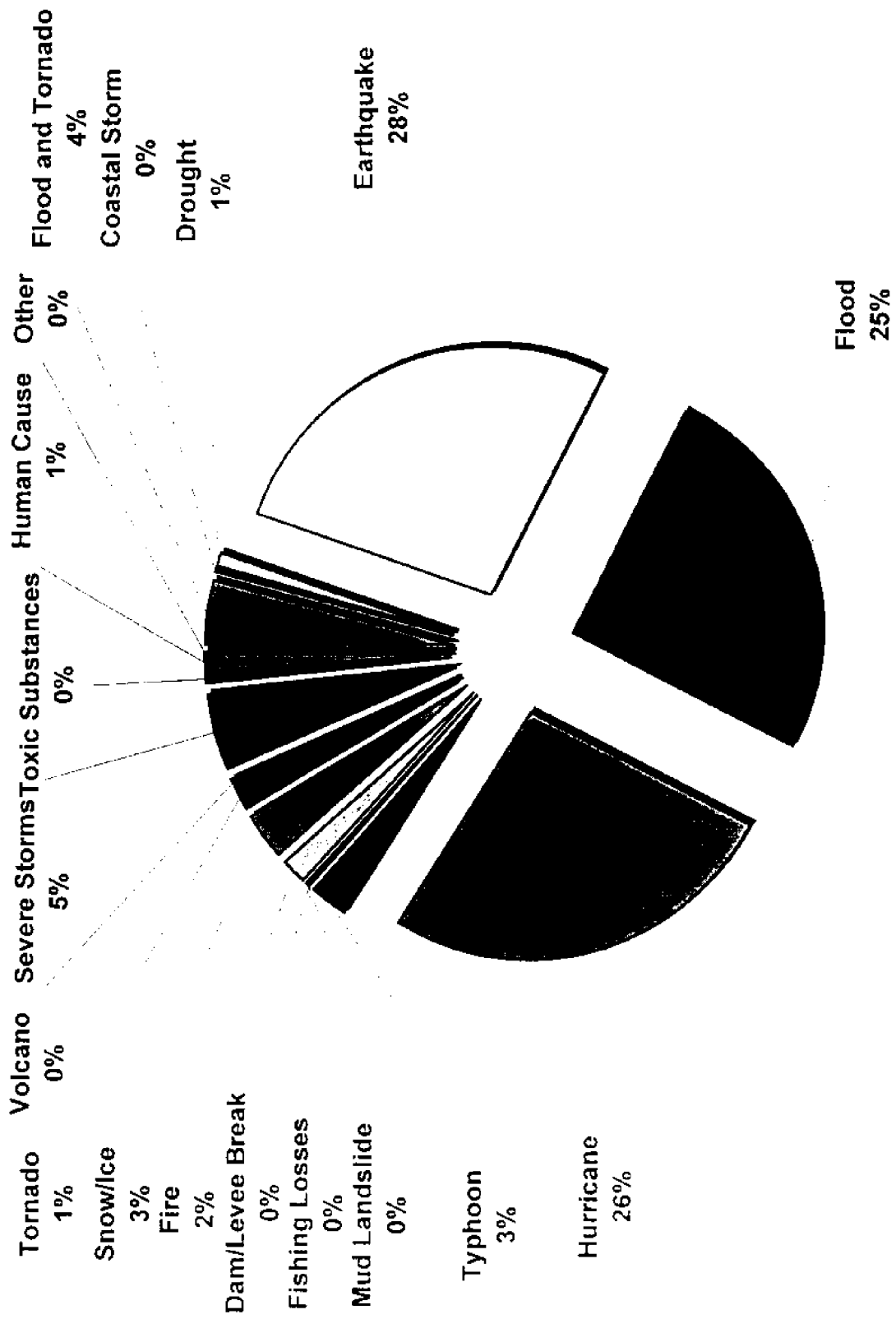
Presidential Administration	Time-Span	Pres. Approvals			Pres. Turndowns			Turndown Percentage		
		Major	Emerg	Total	Major	Emerg	Total	Major	Emerg	Total
Eisenhower	1953-61	106	0	106	55	0	55	34%	0%	34%
Kennedy	1961-63	52	0	52	20	0	20	28%	0%	28%
Johnson	1963-69	93	0	93	51	0	51	35%	0%	35%
Nixon	1969-74	195	1	196	102	15	117	34%	94%	37%
Ford	1974-77	76	23	99	35	7	42	32%	23%	30%
Carter	1977-81	112	59	171	92	37	129	45%	39%	43%
Reagan	1981-89	184	9	193	94	16	110	34%	64%	36%
Bush	1989-93	158	2	160	44	4	48	22%	67%	23%
Clinton	1993-5/97	199	30	229	65	5	70	25%	14%	23%
Total		1175	124	1299	558	84	642	32%	40%	33%

\*Represents Presidential declarations of major disasters.

\*\*Represents Presidential declarations of emergencies, which are usually capped at \$5 million. Emergency declarations did not begin until after 1970 during the Nixon Administration.

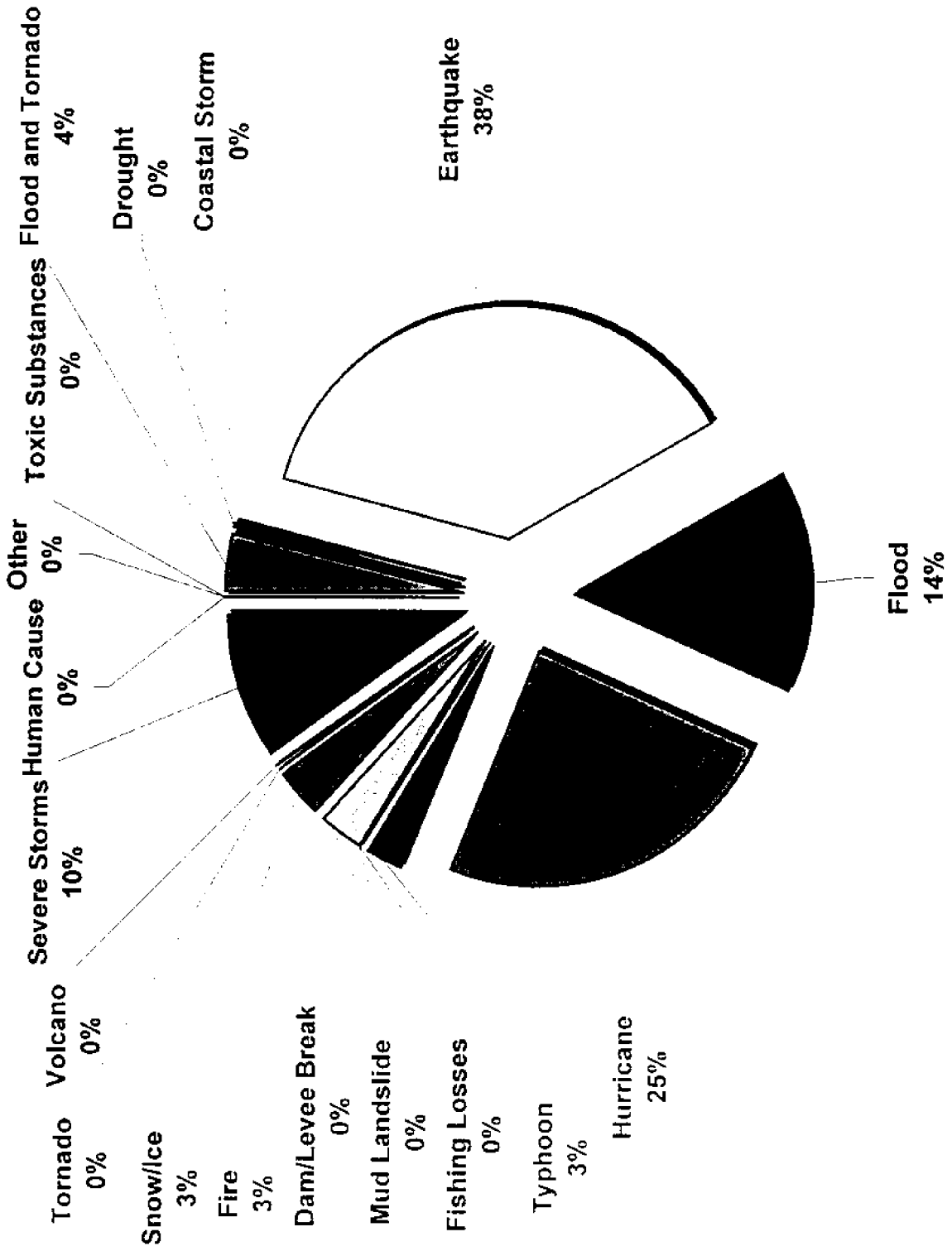
\*\*\*Disaster declaration issuance is determined down to the day, so Presidential approvals and turndowns are correctly assigned for every day an Administration resides in office.

**Table 3-C Coastal Disaster Spending by Category, May 1953 to May 1997**

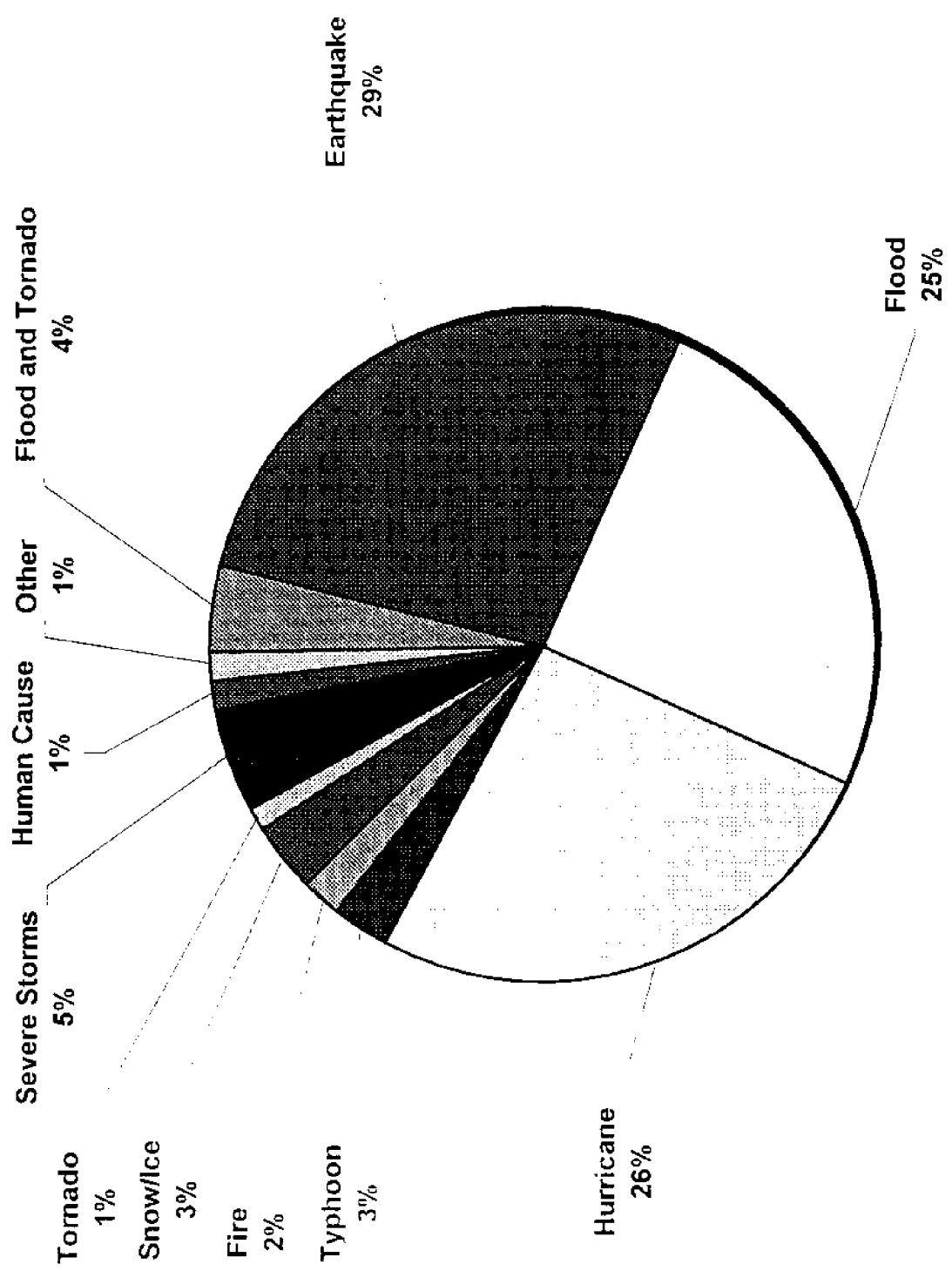




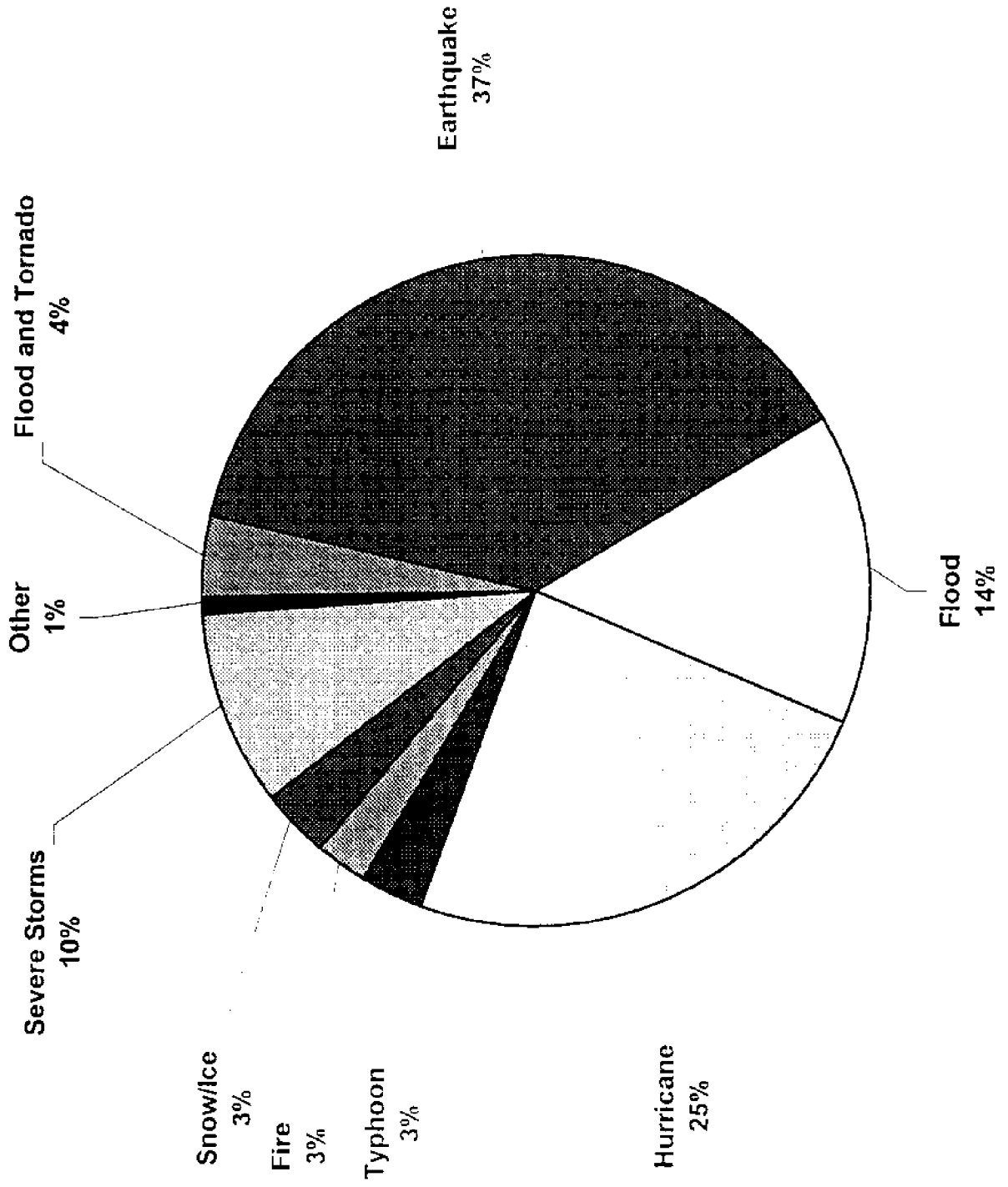
**Table 3-C-90 Coastal Disaster Spending by Category,  
January 1990 to May 1997**



**Table 4-C Coastal Disaster Spending by Category, May 1953 to May 1997**



**Table 4-C-90 Coastal Disaster Spending by Category,  
January 1990 to May 1997**



**Table 5-C Coastal State and Territory Federal Disaster Relief Spending\*  
from May 1953 to May 1997**

State/Territory	Abbr	Approved Declarations**	Total Amount	AVG Amount
Alaska	AK	20	\$ 450,901,337	\$ 22,545,067
Alabama	AL	35	\$ 661,384,840	\$ 18,896,710
American Samoa	AS	7	\$ 174,952,124	\$ 24,993,161
California	CA	65	\$ 10,057,272,058	\$ 154,727,262
Connecticut	CT	12	\$ 114,083,576	\$ 9,506,965
Delaware	DE	7	\$ 30,255,643	\$ 4,322,235
Florida	FL	39	\$ 2,674,664,505	\$ 68,581,141
Fed States of Micronesia	FM	7	\$ 60,141,464	\$ 8,591,638
Georgia	GA	29	\$ 513,159,473	\$ 17,695,154
Guam	GU	7	\$ 251,578,392	\$ 35,939,770
Hawaii	HI	19	\$ 328,200,821	\$ 17,273,727
Illinois	IL	34	\$ 826,910,213	\$ 24,320,889
Indiana	IN	23	\$ 170,843,910	\$ 7,427,996
Louisiana	LA	41	\$ 822,409,358	\$ 20,058,765
Massachusetts	MA	18	\$ 335,160,146	\$ 18,620,008
Maryland	MD	14	\$ 177,801,832	\$ 12,700,131
Maine	ME	21	\$ 96,238,613	\$ 4,582,791
Marshall Islands	MH	6	\$ 24,172,360	\$ 4,028,727
Michigan	MI	21	\$ 156,073,095	\$ 7,432,052
Minnesota	MN	29	\$ 420,828,475	\$ 14,511,327
N. Mariana Islands	MP	8	\$ 38,453,643	\$ 4,806,705
Mississippi	MS	35	\$ 674,655,865	\$ 19,275,882
North Carolina	NC	26	\$ 660,897,662	\$ 25,419,141
New Hampshire	NH	14	\$ 35,579,168	\$ 2,541,369
New Jersey	NJ	18	\$ 288,014,597	\$ 16,000,811
New York	NY	40	\$ 976,256,725	\$ 24,406,418
Ohio	OH	29	\$ 250,877,040	\$ 8,650,932
Oregon	OR	19	\$ 221,581,366	\$ 11,662,177
Pennsylvania	PA	32	\$ 1,007,422,267	\$ 31,481,946
Puerto Rico	PR	16	\$ 1,616,795,047	\$ 101,049,690
Palau	PW	1	\$ 7,493,094	\$ 7,493,094
Rhode Island	RI	10	\$ 49,312,860	\$ 4,931,286
South Carolina	SC	7	\$ 496,641,572	\$ 70,948,796
Trust Territory	TT	11	\$ 91,666,061	\$ 8,333,278
Texas	TX	64	\$ 940,329,096	\$ 14,692,642
Virginia	VA	26	\$ 357,416,450	\$ 13,746,787
Virgin Islands	VI	11	\$ 916,731,523	\$ 83,339,229
Washington	WA	35	\$ 433,431,506	\$ 12,383,757
Wisconsin	WI	25	\$ 197,009,085	\$ 7,880,363
Total		881	\$ 27,607,596,865	\$ 31,336,659

\*Spending is in Constant 1994 dollars.

\*\*Approved Presidential declarations for major disasters and emergencies.

**Table 5-C-1 Coastal State Approved Disaster Declarations  
by Primary Incident Type, May 1953 to May 1997**

State/Territory	Abbr	Total																		
		Decs	F&T	C	D	E	F	H	J	K	M	P	R	S	T	V	W	X	Y	Z
Alaska	AK	20	0	0	0	1	7	0	0	0	0	0	3	3	0	0	2	0	0	4
Alabama	AL	35	9	0	1	0	10	4	0	0	0	0	1	5	0	5	0	0	0	
American Samoa	AS	7	0	0	1	0	1	3	2	0	0	0	0	0	0	0	0	0	0	
California	CA	65	1	1	1	8	33	0	0	1	0	1	14	1	0	0	3	0	1	
Connecticut	CT	12	0	0	0	0	3	4	0	0	0	0	0	3	2	0	0	0	0	
Delaware	DE	7	0	1	1	0	2	0	0	0	0	0	2	0	0	1	0	0	0	
Florida	FL	39	4	1	0	0	13	12	0	0	0	0	5	0	0	2	0	1	1	
Micronesia	FM	7	0	0	1	0	0	0	6	0	0	0	0	0	0	0	0	0	0	
Georgia	GA	29	5	0	1	0	10	2	0	0	0	0	2	9	0	0	0	0	0	
Guam	GU	7	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	
Hawaii	HI	19	0	0	0	3	7	1	2	0	0	0	0	0	2	2	0	0	2	
Illinois	IL	34	10	0	0	0	12	0	0	0	0	0	2	6	0	4	0	0	0	
Indiana	IN	23	2	0	0	0	12	0	0	0	0	0	4	3	0	2	0	0	0	
Louisiana	LA	41	3	0	0	0	20	9	0	0	0	0	2	3	0	3	1	0	0	
Massachusetts	MA	18	0	2	0	0	4	4	0	0	0	0	2	3	1	0	1	0	1	
Maryland	MD	14	1	0	0	0	8	0	0	0	0	0	4	0	0	1	0	0	0	
Maine	ME	21	0	1	0	0	10	2	0	0	0	1	0	2	0	4	0	0	1	
Marshall Islands	MH	6	0	0	0	0	1	0	3	0	0	0	1	0	0	0	0	0	1	
Michigan	MI	21	1	0	1	0	8	0	0	0	0	0	4	6	0	1	0	0	0	
Minnesota	MN	29	5	0	1	0	17	0	0	0	0	0	4	0	0	2	0	0	0	
Northern Marianas	MP	8	0	0	0	0	1	0	7	0	0	0	0	0	0	0	0	0	0	
Mississippi	MS	35	11	0	0	0	6	4	0	0	0	0	1	10	0	2	1	0	0	
North Carolina	NC	26	0	0	1	0	5	9	0	0	0	0	5	4	0	2	0	0	0	
New Hampshire	NH	14	0	2	0	0	8	1	0	0	0	0	1	1	0	0	1	0	0	
New Jersey	NJ	18	0	1	2	0	8	2	0	0	0	0	3	0	0	2	0	0	0	
New York	NY	40	0	0	1	0	21	5	0	0	0	0	8	0	0	2	2	1	0	
Ohio	OH	29	4	0	0	0	15	0	0	0	1	0	2	4	0	2	0	0	1	
Oregon	OR	19	0	0	1	2	11	0	0	0	0	1	0	0	0	4	0	0	0	
Pennsylvania	PA	32	0	0	1	0	20	2	0	0	0	0	3	2	0	4	0	0	0	
Puerto Rico	PR	16	0	0	2	0	8	5	0	0	0	0	0	0	0	0	0	1	0	
Palua	PW	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Rhode Island	RI	10	0	0	0	0	0	4	0	0	0	0	4	0	0	0	1	1	0	
South Carolina	SC	7	0	0	1	0	1	4	0	0	0	0	0	1	0	0	0	0	0	
Trust Territory	TT	11	0	0	0	0	1	0	9	0	0	0	1	0	0	0	0	0	0	
Texas	TX	64	7	0	1	0	30	8	0	0	0	0	1	2	12	0	3	0	0	
Virginia	VA	26	0	0	2	0	15	2	0	0	0	0	4	0	0	3	0	0	0	
Virgin Islands	VI	11	0	0	3	0	3	5	0	0	0	0	0	0	0	0	0	0	0	
Washington	WA	35	0	0	1	1	25	0	0	0	0	1	1	1	0	1	4	0	0	
Wisconsin	WI	25	5	0	1	0	12	0	0	0	0	0	1	4	0	2	0	0	0	
<b>Total</b>		<b>881</b>	<b>68</b>	<b>9</b>	<b>25</b>	<b>15</b>	<b>368</b>	<b>92</b>	<b>37</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>24</b>	<b>77</b>	<b>72</b>	<b>3</b>	<b>64</b>	<b>5</b>	<b>4</b>	<b>12</b>

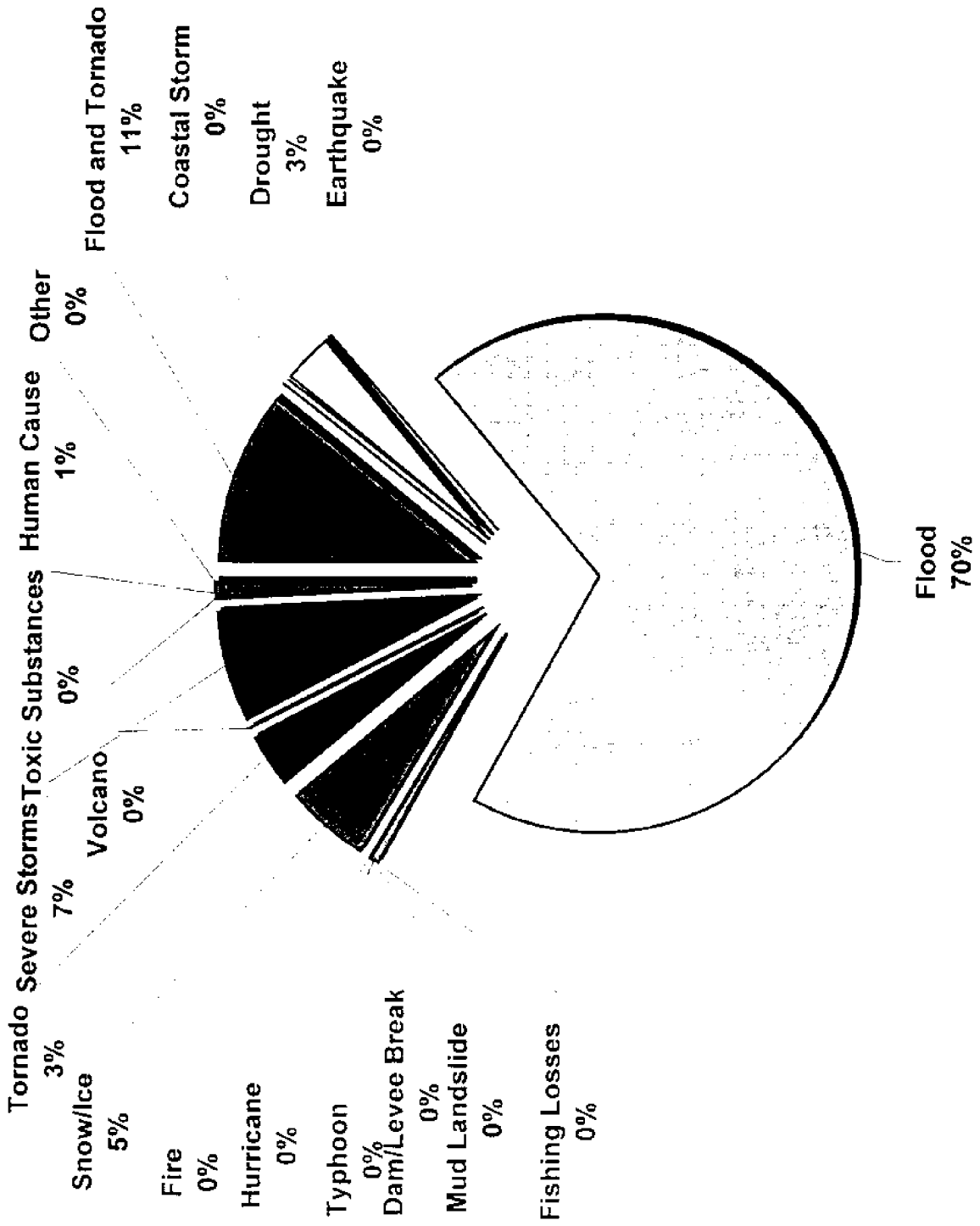
Key: F&T=Flood and Tornado, C=Coastal Storm, D=Drought, E=Earthquake, F=Flood, H=Hurricane, J=Typhoon, K=Dam/Levee Break, M=Mudslide, P=Fishing Loss, R=Fire, S=Snow/Ice, T=Tornado, V=Volcano, W=Severe Storm, X=Toxic, Y=Human, Z=Other.

**Table 5-C-2 Coastal State Presidential Disaster Declaration Turndowns  
by Primary Incident Type, May 1953 to May 1997**

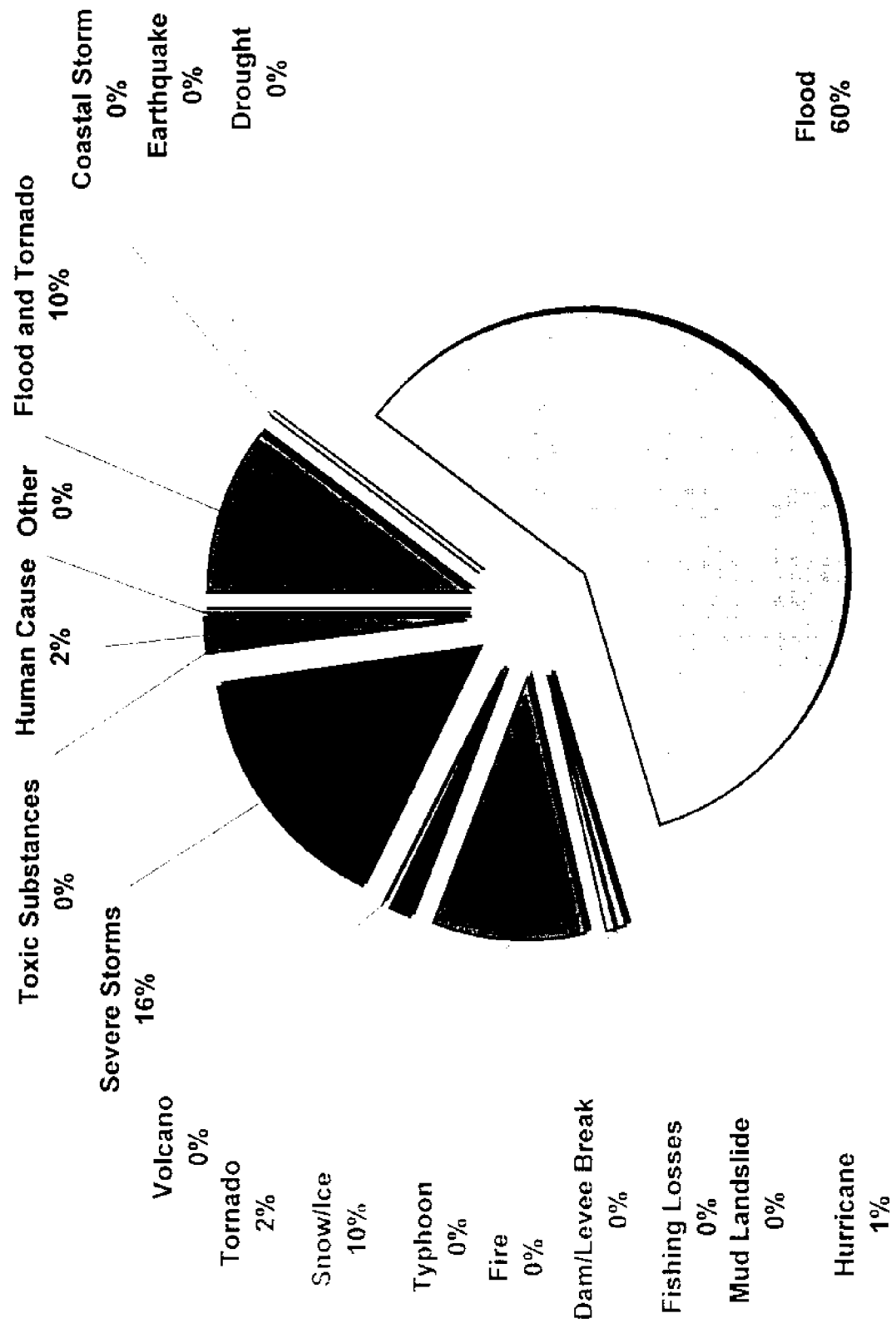
State/Territory	Abbr	Total																		
		Decs	F&T	C	D	E	F	H	J	K	M	P	R	S	T	V	W	X	Y	Z
Alaska	AK	11	0	1	0	0	4	0	0	0	0	2	1	1	0	0	0	1	1	0
Alabama	AL	32	2	0	0	0	10	1	0	0	0	1	0	6	7	0	4	1	0	0
American Samoa	AS	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
California	CA	28	0	1	0	0	6	0	0	0	6	0	9	1	0	0	2	0	1	2
Connecticut	CT	5	0	0	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0
Delaware	DE	5	0	0	0	0	1	0	0	0	0	1	0	3	0	0	0	0	0	0
Florida	FL	22	0	1	0	0	13	1	0	0	1	0	0	2	1	0	1	0	0	2
Micronesia	FM	2	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Georgia	GA	24	1	0	1	0	8	1	0	0	0	0	0	5	7	0	1	0	0	0
Guam	GU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hawaii	HI	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Illinois	IL	16	0	0	1	0	2	0	0	0	0	0	0	4	4	0	1	0	0	4
Indiana	IN	12	1	0	0	0	4	0	0	0	2	0	0	3	1	0	1	0	0	0
Louisiana	LA	14	1	0	2	0	4	1	0	0	1	0	0	1	2	0	0	0	0	2
Massachusetts	MA	6	0	0	0	0	2	0	0	0	0	1	1	0	0	0	1	1	0	0
Maryland	MD	7	0	0	0	0	1	2	0	0	0	0	0	2	0	0	1	0	0	1
Maine	ME	8	0	0	0	0	6	0	0	0	0	1	0	1	0	0	0	0	0	0
Marshall Islands	MH	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Michigan	MI	16	0	0	0	0	6	1	0	0	1	0	0	4	0	0	2	1	1	0
Minnesota	MN	13	0	0	2	0	6	0	0	0	0	0	0	1	0	1	0	0	0	3
Northern Marianas	MP	5	0	0	0	0	0	0	3	0	0	0	0	0	1	1	0	0	0	0
Mississippi	MS	20	4	0	1	0	6	0	0	0	0	0	1	3	5	0	0	0	0	0
North Carolina	NC	18	3	0	1	0	1	1	0	0	1	0	1	4	3	0	0	2	1	0
New Hampshire	NH	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
New Jersey	NJ	8	0	1	2	0	3	0	0	0	0	0	1	0	0	0	0	1	0	0
New York	NY	30	0	1	0	0	13	1	0	0	2	0	0	6	1	0	3	0	1	2
Ohio	OH	23	0	0	0	0	7	0	0	0	1	0	0	8	3	0	3	0	0	1
Oregon	OR	3	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1
Pennsylvania	PA	13	0	0	0	1	2	0	0	0	0	0	0	4	0	0	2	0	1	3
Puerto Rico	PR	4	0	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Palua	PW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhode Island	RI	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0
South Carolina	SC	12	1	0	0	0	0	0	0	0	0	0	0	4	6	0	0	0	0	1
Trust Territory	TT	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Texas	TX	35	4	0	0	0	18	2	0	0	1	0	0	0	3	0	6	0	0	1
Virginia	VA	10	0	0	0	0	6	0	0	0	0	0	0	2	1	0	1	0	0	0
Virgin Islands	VI	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Washington	WA	11	0	0	0	0	7	0	0	0	0	1	0	0	0	0	1	0	0	2
Wisconsin	WI	16	1	0	0	0	8	0	0	0	0	0	0	0	6	0	1	0	0	0
<b>Total</b>		<b>444</b>	<b>18</b>	<b>7</b>	<b>12</b>	<b>1</b>	<b>157</b>	<b>12</b>	<b>5</b>	<b>0</b>	<b>16</b>	<b>7</b>	<b>14</b>	<b>66</b>	<b>51</b>	<b>2</b>	<b>36</b>	<b>7</b>	<b>7</b>	<b>26</b>

Key: F&T=Flood and Tornado, C=Coastal Storm, D=Drought, E=Earthquake, F=Flood, H=Hurricane, J=Typhoon, K=Dam/Levee Break, M=Mudslide, P=Fishing Loss, R=Fire, S=Snow/Ice, T=Tornado, V=Volcano, W=Severe Storm, X=Toxic, Y=Human, Z=Other.

**Table 3-1 Inland Disaster Spending by Category, May 1953 to May 1997**

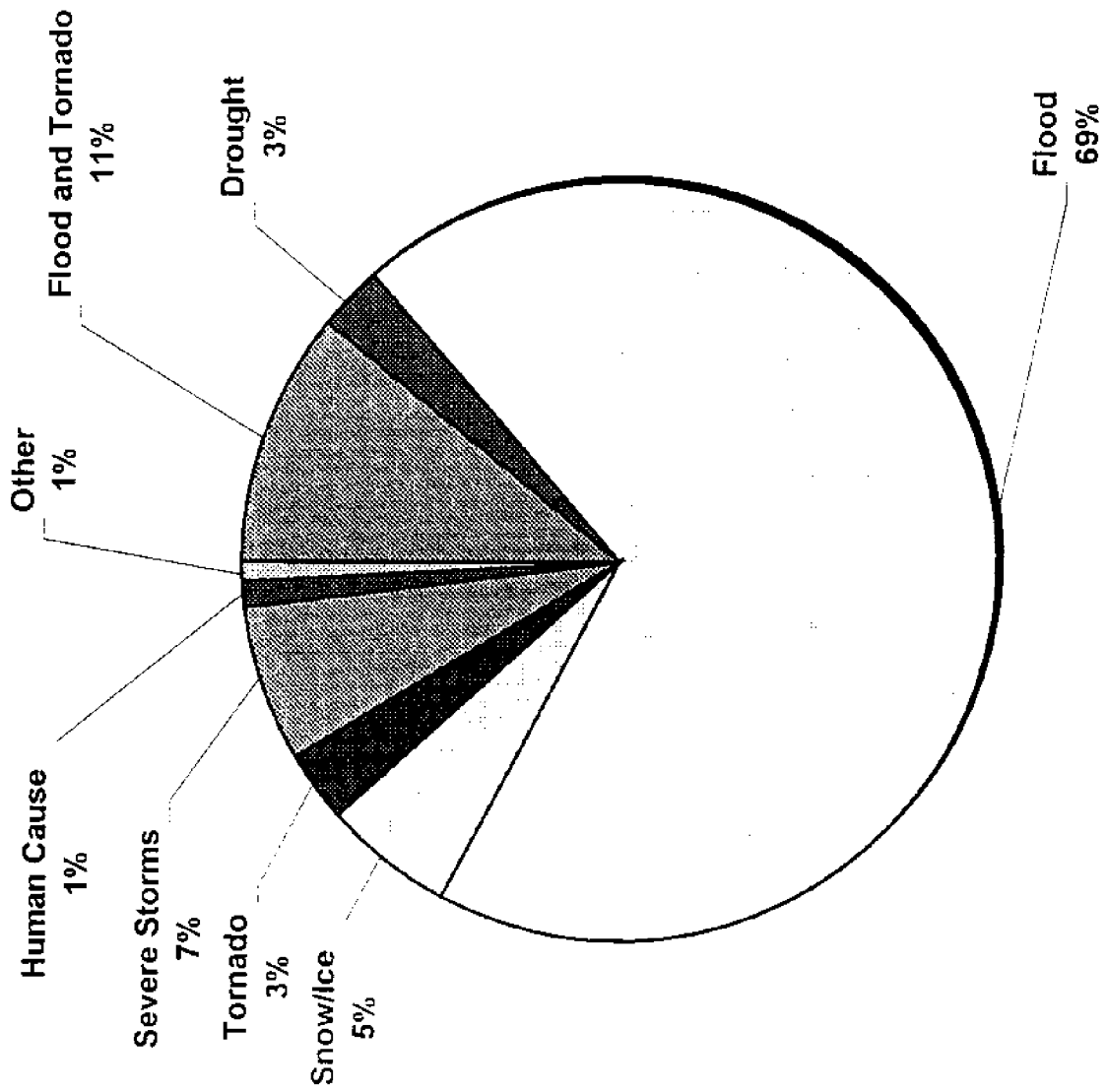


**Table 3-I-90 Inland Disaster Spending by Category, January 1990 to May 1997**

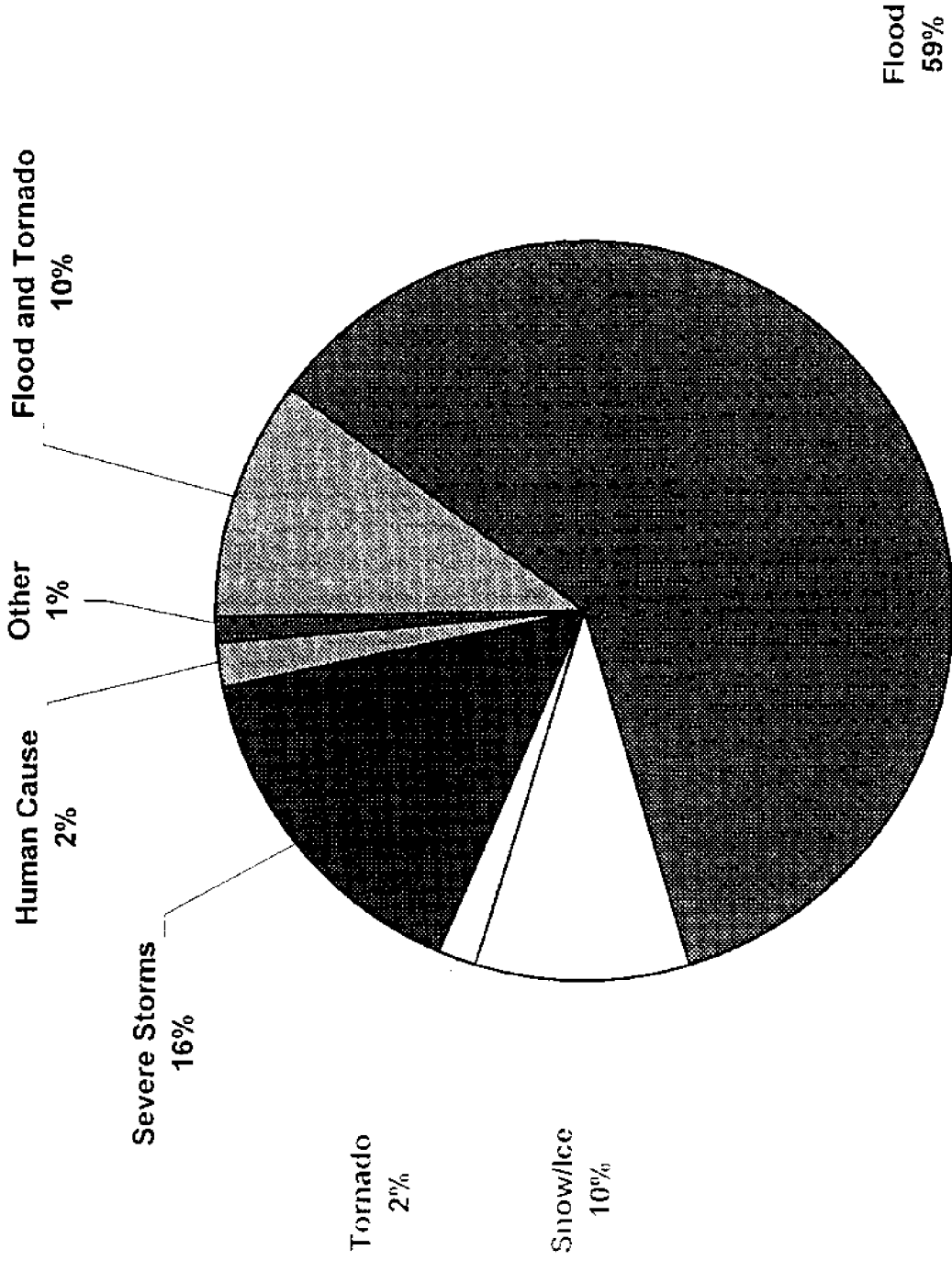




**Table 4-1 Inland Disaster Spending by Category, May 1953 to May 1997**



**Table 4-I-90 Inland Disaster Spending by Category,  
January 1990 to May 1997**



**Table 5-I Inland State and Territory Federal Disaster Relief Spending\*  
from May 1953 to May 1997**

State/Territory	Abbr	Approved Declarations**	Total Amount	AVG Amount
Arkansas	AR	36	\$ 144,686,533	\$ 4,019,070
Arizona	AZ	14	\$ 256,405,770	\$ 18,314,698
Colorado	CO	12	\$ 145,531,799	\$ 12,127,650
District of Columbia	DC	4	\$ 8,063,627	\$ 2,015,907
Iowa	IA	29	\$ 387,277,811	\$ 13,354,407
Idaho	ID	17	\$ 166,094,448	\$ 9,770,262
Kansas	KS	19	\$ 174,325,232	\$ 9,175,012
Kentucky	KY	32	\$ 427,569,631	\$ 13,361,551
Missouri	MO	27	\$ 562,326,975	\$ 20,826,925
Montana	MT	12	\$ 76,621,493	\$ 6,385,124
North Dakota	ND	25	\$ 232,147,969	\$ 9,285,919
Nebraska	NE	24	\$ 267,754,819	\$ 11,156,451
New Mexico	NM	15	\$ 40,322,215	\$ 2,688,148
Nevada	NV	13	\$ 36,869,108	\$ 2,836,085
Oklahoma	OK	40	\$ 211,099,752	\$ 5,277,494
South Dakota	SD	19	\$ 268,817,594	\$ 14,148,294
Tennessee	TN	24	\$ 186,584,657	\$ 7,774,361
Utah	UT	5	\$ 83,836,547	\$ 16,767,309
Vermont	VT	14	\$ 92,698,019	\$ 6,621,287
West Virginia	WV	31	\$ 450,701,780	\$ 14,538,767
Wyoming	WY	6	\$ 9,878,737	\$ 1,646,456
<b>Total</b>		<b>418</b>	<b>\$ 4,229,614,518</b>	<b>\$ 10,118,695</b>

\*Spending is in Constant 1994 dollars.

\*\*Approved Presidential declarations for major disasters and emergencies.

**Table 5-I-1 Inland State Approved Disaster Declarations  
by Primary Incident Type, May 1953 to May 1997**

State/Territory	Total																			
	Abbr	Decs	F&T	C	D	E	F	H	J	K	M	P	R	S	T	V	W	X	Y	Z
Arkansas	AR	36	7	0	1	0	15	0	0	0	0	0	0	1	10	0	2	0	0	0
Arizona	AZ	14	0	0	1	0	12	0	0	0	0	0	0	0	0	0	1	0	0	0
Colorado	CO	12	1	0	1	0	9	0	0	1	0	0	0	0	0	0	0	0	0	0
Dist. of Columbia	DC	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0
Iowa	IA	29	1	0	1	0	20	0	0	0	0	0	0	1	4	0	2	0	0	0
Idaho	ID	17	0	0	1	1	9	0	0	0	0	0	2	1	0	1	2	0	0	0
Kansas	KS	19	5	0	0	0	11	0	0	0	0	0	0	3	0	0	0	0	0	0
Kentucky	KY	32	2	0	0	0	20	0	0	0	0	0	0	3	4	0	1	1	0	1
Missouri	MO	27	5	0	1	0	16	0	0	0	0	0	0	2	0	3	0	0	0	0
Montana	MT	12	0	0	1	0	8	0	0	0	0	0	0	1	0	0	2	0	0	0
North Dakota	ND	25	0	0	1	0	17	0	0	0	0	0	0	2	2	0	3	0	0	0
Nebraska	NE	24	2	0	1	0	15	0	0	0	0	0	0	2	3	0	1	0	0	0
New Mexico	NM	15	0	0	1	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
Nevada	NV	13	0	0	1	1	10	0	0	0	0	0	0	0	0	0	1	0	0	0
Oklahoma	OK	40	7	0	0	0	19	0	0	0	0	0	2	0	8	0	2	0	2	0
South Dakota	SD	19	3	0	1	0	9	0	0	0	0	0	0	4	0	0	2	0	0	0
Tennessee	TN	24	3	0	0	0	16	0	0	0	0	0	0	1	3	0	1	0	0	0
Utah	UT	5	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	VT	14	0	0	2	0	11	0	0	0	0	0	0	0	0	0	1	0	0	0
West Virginia	WV	31	0	0	2	0	22	2	0	0	0	0	1	2	0	0	2	0	0	0
Wyoming	WY	6	0	0	1	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0
<b>Total</b>		<b>418</b>	<b>36</b>	<b>0</b>	<b>18</b>	<b>2</b>	<b>260</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>20</b>	<b>40</b>	<b>1</b>	<b>28</b>	<b>2</b>	<b>2</b>	<b>1</b>

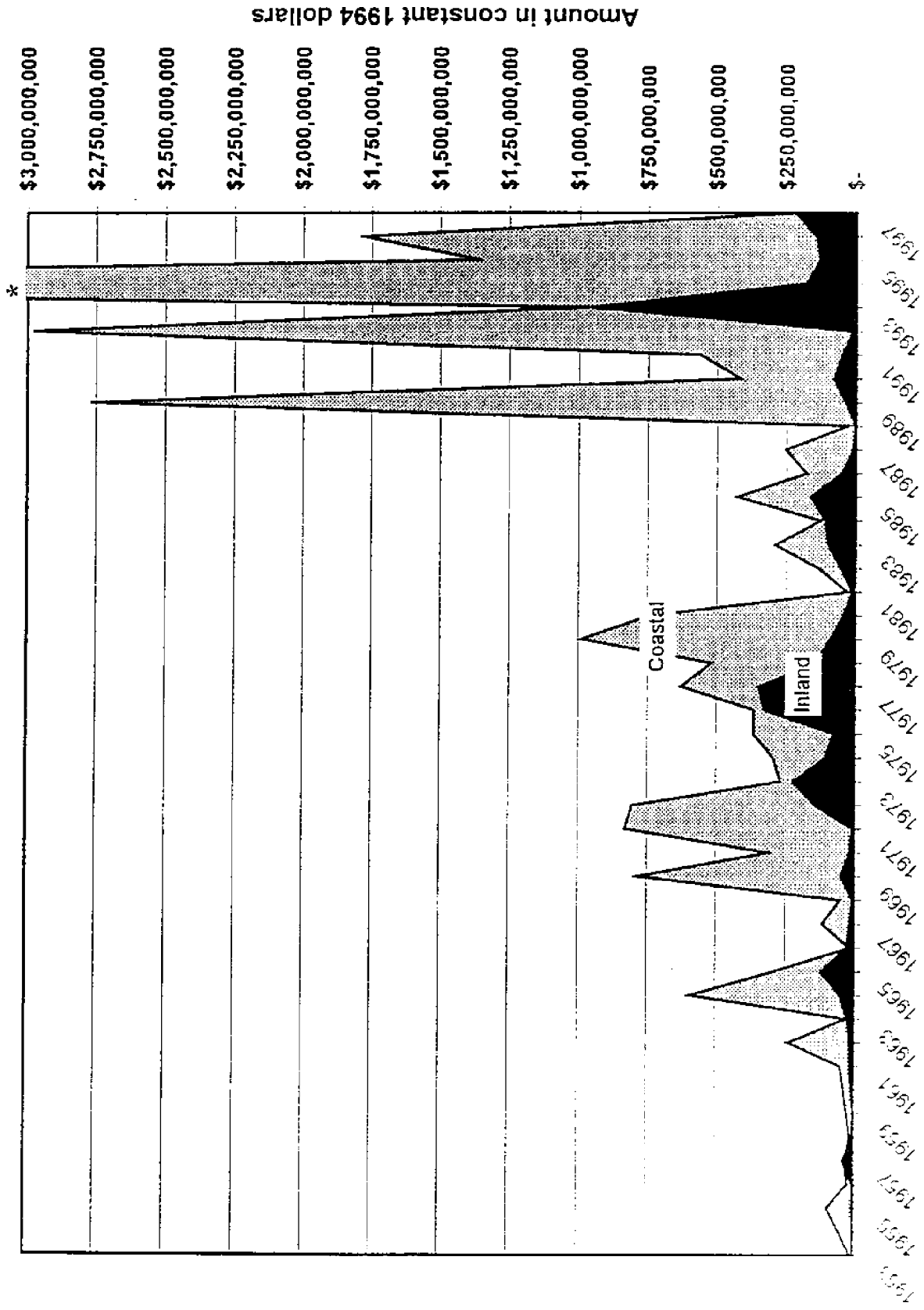
**Key: F&T=Flood and Tornado, C=Coastal Storm, D=Drought, E=Earthquake, F=Flood, H=Hurricane, J=Typhoon, K=Dam/Levee Break, M=Mudslide, P=Fishing Loss, R=Fire, S=Snow/Ice, T=Tornado, V=Volcano, W=Severe Storm, X=Toxic, Y=Human, Z=Other.**

**Table 5-I-2 Inland State Presidential Disaster Declaration Turndowns  
by Primary Incident Type, May 1953 to May 1997**

State/Territory	Abbr	Total																		
		Decs	F&T	C	D	E	F	H	J	K	M	P	R	S	T	V	W	X	Y	Z
Arkansas	AR	18	1	0	0	0	13	0	0	0	0	0	0	1	3	0	0	0	0	0
Arizona	AZ	7	0	0	1	0	4	0	0	0	0	0	1	1	0	0	0	0	0	0
Colorado	CO	3	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
Dist. of Columbia	DC	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Iowa	IA	13	2	0	0	0	7	0	0	0	0	0	0	2	0	0	2	0	0	0
Idaho	ID	4	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	0	0	0
Kansas	KS	13	1	0	0	0	6	0	0	0	0	0	0	3	2	0	0	0	1	0
Kentucky	KY	20	4	0	2	0	9	0	0	0	1	0	0	1	1	0	2	0	0	0
Missouri	MO	23	1	0	1	0	10	0	0	0	0	0	0	4	4	0	2	0	0	1
Montana	MT	5	0	0	1	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0
North Dakota	ND	11	0	0	3	0	3	0	0	0	0	0	0	2	0	0	2	0	0	1
Nebraska	NE	8	0	0	0	0	1	0	0	0	0	0	0	2	2	0	3	0	0	0
New Mexico	NM	8	0	0	0	0	6	0	0	0	0	0	0	0	1	0	1	0	0	0
Nevada	NV	9	0	0	1	0	3	0	0	0	0	0	2	2	0	0	1	0	0	0
Oklahoma	OK	19	1	0	1	0	5	0	0	0	0	0	3	1	4	0	0	0	0	4
South Dakota	SD	8	0	0	4	0	1	0	0	0	1	0	0	2	0	0	0	0	0	0
Tennessee	TN	11	1	1	1	0	3	0	0	0	0	0	0	1	1	0	2	0	0	1
Utah	UT	8	0	0	1	0	6	0	0	0	0	0	0	0	0	0	1	0	0	0
Vermont	VT	3	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
West Virginia	WV	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Wyoming	WY	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>		<b>198</b>	<b>12</b>	<b>1</b>	<b>16</b>	<b>0</b>	<b>90</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>9</b>	<b>23</b>	<b>19</b>	<b>1</b>	<b>17</b>	<b>0</b>	<b>1</b>	<b>7</b>

**Key: F&T=Flood and Tornado, C=Coastal Storm, D=Drought, E=Earthquake, F=Flood, H=Hurricane, J=Typhoon, K=Dam/Levee Break, M=Mudslide, P=Fishing Loss, R=Fire, S=Snow/Ice, T=Tornado, V=Volcano, W=Severe Storm, X=Toxic, Y=Human, Z=Other.**

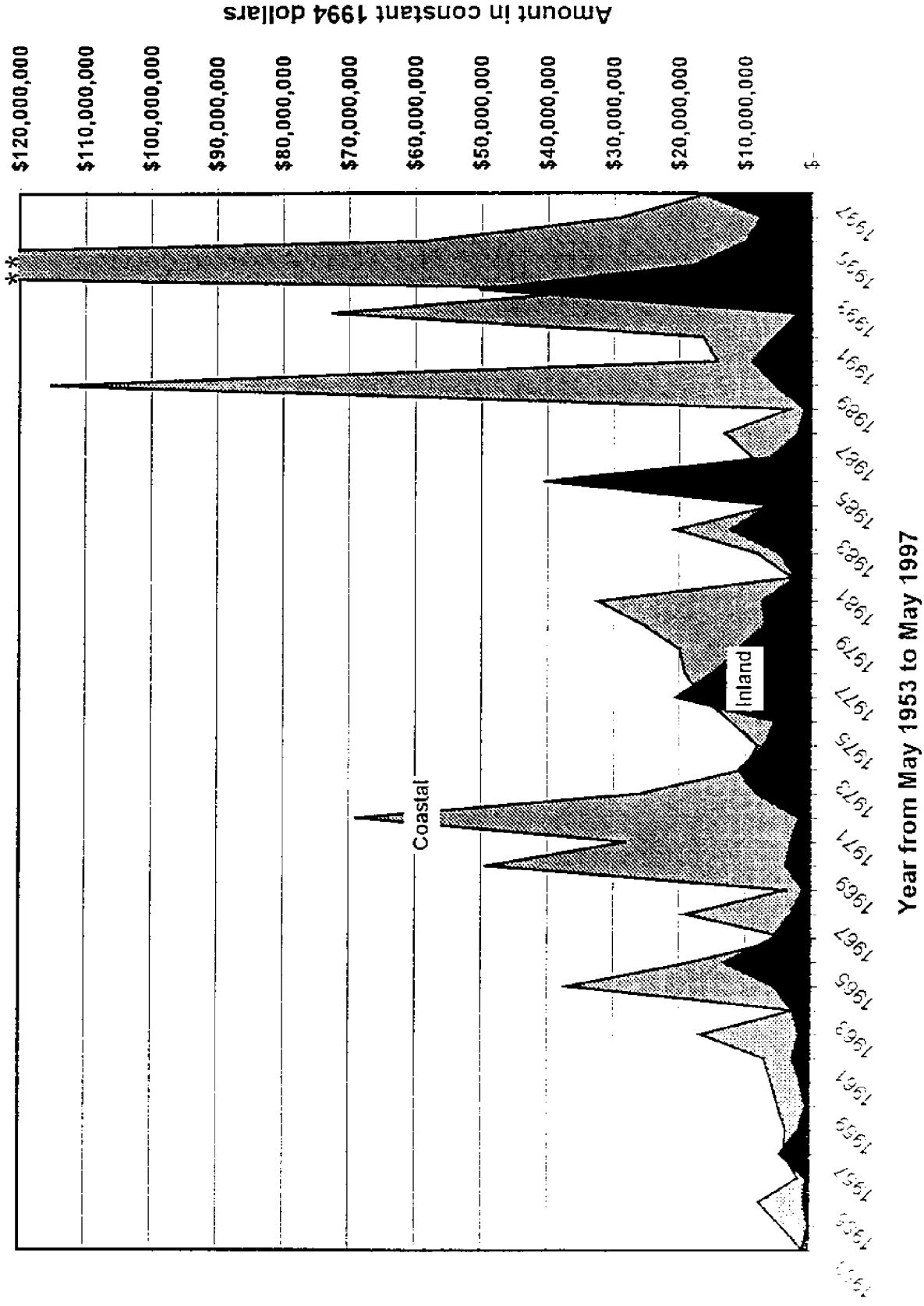
**Table 6 Total Federal Disaster Relief Spending in 1994 Constant Dollars  
Coastal vs. Inland States, May 1953 to May 1997**



Year from May 1953 to May 1997

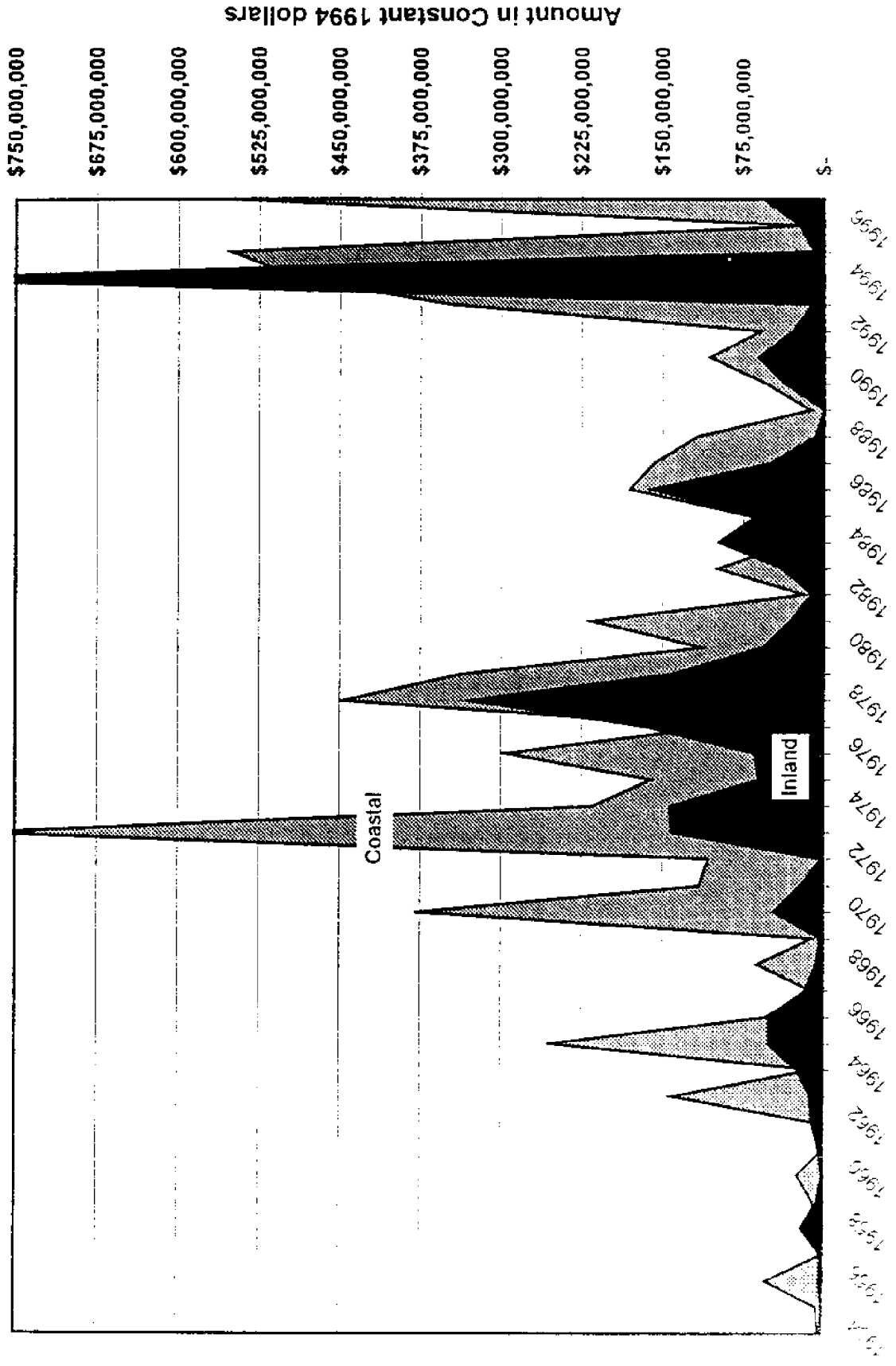
\*Peak Amount=\$ 6,552,575,865 in 1994.

**Table 6-A Average\* Federal Disaster Relief Spending in 1994 Constant Dollars  
Coastal vs. Inland States, May 1953 to May 1997**



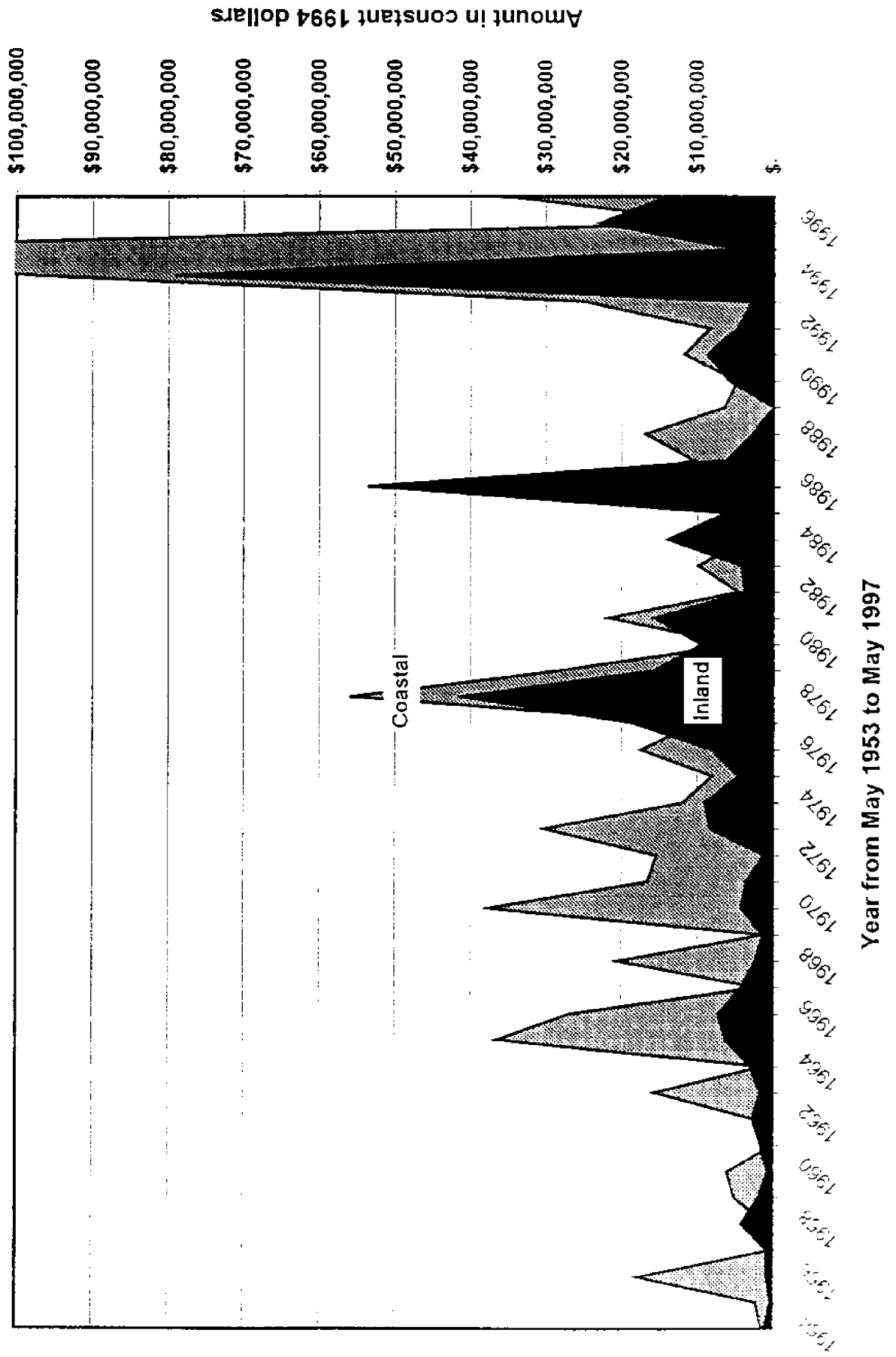
\*Total coastal and inland federal disaster relief per year divided by the total number of coastal and inland declarations per year.  
 \*\*Peak Amount=\$242,685,773 in 1994.

**Table 6-B Total Flood Disaster Spending in 1994 Constant Dollars  
Coastal vs. Inland States, May 1953 to May 1997**

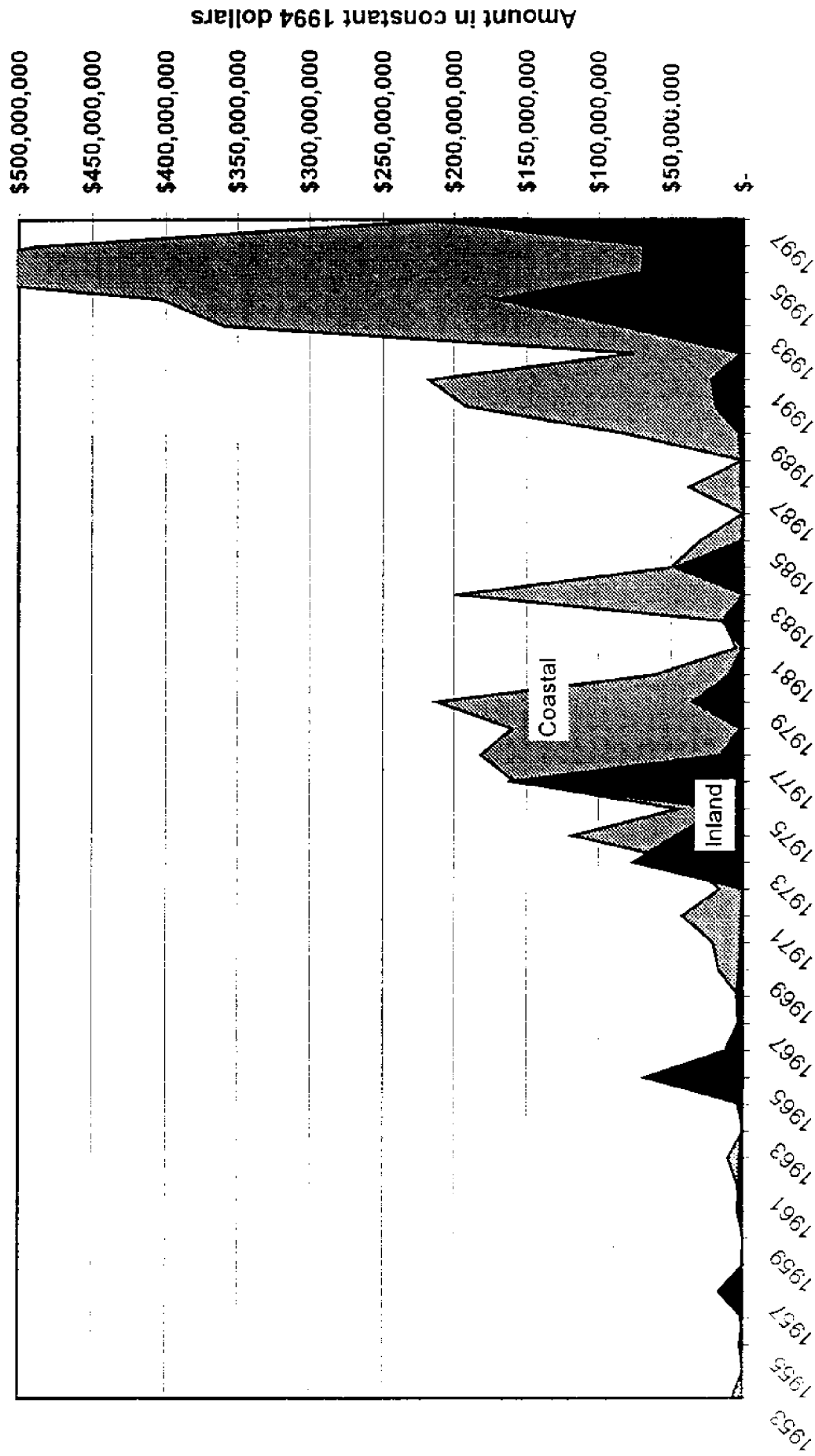




**Table 6-B-1 AVG Flood Disaster Spending in 1994 Constant Dollars  
Coastal vs. Inland States, May 1953 to May 1997**



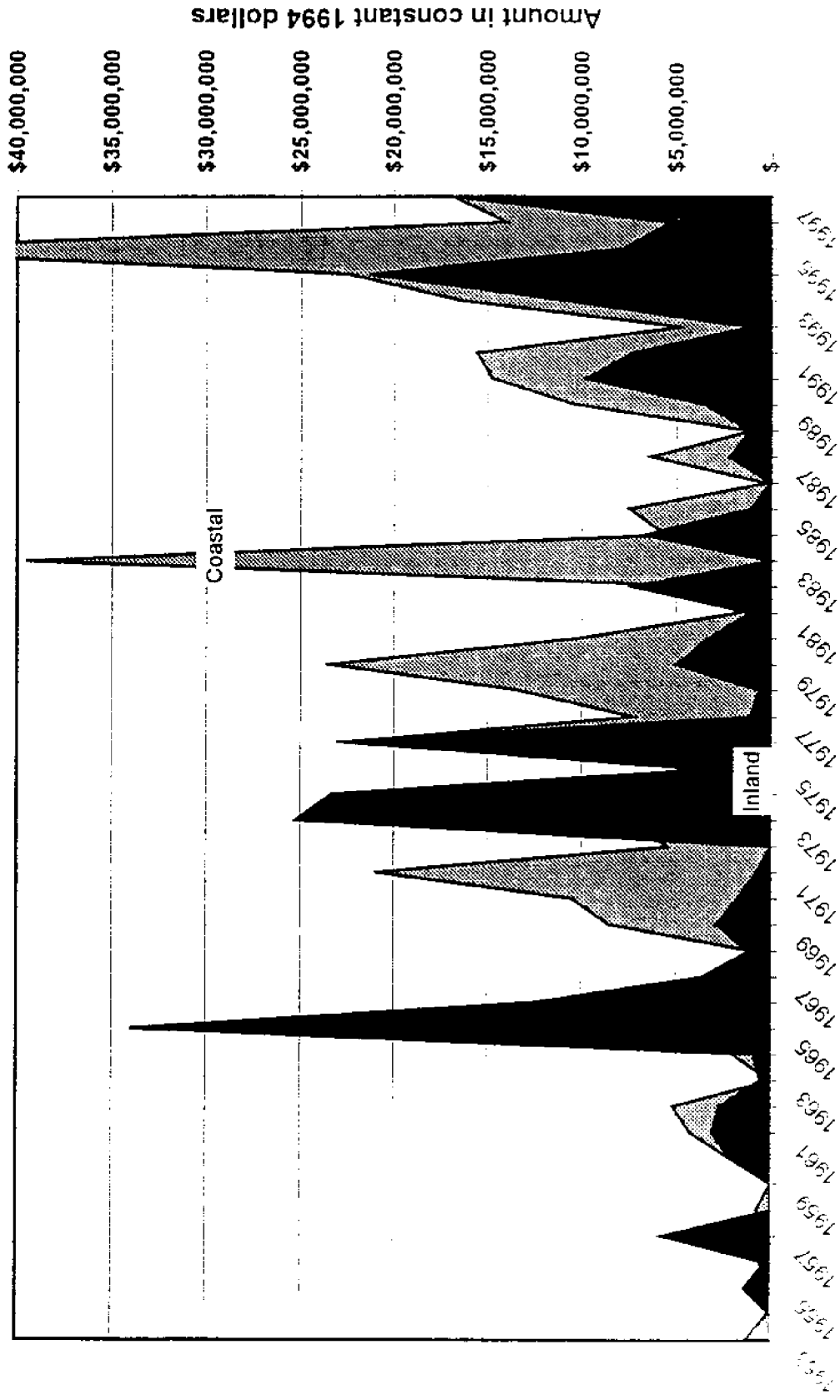
**Table 6-C Total Severe Storm/Tornado\* Disaster Spending in 1994  
Constant Dollars: Coastal vs. Inland States, May 1953 to May 1997**



Year from May 1953 to May 1997

\*Severe Storm/Tornado includes the following disaster categories: Flood and Tornado, Tornado, Severe Storm, Coastal Storm, Snow/Icc, and Drought.

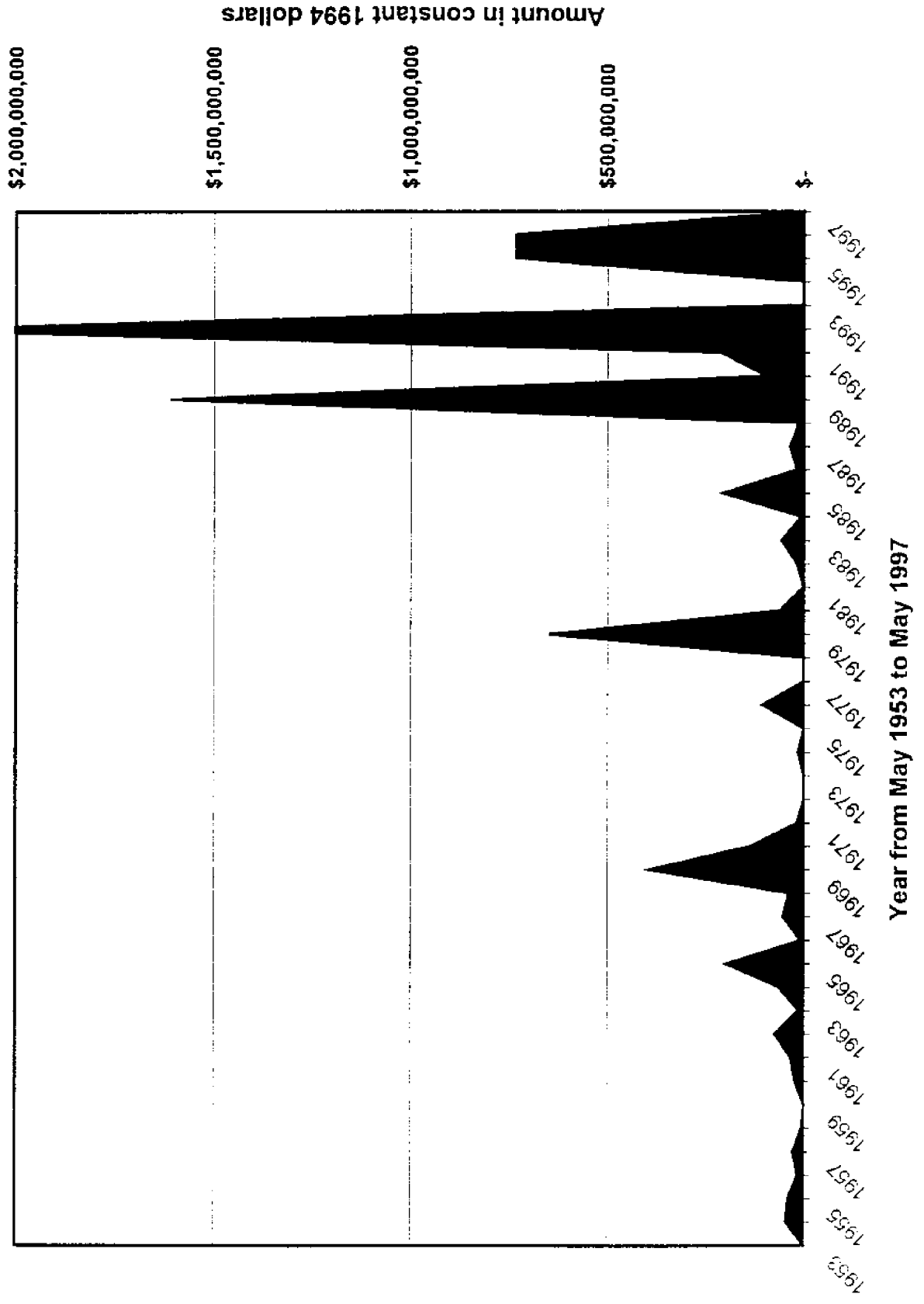
**Table 6-C-1 AVG Severe Storm/Tornado\* Disaster Spending in 1994  
Constant Dollars: Coastal vs. Inland States, May 1953 to May 1997**



Year from 1953 to May 1997

\*Severe Storm and Tornado includes the following Disaster categories: Flood and Tornado, Tornado, Severe Storm, Coastal Storm, Snow/Ice, and Drought

**Table 6-D Total Combined Hurricane and Typhoon Disaster Spending  
in 1994 Constant Dollars, May 1953 to May 1997**



**Table 7 Coastal State Federal Disaster Relief Spending Demographics  
in 1994 Constant Dollars, January 1990 to May 1997**

State/Territory	Abbr	Decs	Total Amount	AVG Amount*	Total Federal Spending by**		
					SQ Mile	Person	Density
Alaska	AK	4	\$ 93,129,718	\$ 23,282,429	\$ 142	\$ 169	\$ 93,129,718
Alabama	AL	11	\$ 173,091,782	\$ 15,735,617	\$ 3,302	\$ 43	\$ 2,174,520
American Samoa	AS	2	\$ 152,331,835	\$ 76,165,917	\$ 1,978,336	\$ 3,906	\$ 300,754
California	CA	16	\$ 6,725,907,384	\$ 420,369,211	\$ 41,085	\$ 226	\$ 35,251,087
Connecticut	CT	4	\$ 24,343,377	\$ 6,085,844	\$ 4,391	\$ 7	\$ 35,878
Delaware	DE	5	\$ 14,634,439	\$ 2,926,888	\$ 5,880	\$ 22	\$ 42,954
Florida	FL	14	\$ 2,110,192,223	\$ 150,728,016	\$ 32,090	\$ 163	\$ 8,807,146
Micronesia	FM	5	\$ 36,267,054	\$ 7,253,411	\$ 134,322	\$ 333	\$ 89,836
Georgia	GA	11	\$ 485,464,583	\$ 44,133,144	\$ 8,167	\$ 75	\$ 4,342,259
Guam	GU	3	\$ 104,266,485	\$ 34,755,495	\$ 498,883	\$ 783	\$ 180,111
Hawaii	HI	4	\$ 279,003,144	\$ 69,750,786	\$ 25,522	\$ 252	\$ 1,617,410
Illinois	IL	11	\$ 577,117,995	\$ 52,465,272	\$ 9,964	\$ 50	\$ 2,806,994
Indiana	IN	10	\$ 83,623,278	\$ 8,362,328	\$ 2,296	\$ 15	\$ 540,901
Louisiana	LA	7	\$ 360,498,611	\$ 51,499,802	\$ 6,954	\$ 85	\$ 3,720,316
Massachusetts	MA	7	\$ 130,195,792	\$ 18,599,399	\$ 12,335	\$ 22	\$ 169,614
Maryland	MD	5	\$ 43,455,674	\$ 8,691,135	\$ 3,503	\$ 9	\$ 88,848
Maine	ME	11	\$ 39,982,537	\$ 3,634,776	\$ 1,130	\$ 33	\$ 1,004,586
Marshall Islands	MH	4	\$ 18,184,076	\$ 4,546,019	\$ 259,773	\$ 395	\$ 27,671
Michigan	MI	2	\$ 24,490,144	\$ 12,245,072	\$ 253	\$ 3	\$ 149,695
Minnesota	MN	9	\$ 174,906,429	\$ 19,434,048	\$ 2,012	\$ 40	\$ 3,185,909
Northern Marianas	MP	2	\$ 3,223,246	\$ 1,611,623	\$ 17,518	\$ 73	\$ 13,479
Mississippi	MS	9	\$ 114,141,659	\$ 12,682,407	\$ 2,357	\$ 44	\$ 2,082,877
North Carolina	NC	7	\$ 459,111,589	\$ 65,587,370	\$ 8,530	\$ 69	\$ 3,373,340
New Hampshire	NH	6	\$ 13,722,593	\$ 2,287,099	\$ 1,468	\$ 12	\$ 110,934
New Jersey	NJ	5	\$ 103,309,971	\$ 20,661,994	\$ 11,845	\$ 13	\$ 99,155
New York	NY	9	\$ 307,985,452	\$ 34,220,606	\$ 5,654	\$ 17	\$ 808,361
Ohio	OH	6	\$ 93,118,457	\$ 15,519,743	\$ 2,077	\$ 9	\$ 351,523
Oregon	OR	9	\$ 111,079,887	\$ 12,342,210	\$ 1,129	\$ 39	\$ 3,752,699
Pennsylvania	PA	8	\$ 316,679,974	\$ 39,584,997	\$ 6,876	\$ 27	\$ 1,194,568
Puerto Rico	PR	4	\$ 359,220,303	\$ 89,805,076	\$ 102,196	\$ 102	\$ 352,799
Palau	PW	1	\$ 7,493,094	\$ 7,493,094	\$ 38,230	\$ 500	\$ 97,910
Rhode Island	RI	5	\$ 19,050,896	\$ 3,810,179	\$ 12,331	\$ 19	\$ 19,841
South Carolina	SC	2	\$ 10,891,330	\$ 5,445,665	\$ 340	\$ 3	\$ 94,053
Trust Territory	TT	0	\$ -	\$ -	\$ -	\$ -	\$ -
Texas	TX	13	\$ 272,924,058	\$ 20,994,158	\$ 1,016	\$ 16	\$ 4,205,301
Virginia	VA	9	\$ 107,115,374	\$ 11,901,708	\$ 2,505	\$ 17	\$ 685,758
Virgin Islands	VI	2	\$ 501,939,901	\$ 250,969,951	\$ 3,773,984	\$ 4,930	\$ 591,561
Washington	WA	11	\$ 269,350,169	\$ 24,486,379	\$ 3,778	\$ 55	\$ 3,684,681
Wisconsin	WI	8	\$ 92,633,560	\$ 11,579,195	\$ 1,414	\$ 19	\$ 1,028,119
		261	\$ 14,814,078,072	\$ 56,758,920	\$ 184,831	\$ 331	\$ 4,742,452

\*In the AVG Amount column, the final value \$56,758,920 equals the avg amount per disaster declaration across all coastal states.

\*\*In the Spending by Demographics Columns, the final values equal the avg amount per state for all disaster declarations. For example, \$184,831 represents the disaster spending of all coastal states by square mile divided by the total number of coastal states that incurred disasters during the 1990s.

**Table 7-A Inland State Federal Disaster Relief Spending Demographics  
in 1994 Constant Dollars, January 1990 to May 1997**

State/Territory	Abbr	Decs	Total Amount	AVG Amount*	Total Federal Spending by**		
					SQ Mile	Person	Density
Arkansas	AR	7	\$ 58,934,578	\$ 8,419,225	\$ 1,108	\$ 25	\$ 1,306,753
Arizona	AZ	2	\$ 103,582,545	\$ 51,791,272	\$ 909	\$ 28	\$ 3,206,890
Colorado	CO	0	\$ -	\$ -	\$ -	\$ -	\$ -
Dist. Of Columbia	DC	3	\$ 4,584,913	\$ 1,528,304	\$ 67,425	\$ 8	\$ 461
Iowa	IA	9	\$ 317,201,451	\$ 35,244,606	\$ 5,637	\$ 114	\$ 6,382,323
Idaho	ID	2	\$ 38,951,676	\$ 19,475,838	\$ 466	\$ 39	\$ 3,192,760
Kansas	KS	2	\$ 99,556,272	\$ 49,778,136	\$ 1,210	\$ 40	\$ 3,285,686
Kentucky	KY	7	\$ 106,420,940	\$ 15,202,991	\$ 2,633	\$ 29	\$ 1,146,777
Missouri	MO	6	\$ 346,006,911	\$ 57,667,819	\$ 4,964	\$ 68	\$ 4,656,890
Montana	MT	2	\$ 3,317,376	\$ 1,658,688	\$ 23	\$ 4	\$ 603,159
North Dakota	ND	6	\$ 117,635,345	\$ 19,605,891	\$ 1,664	\$ 184	\$ 12,648,962
Nebraska	NE	7	\$ 153,126,078	\$ 21,875,154	\$ 1,861	\$ 97	\$ 7,469,566
New Mexico	NM	2	\$ 3,903,619	\$ 1,951,809	\$ 32	\$ 3	\$ 312,289
Nevada	NV	1	\$ 17,017,410	\$ 17,017,410	\$ 154	\$ 14	\$ 1,561,230
Oklahoma	OK	10	\$ 85,700,268	\$ 8,570,027	\$ 1,226	\$ 27	\$ 1,871,185
South Dakota	SD	9	\$ 99,521,713	\$ 11,057,968	\$ 1,287	\$ 143	\$ 10,817,578
Tennessee	TN	9	\$ 104,188,081	\$ 11,576,453	\$ 2,472	\$ 21	\$ 880,711
Utah	UT	0	\$ -	\$ -	\$ -	\$ -	\$ -
Vermont	VT	6	\$ 18,345,848	\$ 3,057,641	\$ 1,908	\$ 33	\$ 301,741
West Virginia	WV	8	\$ 96,201,688	\$ 12,025,211	\$ 3,970	\$ 54	\$ 1,291,298
Wyoming	WY	0	\$ -	\$ -	\$ -	\$ -	\$ -
<b>Total</b>		<b>98</b>	<b>\$ 1,774,196,710</b>	<b>\$ 18,104,048</b>	<b>\$ 5,497</b>	<b>\$ 52</b>	<b>\$ 3,385,348</b>

\*In the AVG Amount column, the final value \$18,104,048 equals the avg amount per disaster declaration across all coastal states.

\*\*In the Spending by Demographics Columns, the final values equal the avg amount per state for all disaster declarations. For example, \$5,497 represents the disaster spending of all coastal states by square mile divided by the total number of coastal states that incurred

**Table 8: State Area, Population Density,  
and Population for 1990 Census**

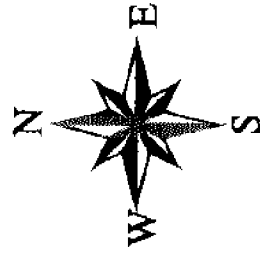
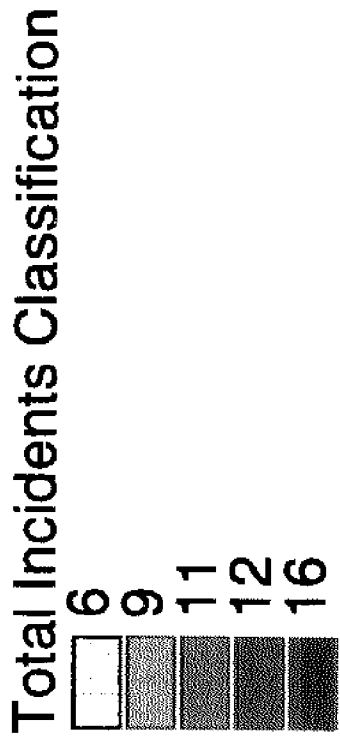
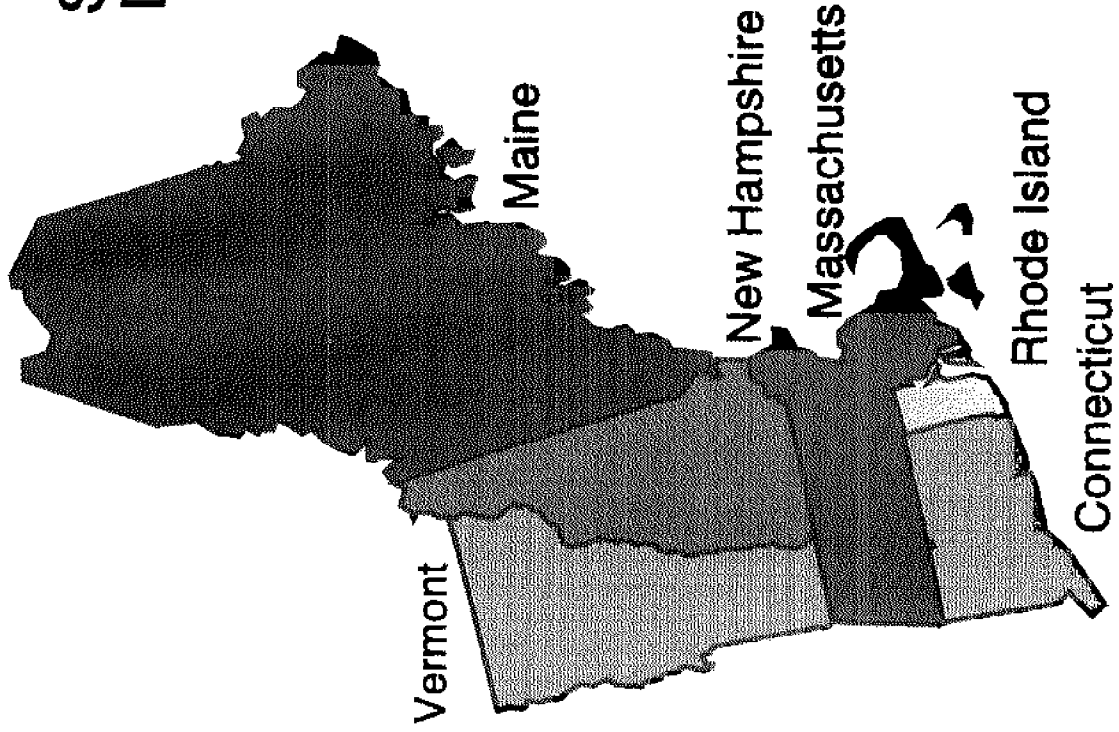
state abbrev.	area in sq/mi	area rank	pop. dens- ity	pop. rank	1990 Census	1980 Census	90-80= Census	%ch 90-80
CA	163707	3	190.8	1	29760021	23760902	6092119	25.7
NY	54475	27	381.0	2	17990455	17558072	432383	2.5
TX	268601	2	64.9	3	16986510	14229191	2757319	19.4
FL	65758	22	239.6	4	12937926	9746324	3191602	32.7
PA	46058	33	265.1	5	11881643	11863895	17748	0.1
IL	57918	25	205.6	6	11430602	11426518	4084	0.0
OH	44828	34	264.9	7	10847115	10797630	49485	0.5
MI	96810	11	163.6	8	9295297	9262078	33219	0.4
NJ	8722	47	1041.9	9	7730188	7364823	365365	5.0
NC	53821	28	136.1	10	6628637	5881766	746871	12.7
GA	59441	24	111.8	11	6478216	5463105	1015111	18.6
VA	42769	35	156.2	12	6187358	5346818	840540	15.7
MA	10555	44	767.6	13	6016425	5737037	279388	4.9
IN	36420	38	154.6	14	5544159	5490224	53935	1.0
MO	69709	21	74.3	15	5117073	4916686	200387	4.1
WI	65503	23	90.1	16	4891769	4705767	186002	4.0
TN	42146	36	118.3	17	4887185	4591120	286065	6.2
WA	71303	18	73.1	18	4866692	4132156	734536	17.8
MD	12407	42	489.1	19	4781468	4216975	564493	13.4
MN	86943	12	54.9	20	4375099	4075970	299129	7.3
LA	51843	31	96.9	21	4219973	4205900	14073	0.3
AL	52423	30	79.6	22	4040587	3893888	146669	3.8
KY	40411	37	92.8	23	3685296	3660777	24519	0.7
AZ	114006	6	32.3	24	3665228	2718215	947013	34.8
PR	3515	-1	1018.2		3522037			
SC	32007	40	115.8	25	3486703	3121820	364883	11.7
CO	104100	8	31.8	26	3294394	2889964	404430	14.0
CT	5544	48	678.5	27	3287116	3107576	179540	5.8
OK	69903	20	45.8	28	3145585	3025290	120295	4.0
OR	98386	9	29.6	29	2842321	2633105	209216	7.9
IA	56276	26	49.7	30	2776755	2913808	-137053	-4.7

state abbrev.	area in sq/mi	area rank	pop. dens-ity	pop. rank	1990 Census	1980 Census	90-80=Census	%ch 90-80
MS	48434	32	54.8	31	2573216	2520638	52578	2.1
KS	82282	15	30.3	32	2477574	2363679	113895	4.8
AR	53182	29	45.1	33	2350725	2286435	64290	2.8
WV	24231	41	74.5	34	1793477	1949644	-156167	-8.0
UT	84904	13	21.0	35	1722850	1461037	261813	17.9
NE	82282	16	20.5	36	1578385	1569825	8560	0.5
NM	121598	5	12.5	37	1515069	1302894	212175	16.3
ME	35387	38	39.8	38	1227928	1124660	103268	9.2
NV	110567	7	10.9	39	1201833	800493	401340	50.1
NH	9351	46	123.7	40	1109252	920610	188642	20.5
HI	10932	43	172.5	41	1108229	964691	143538	14.9
ID	83574	14	12.2	42	1006749	943935	62814	6.7
RI	1545	50	960.2	43	1003464	947154	56310	5.9
MT	147046	4	5.5	44	799065	786690	12375	1.6
SD	77358	17	9.2	45	696004	690768	5236	0.8
DE	2489	49	340.7	46	666168	594338	71830	12.1
ND	70704	19	9.3	47	638800	652717	-13917	-2.1
DC	68	51	9949.2	48	606900	638333	-31433	-4.9
VT	9615	45	60.8	49	562758	511456	51302	10.0
AK	656424	1	1.0	50	550043	401851	148192	36.9
WY	97818	10	4.7	51	453588	469557	-15969	-3.4
GU	209	-1	578.9		133152			
VI	132	-1	848.5		101809			
AS	77	-1	506.5		39000			
US	3792575	-2	70.3		248709873			

Col. 1=State abbreviation Col. 2=Area in square miles (including land and water) Col. 3=Rank by area (land and water) Col. 4=Inhabitants per square mile (based on land area) Includes territories of AS, PR, GU, VI Column 5=Population rank Column 6=1990 Population, Column 7=1980 Population Column 8=Absolute Pop Change from 1980 to 1990 Column 9=Percent Pop Change 1980-1990 Source: Hammond United States History Atlas, Maplewood, N.J.: Hammond Incorporated, 1994, p. U-3.



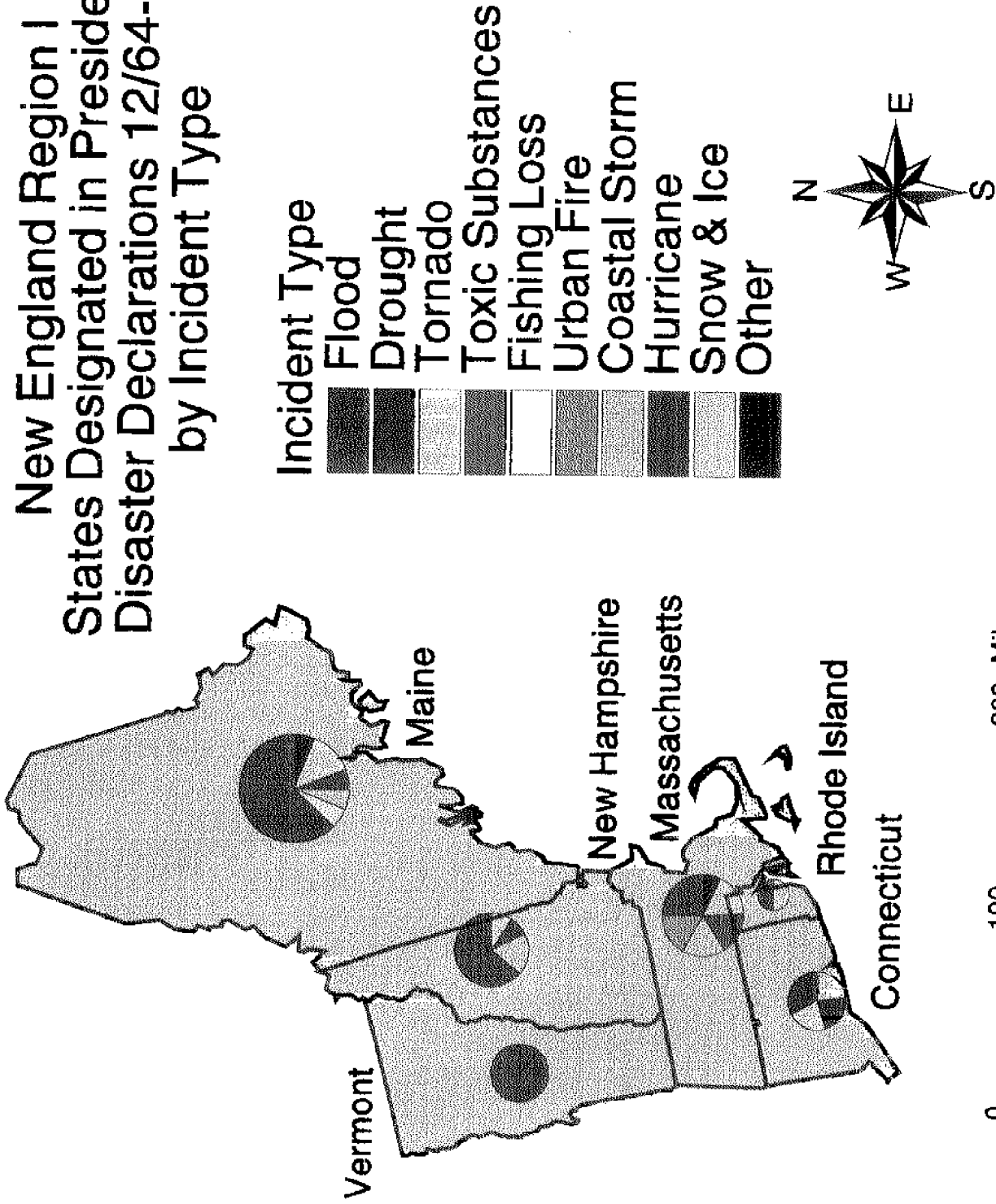
# New England Region I States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware Newark DE

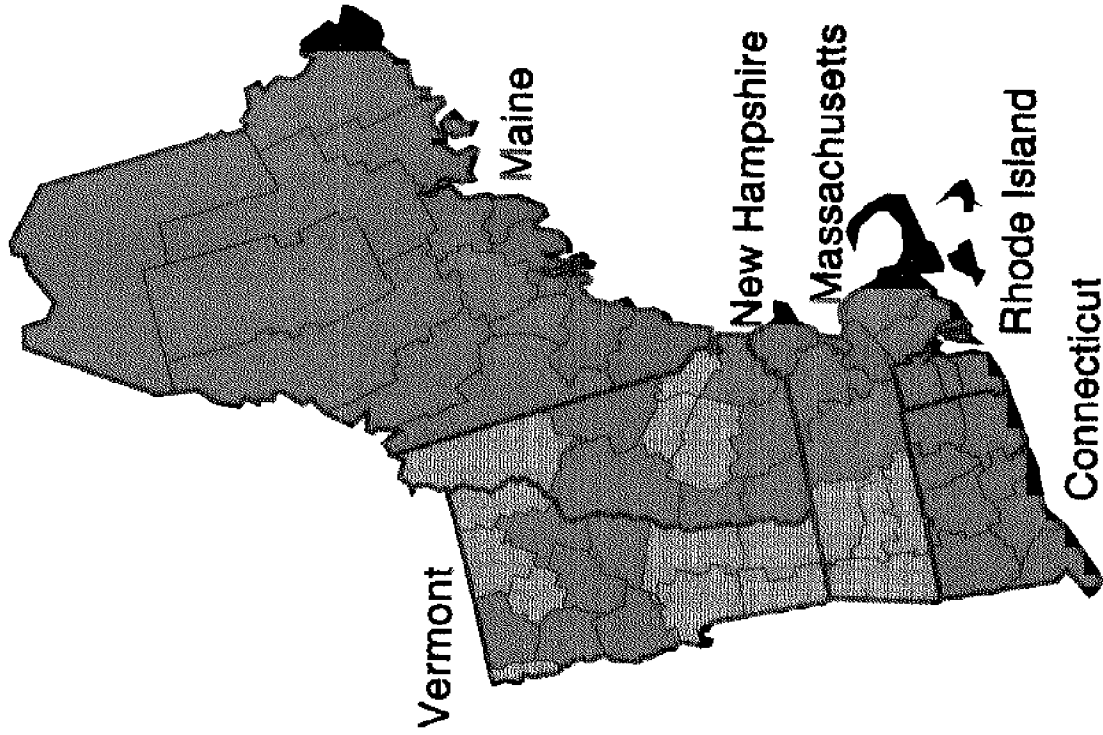
# New England Region I States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



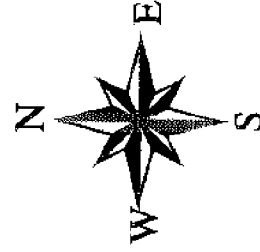
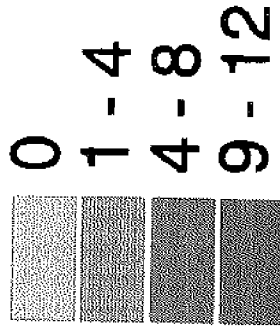
Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware Newark DE

# New England Region I Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents

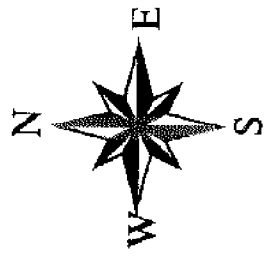
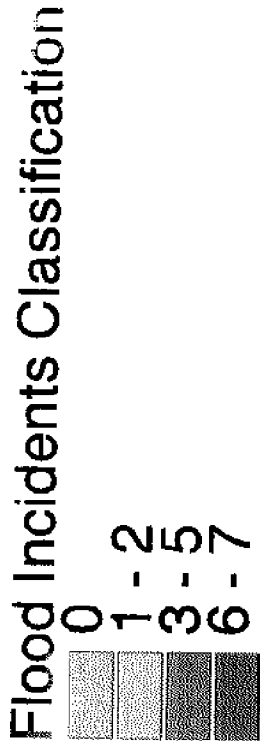
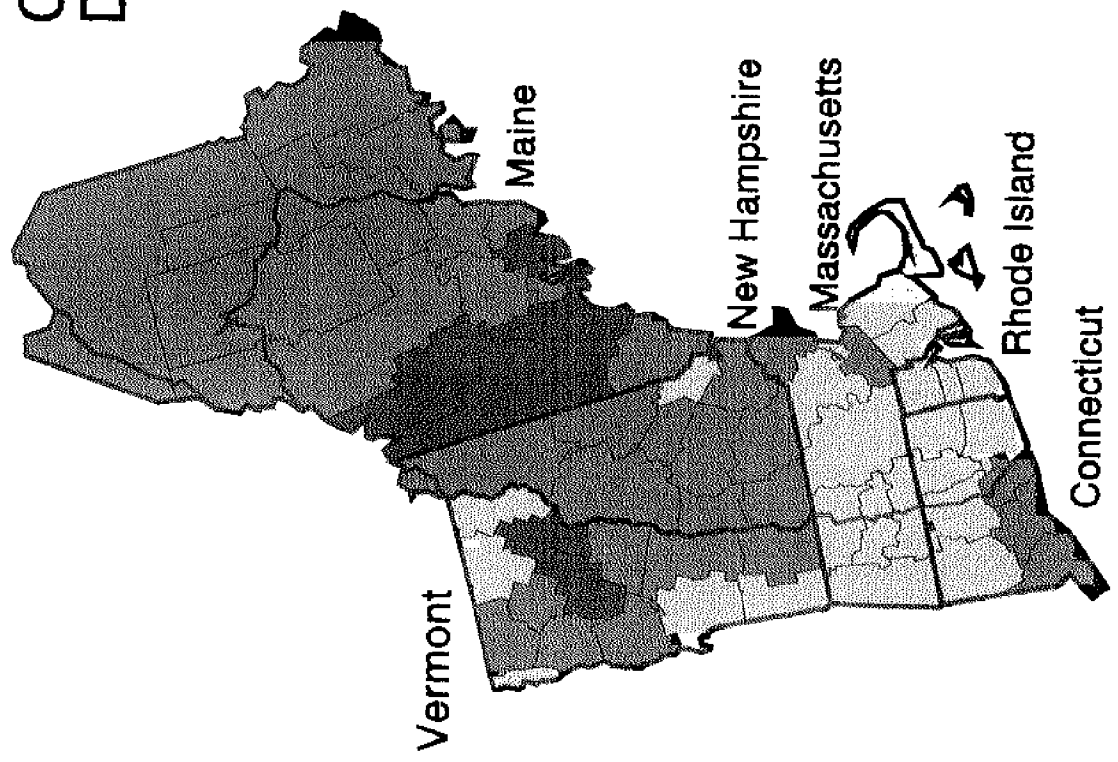


## Total Incidents Classification



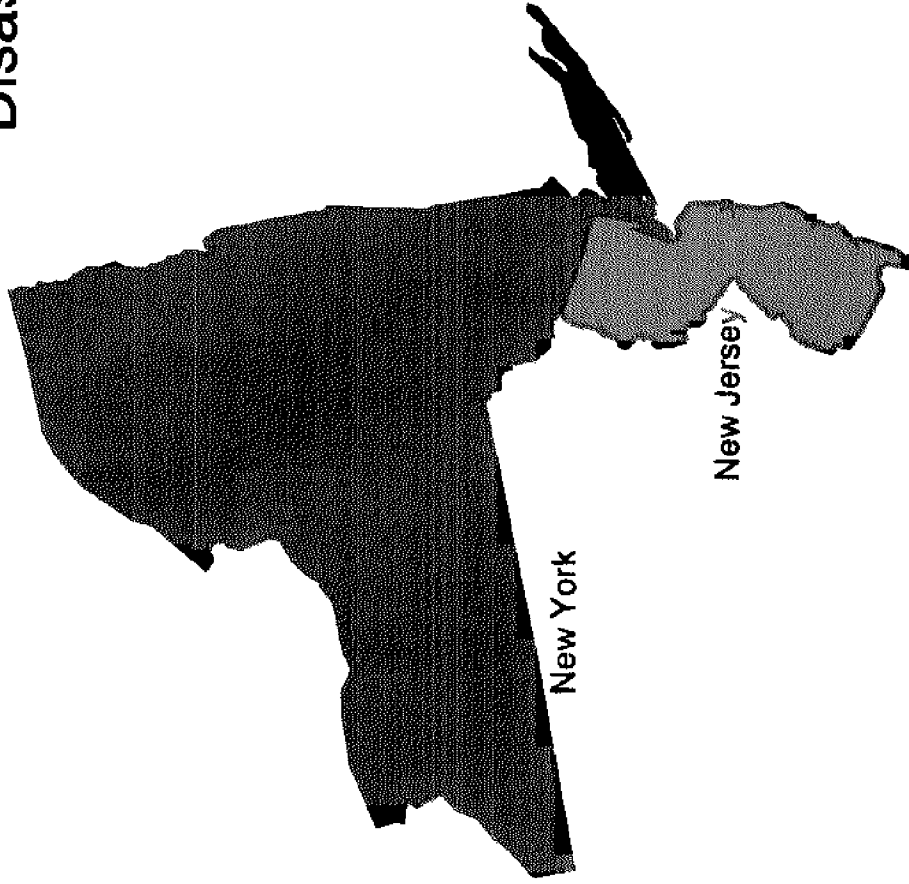
Data Source: U.S. FEMA DARIS 8/94  
Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware Newark DE

# New England Region I Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



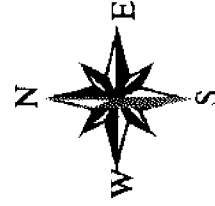
Data Source: U.S. FEMA DARIS 8/94  
 Cartography by Richard Sylves and Inwhan Jung,  
 University of Delaware Newark DE

# Northeast Region II States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Total Incidents Classification

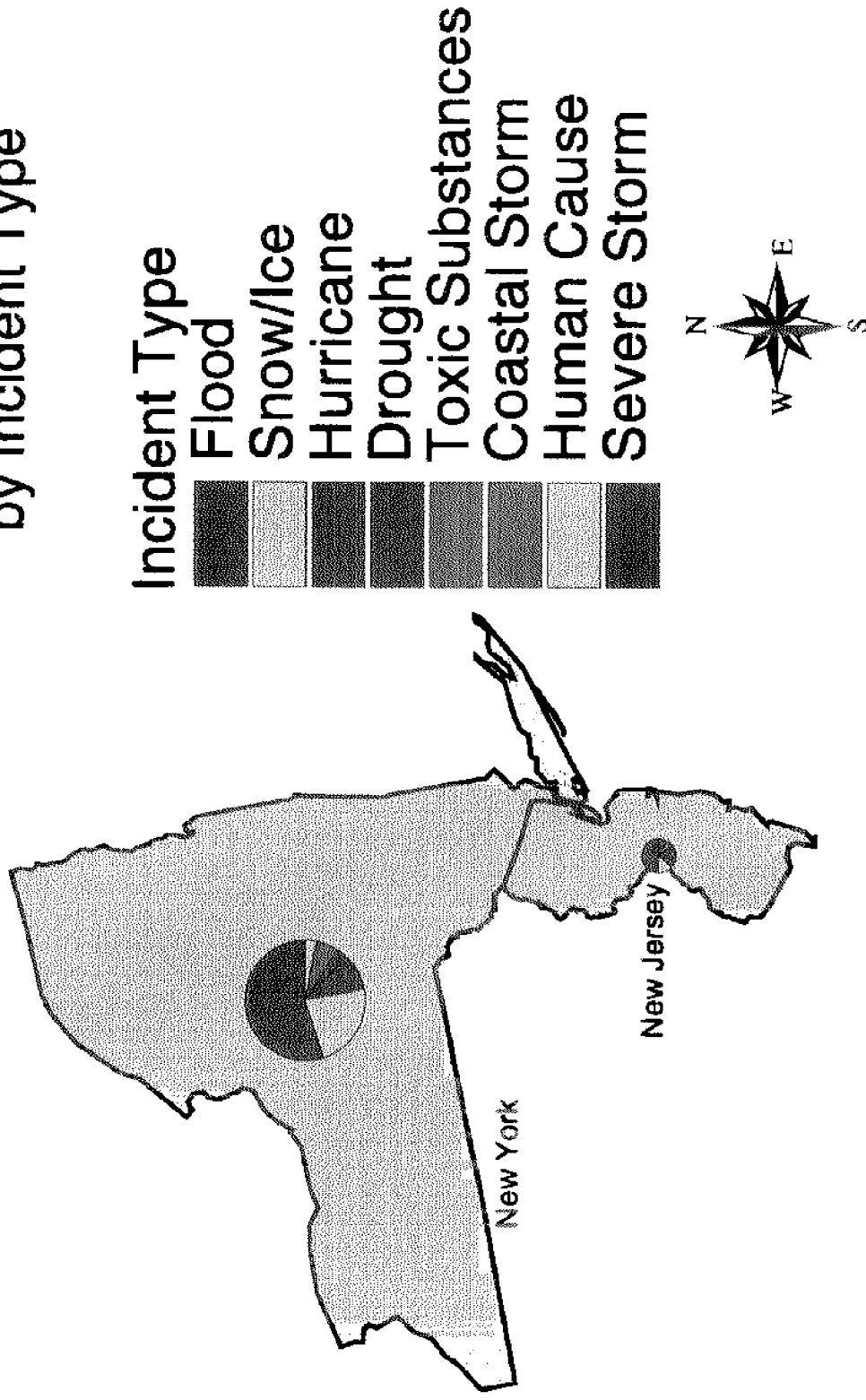
■	14
■	31



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

# Northeast Region II States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type

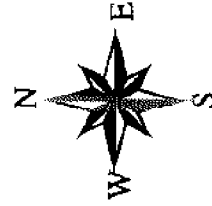
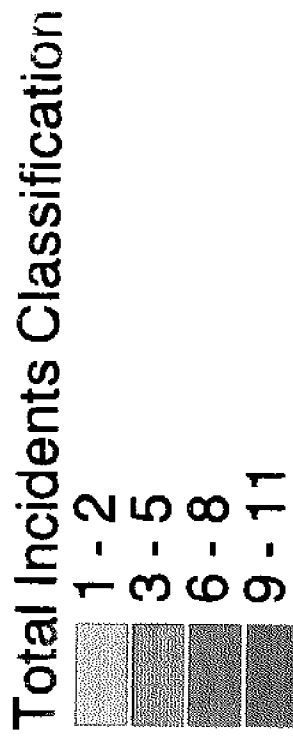
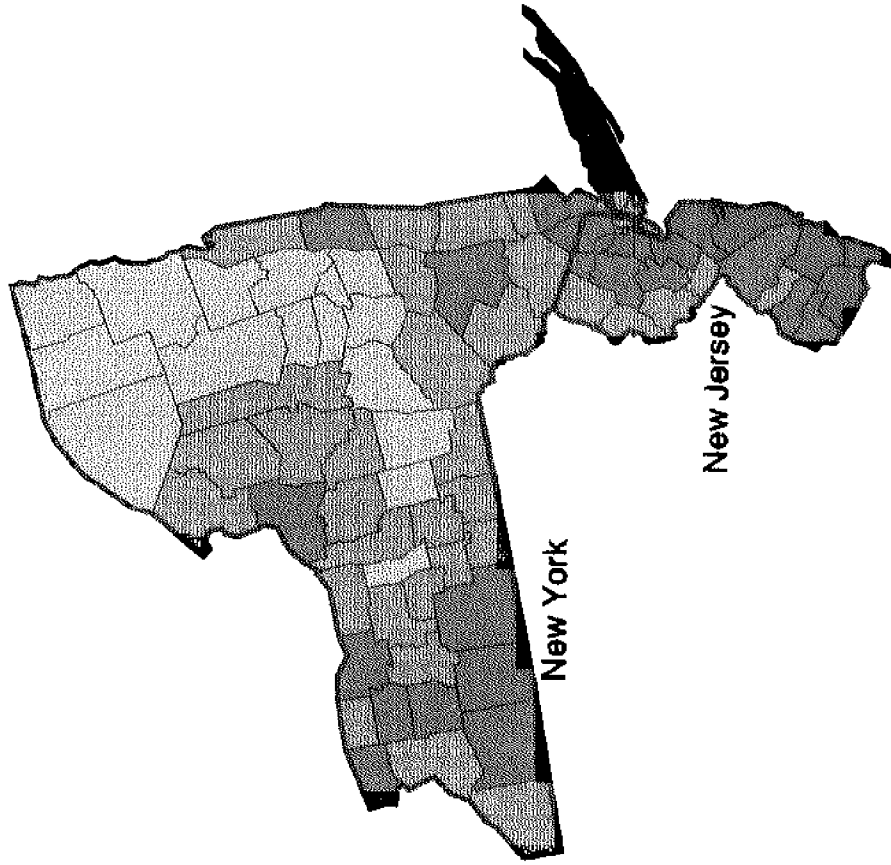


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Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

Data Source: U.S. FEMA DARIS 8/94

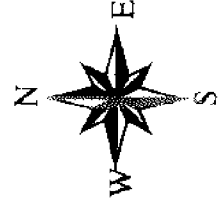
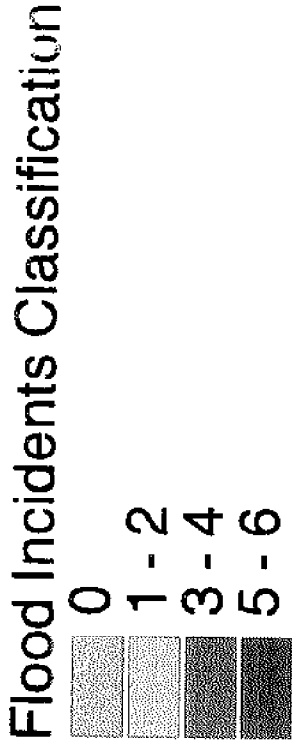
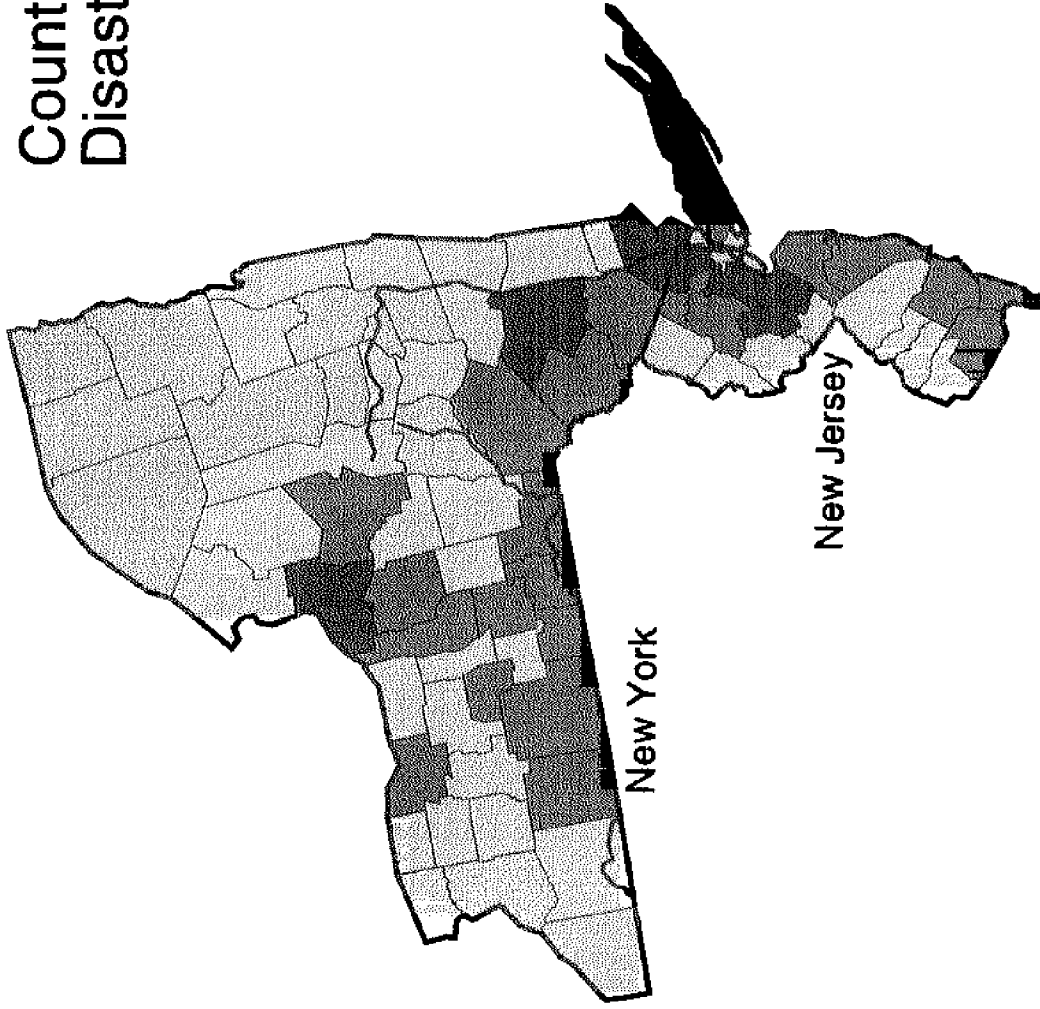
# Northeast Region II Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jurig,  
University of Delaware, Newark, DE

# Northeast Region II Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only

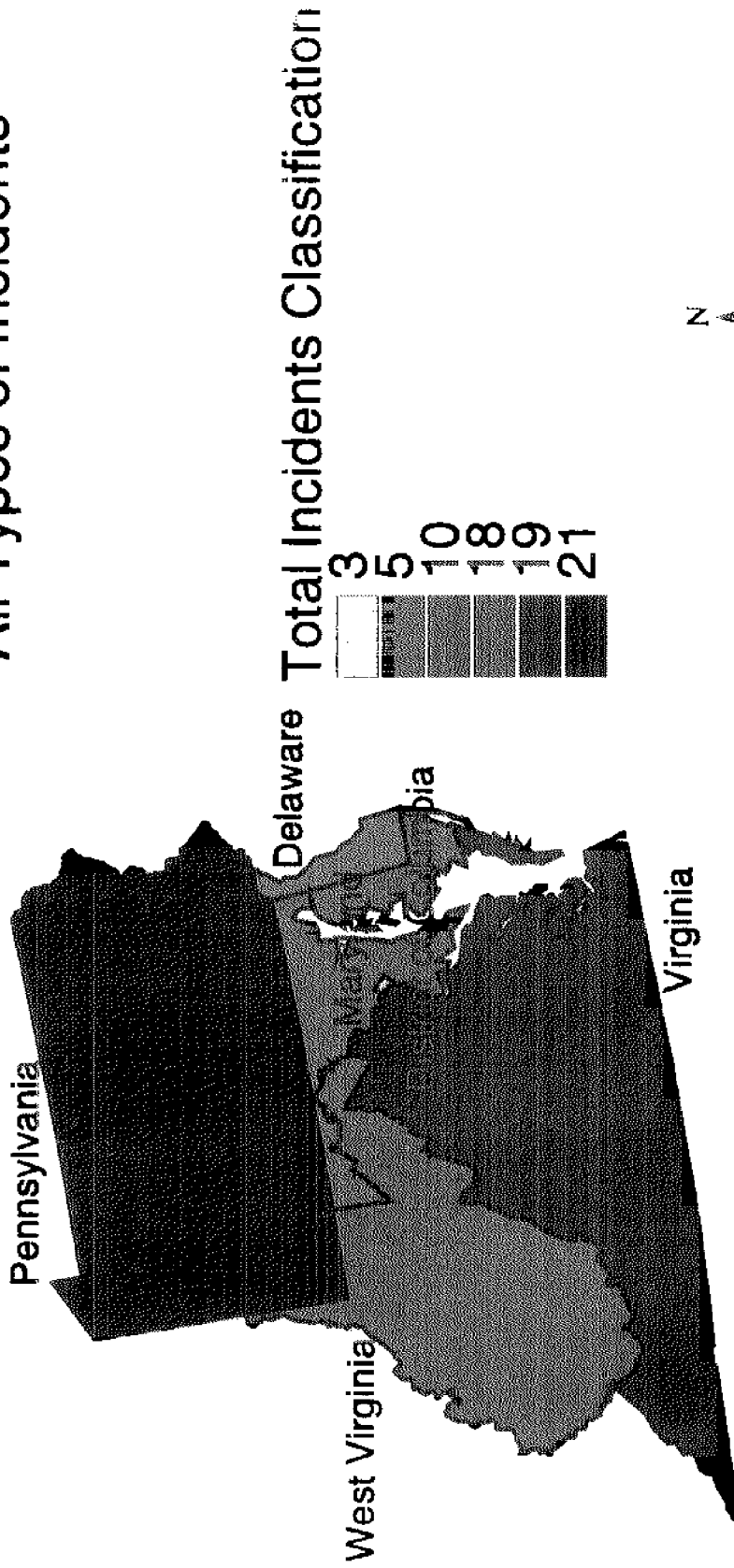


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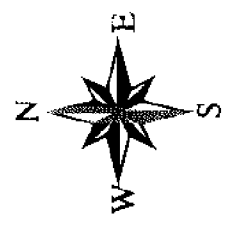
Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE



# Mid-Atlantic Region III States Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents

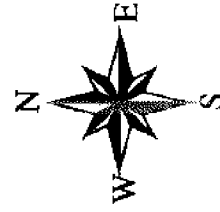
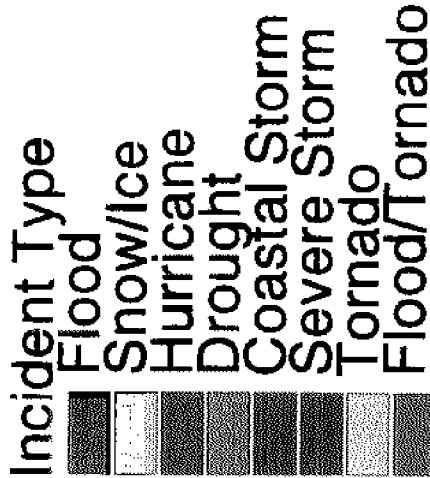
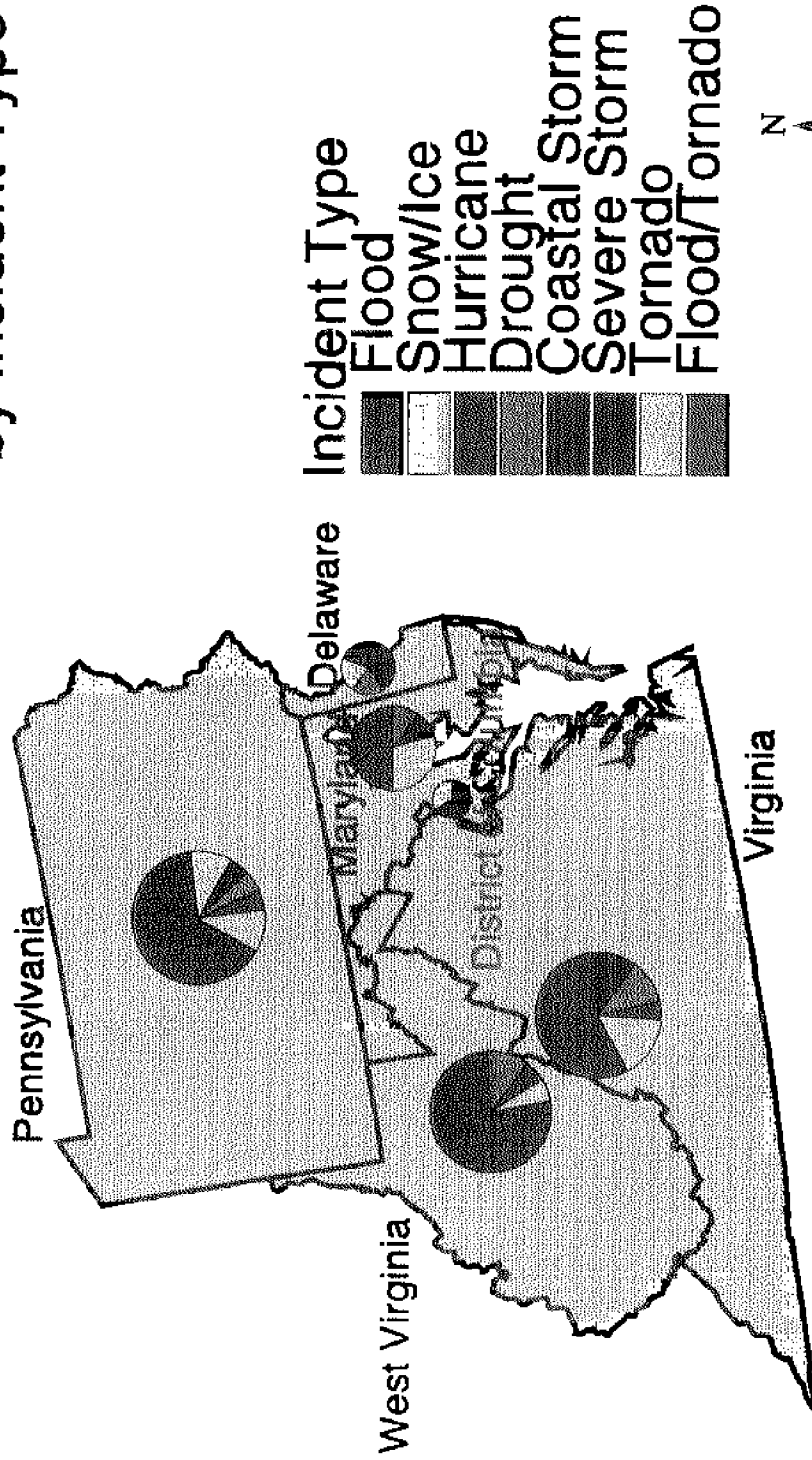


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Data Source: U.S. FEMA DARIS 8/94



Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

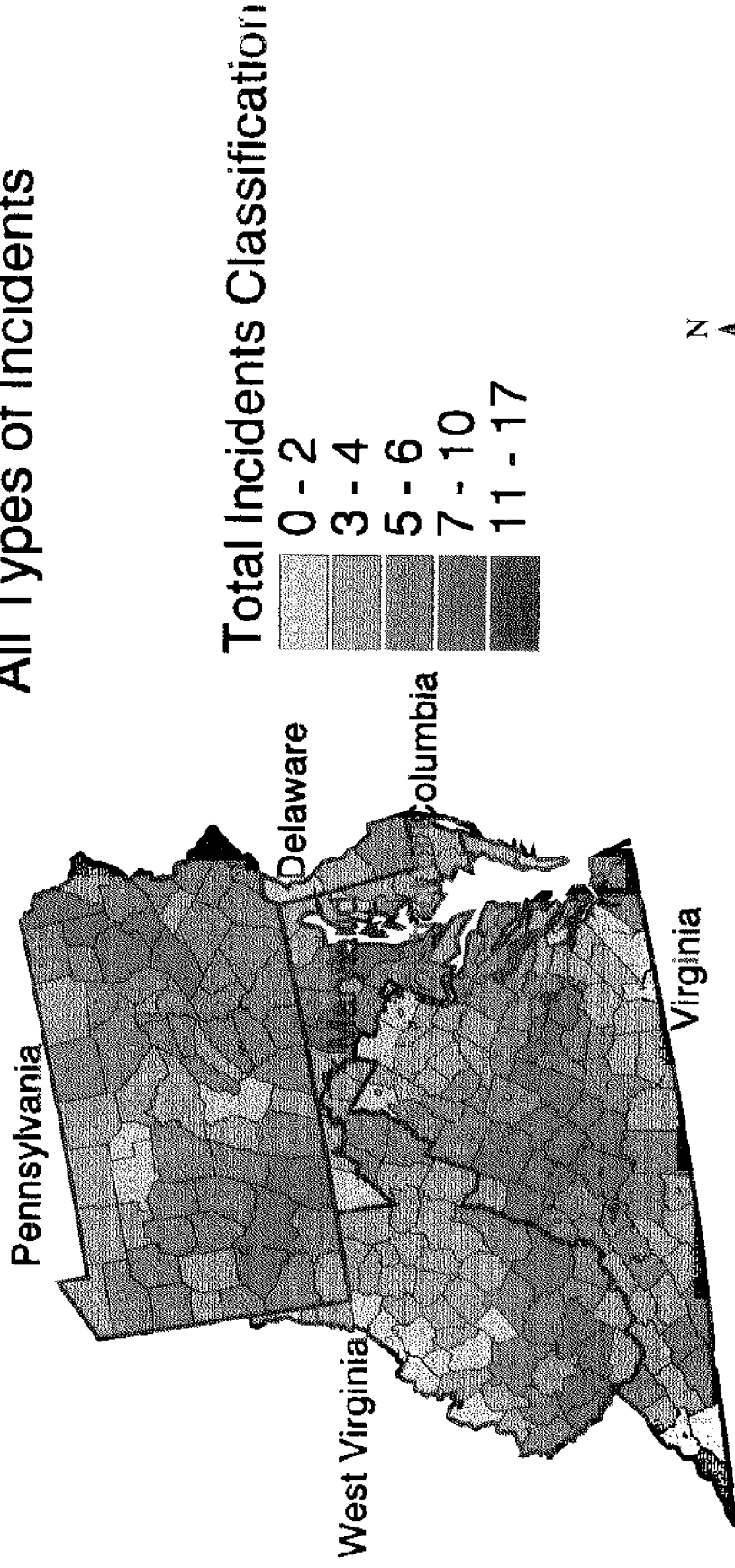
# Mid-Atlantic Region III Counties Included in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

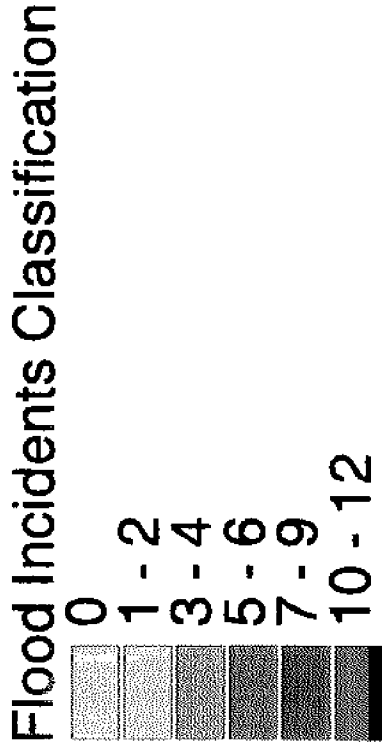
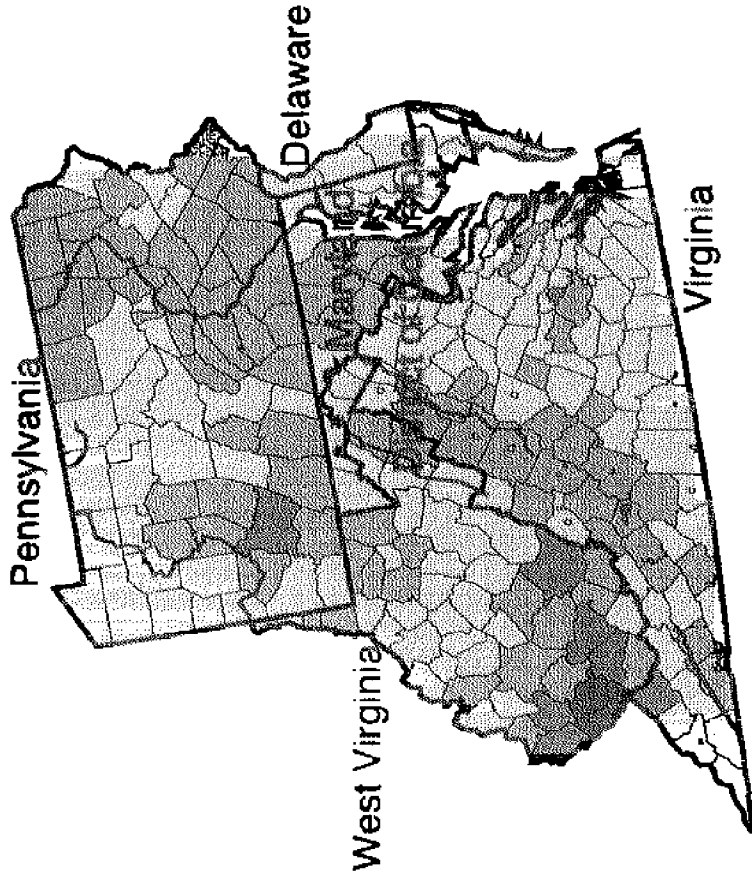
# Mid-Atlantic Region III Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



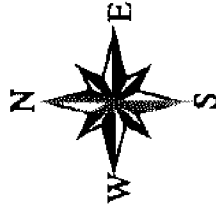
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Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

# Mid-Atlantic Region III Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only

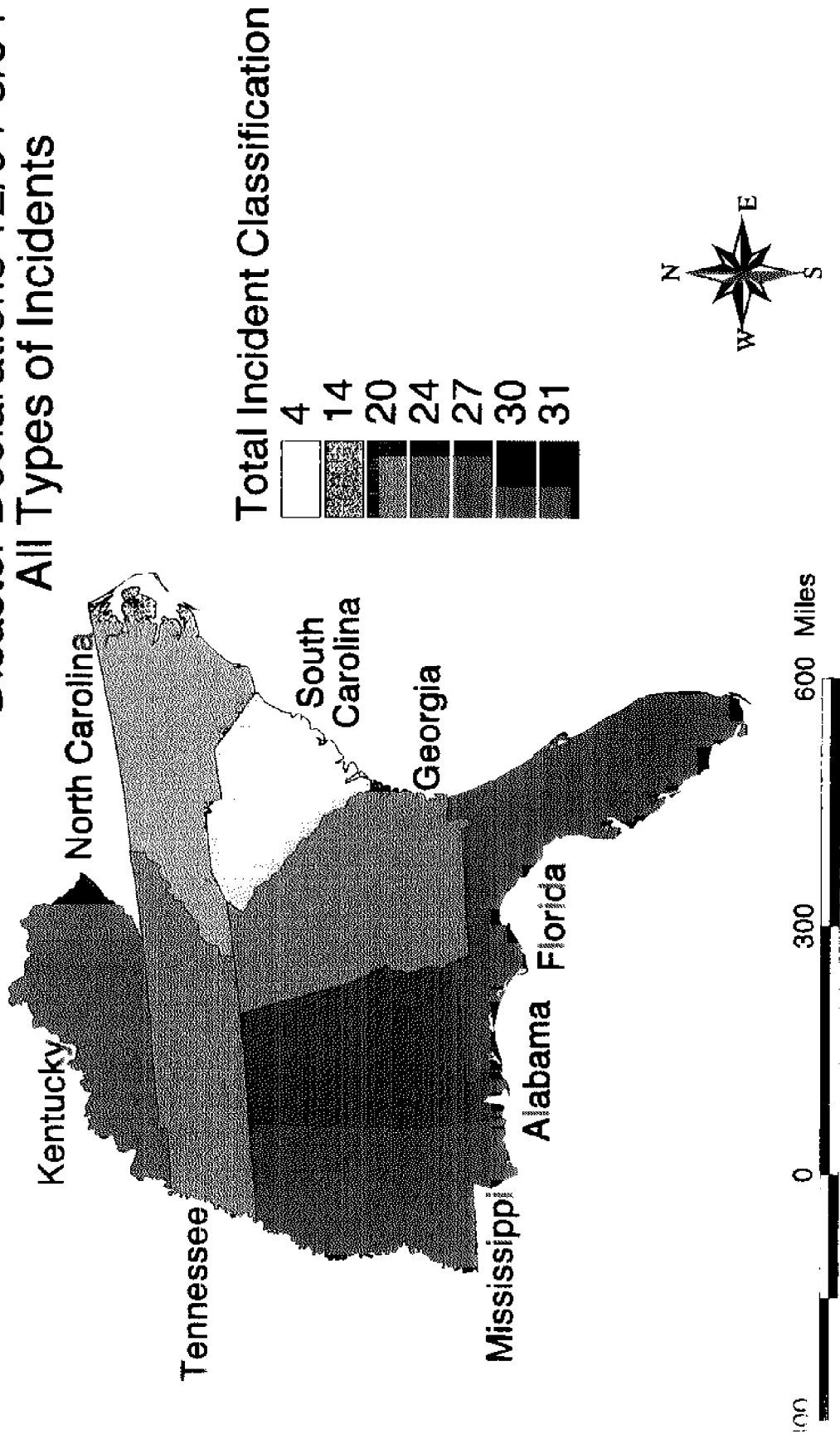


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Cartography by Richard Sylves and Inwhan Jung,  
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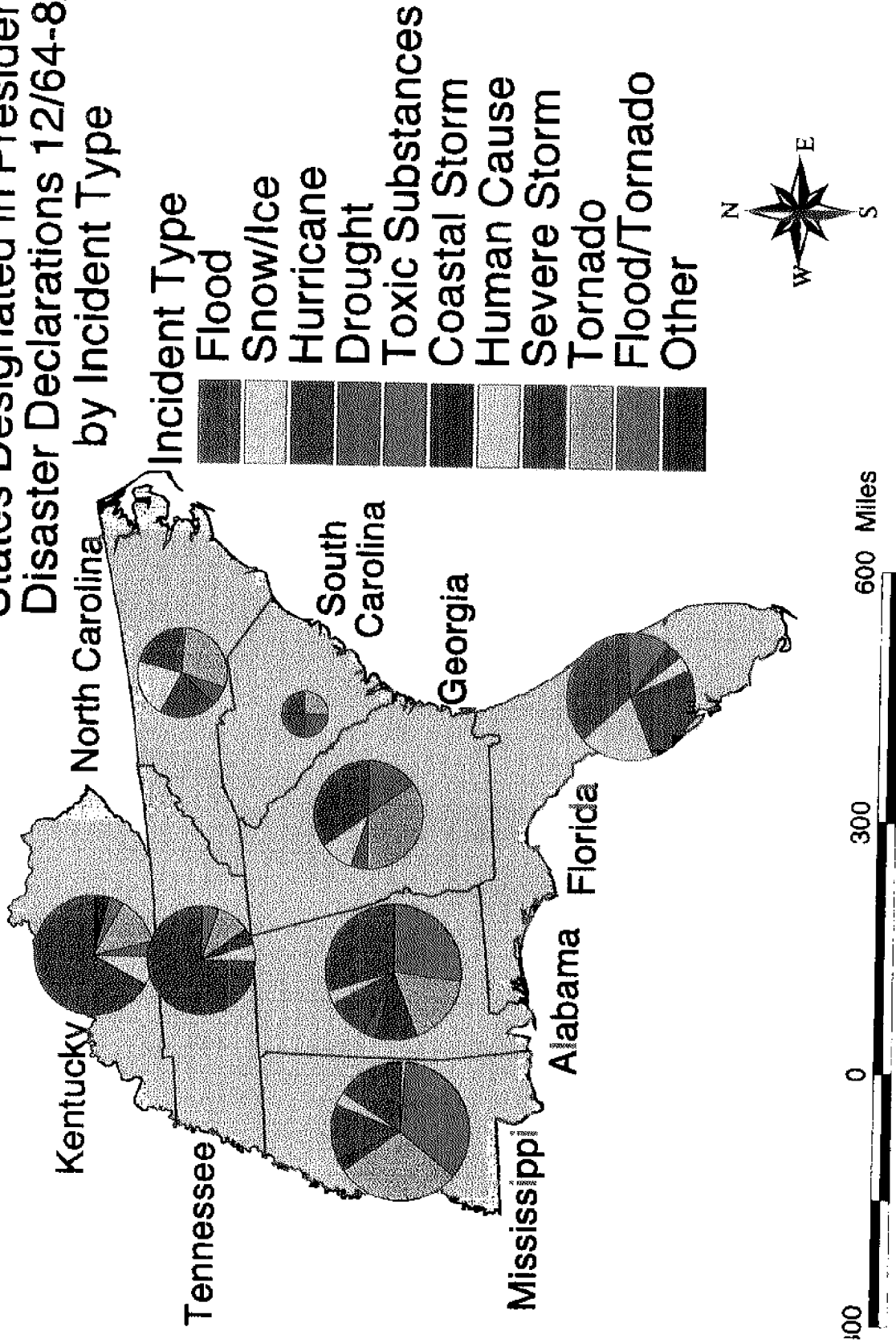
# Southeast Region IV States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

Data Source: U.S. FEMA DARIS 8/94

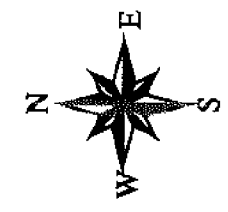
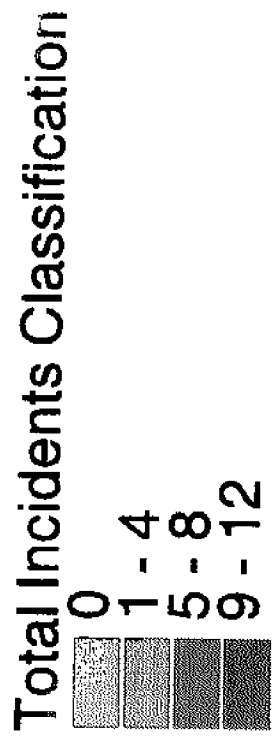
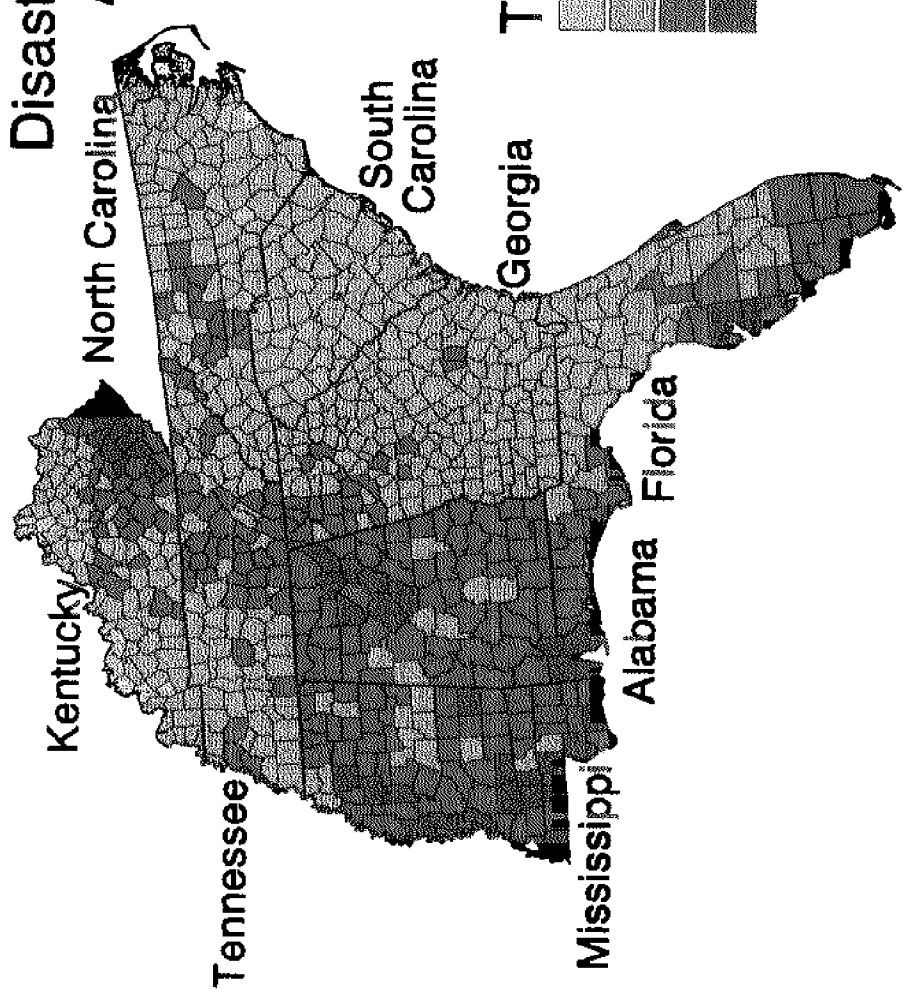
# Southeast Region IV States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

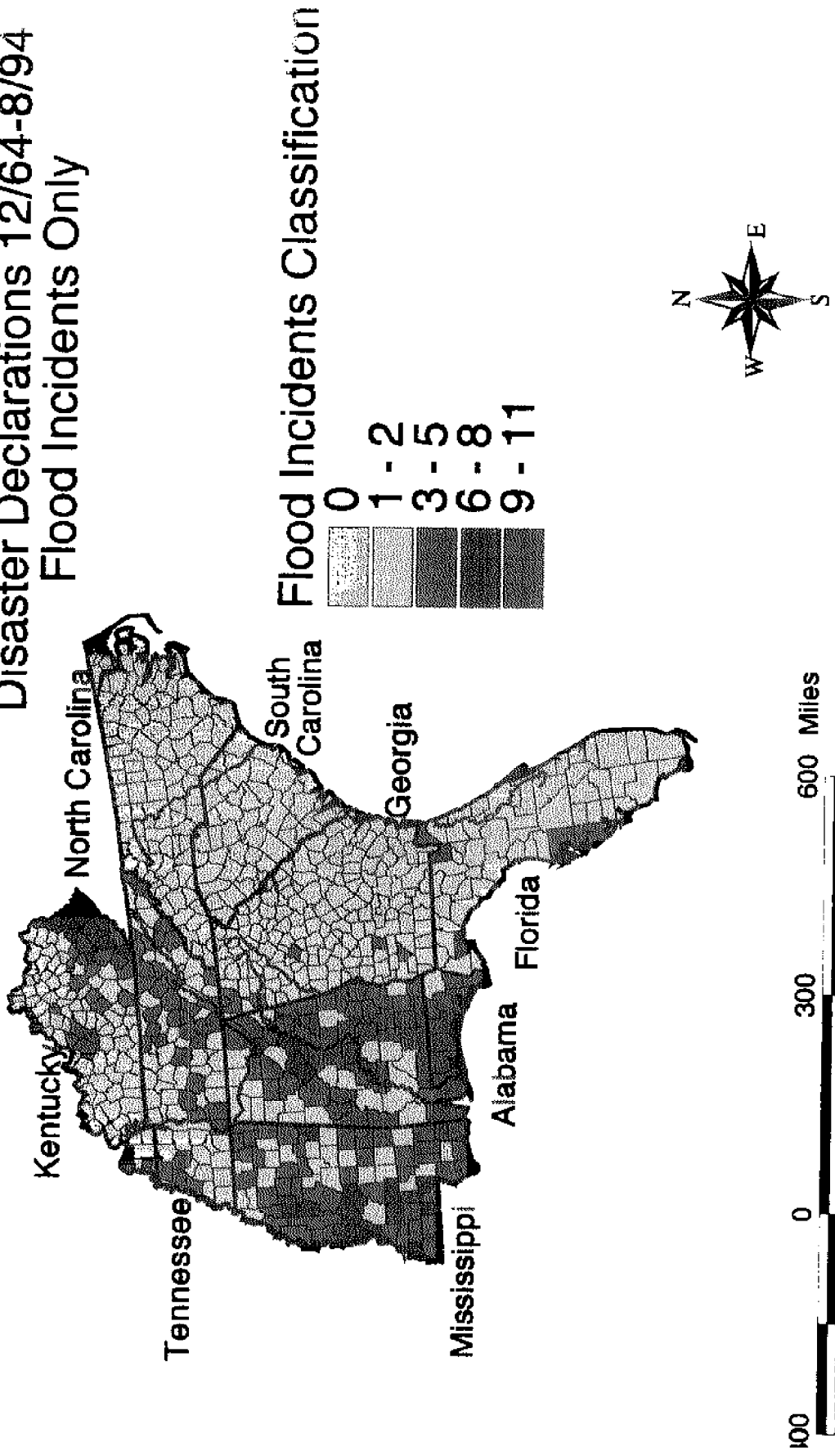
# Southeast Region IV Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

# Southeast Region IV Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only

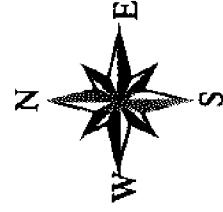
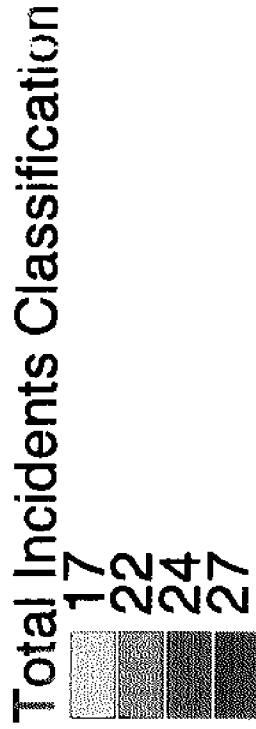
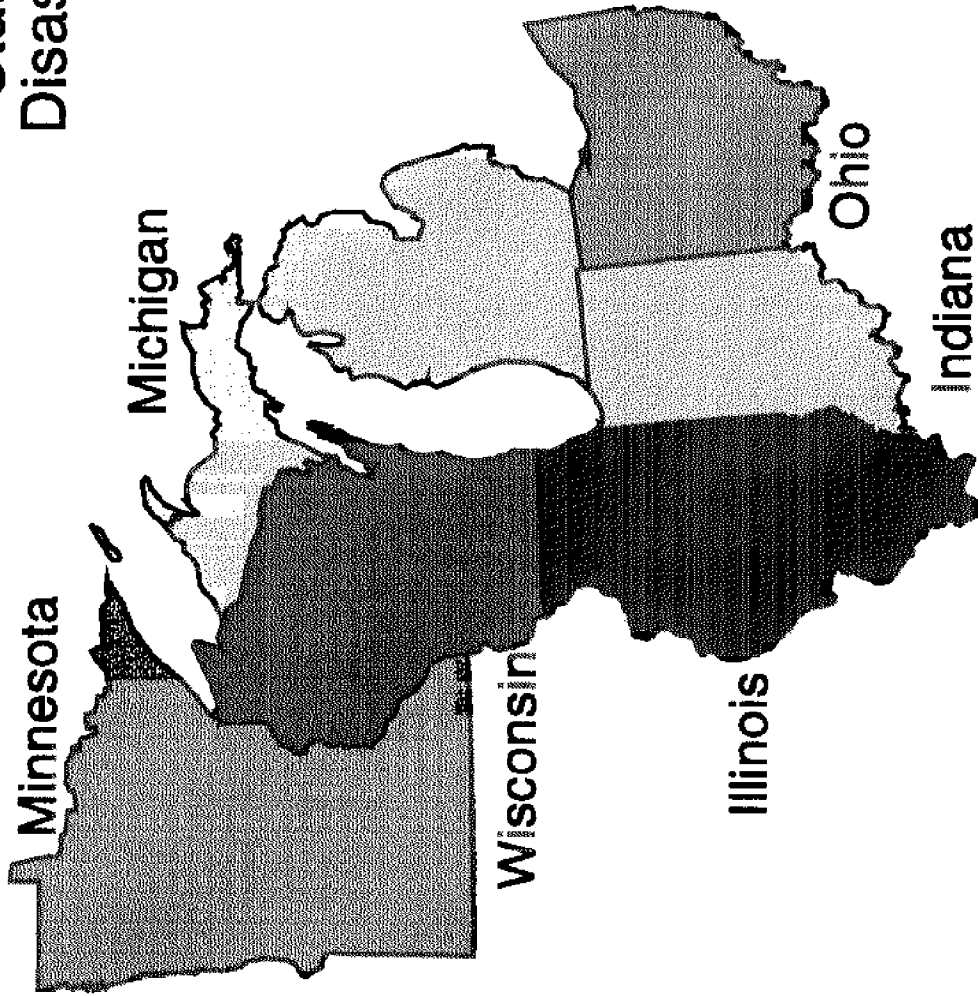


Cartography by Richard Sylves and Inwhan Juny,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

Data Source: U.S. FEMA DARIS 8/94



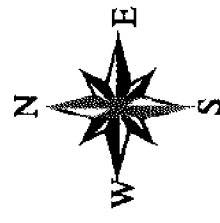
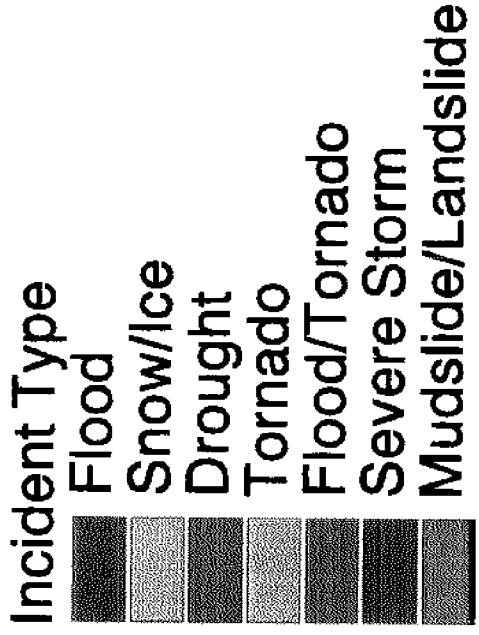
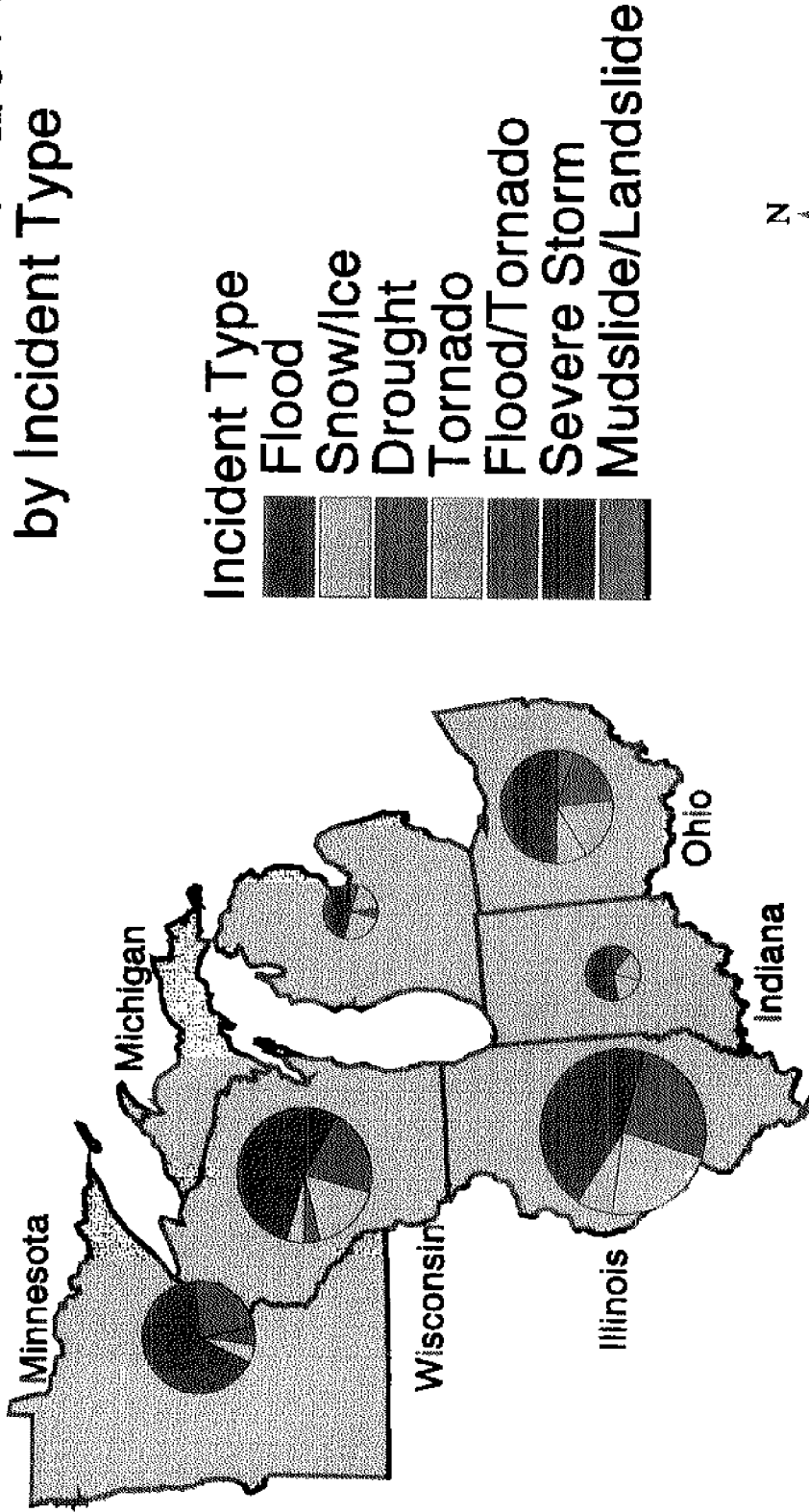
# Great Lakes Region V States Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sykes and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

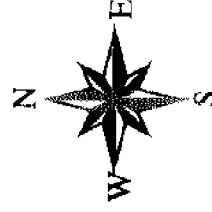
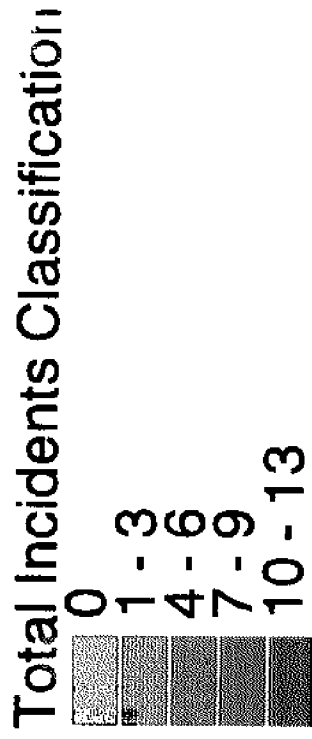
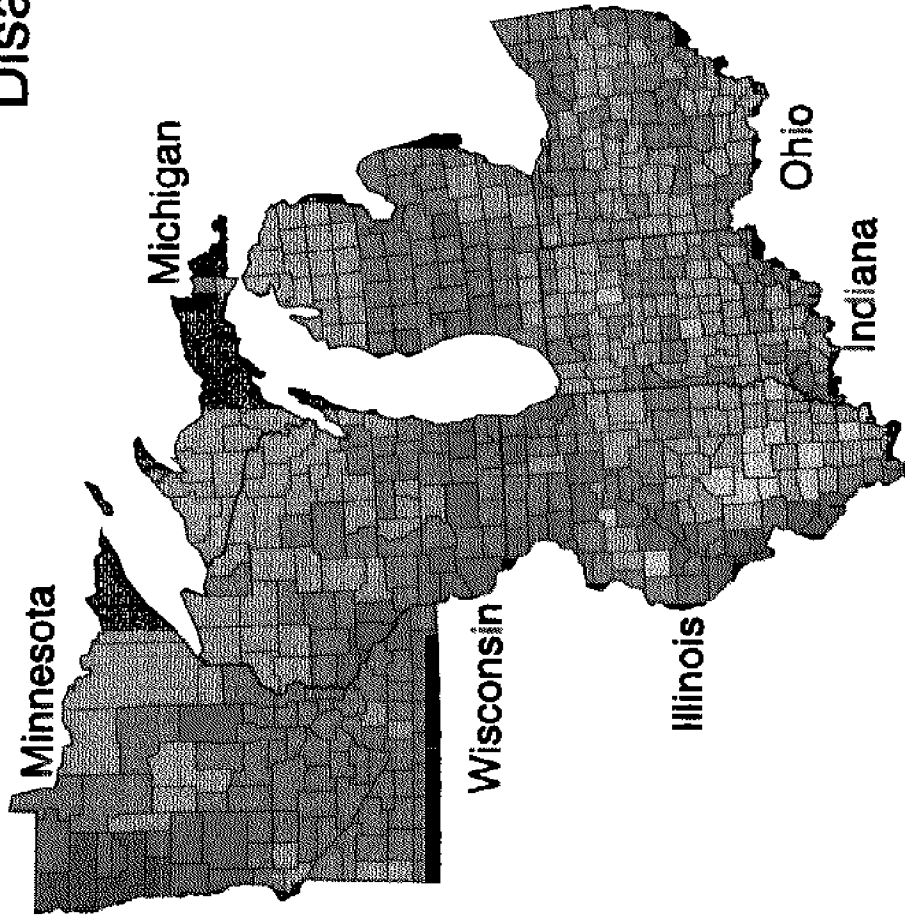
# Great Lakes Region V States Included in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

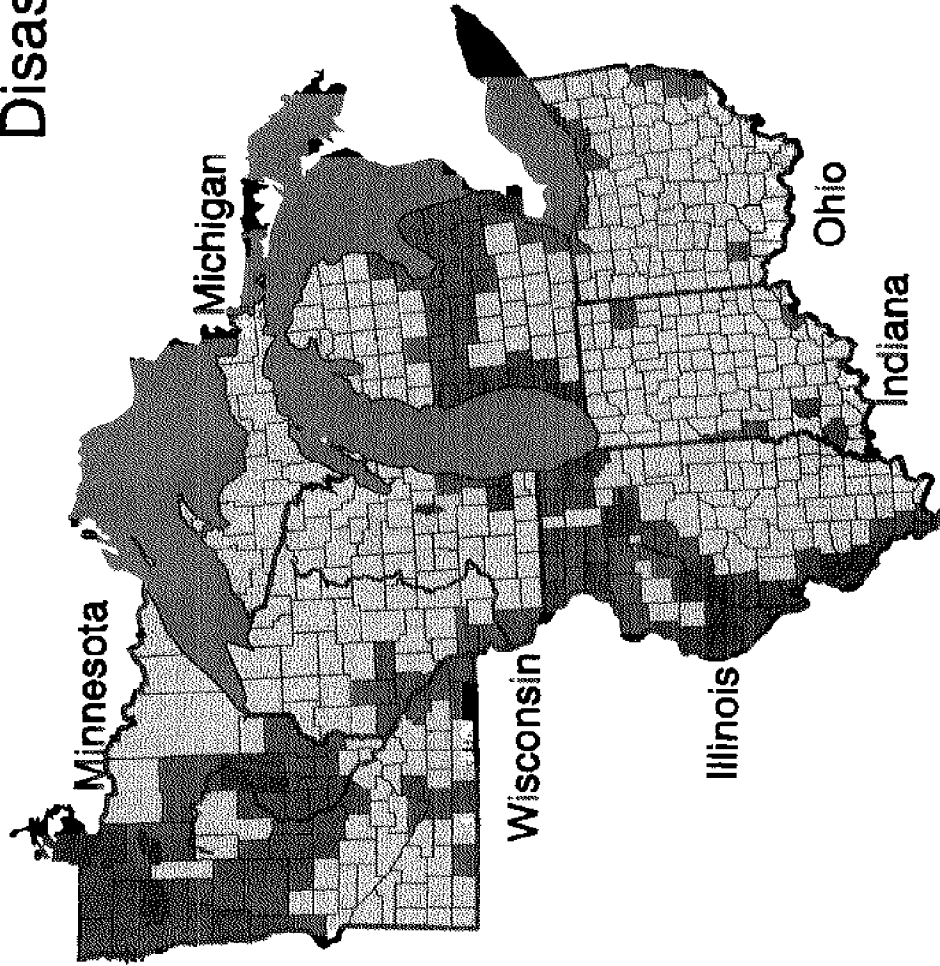
# Great Lakes Region V Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



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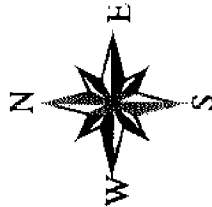
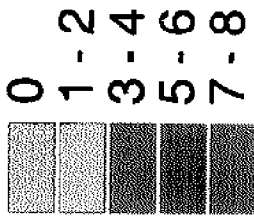
Cartography by Richard Sylves and Inwhan Jung,  
 Center for Energy and Environmental Policy,  
 University of Delaware, Newark, DE

# Great Lakes Region V Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



Great Lakes

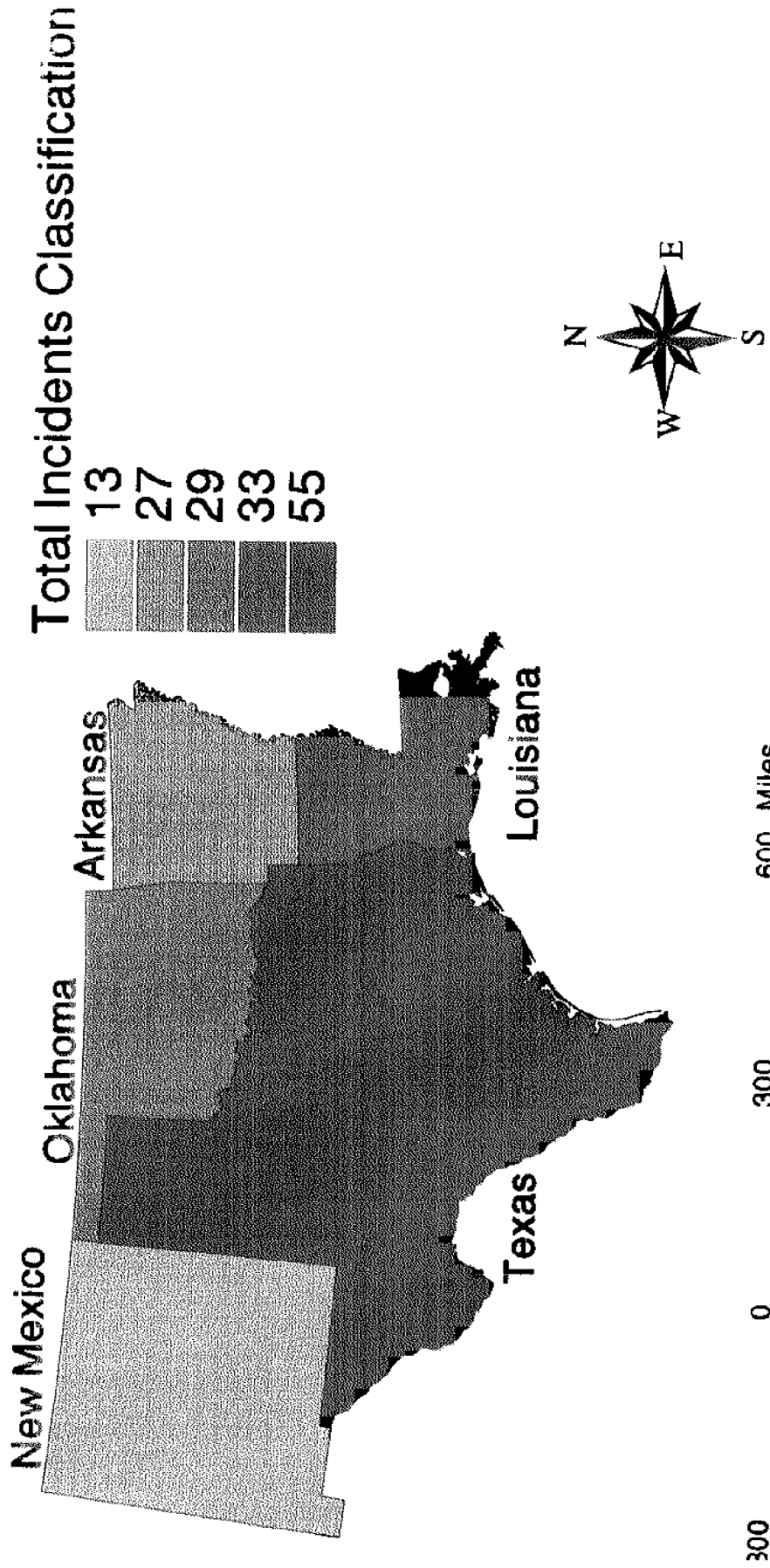
Flood Incidents Classification



Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

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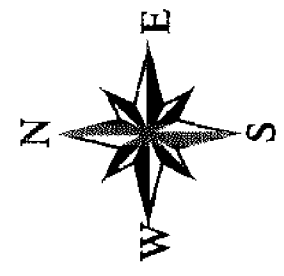
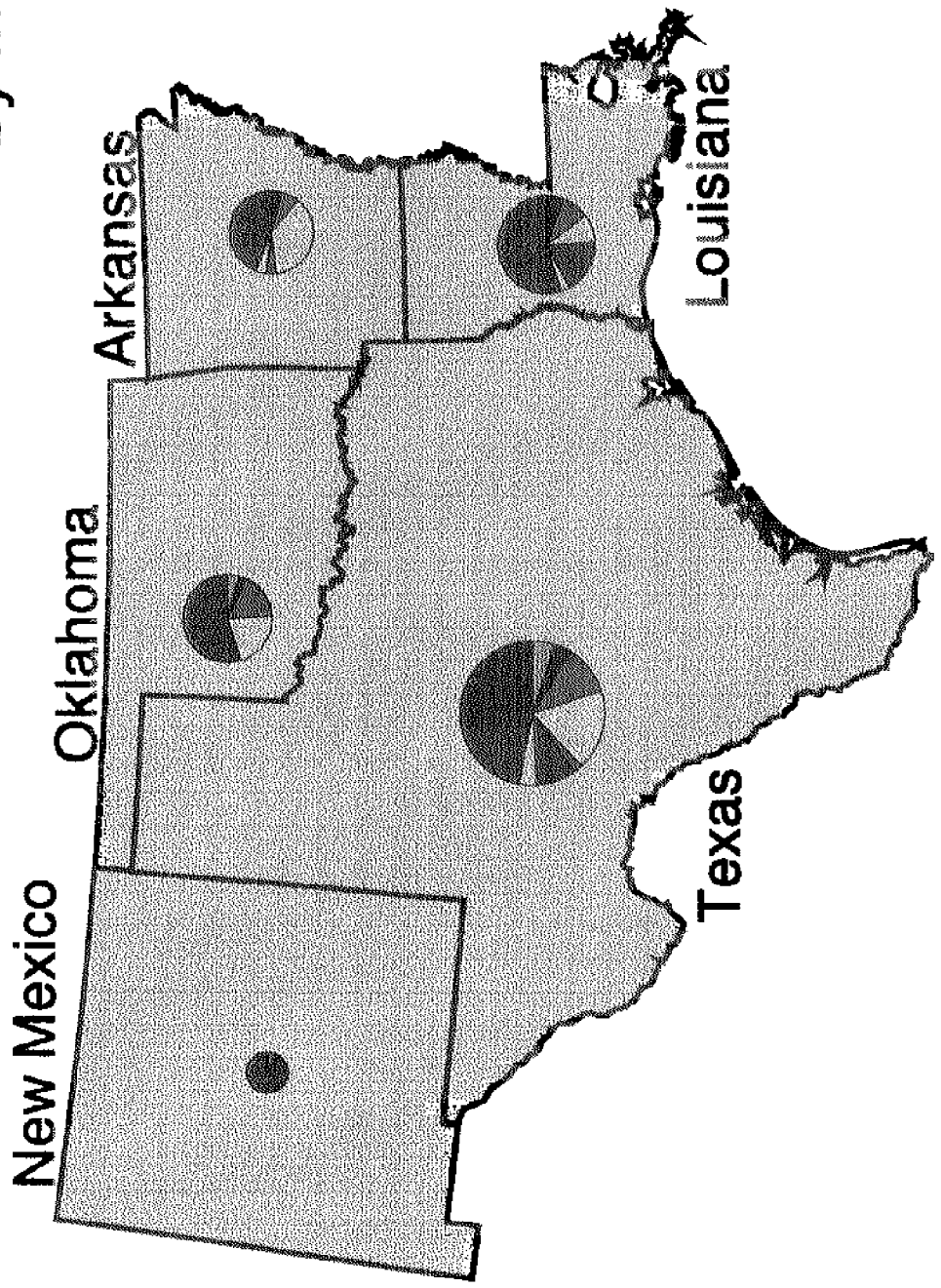
# South Central Region VI States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

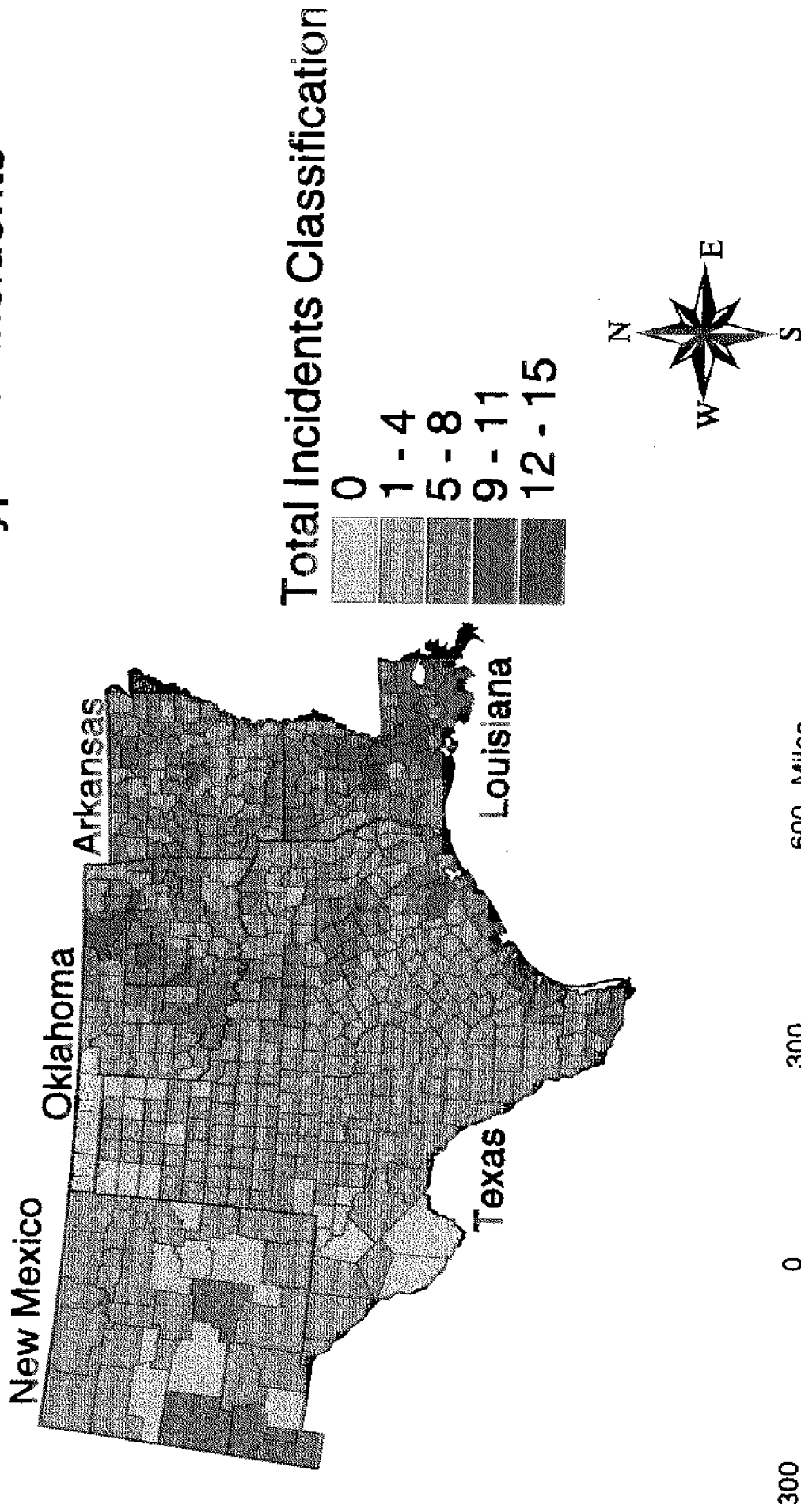
# South Central Region VI States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

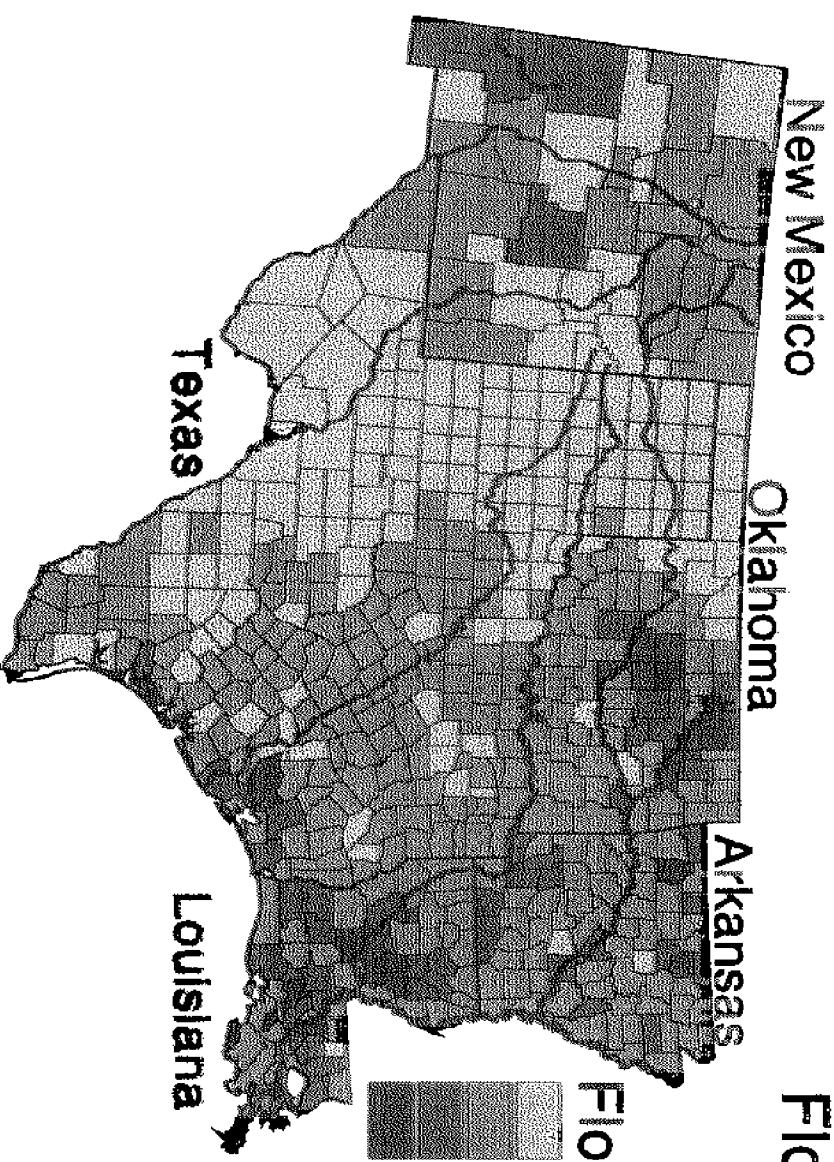
# South Central Region VI Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



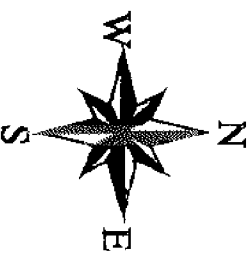
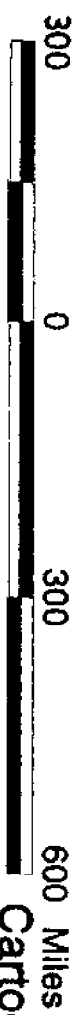
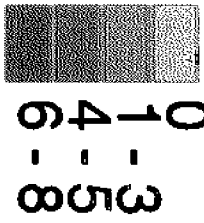
Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

# South Central Region VI Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



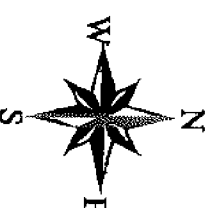
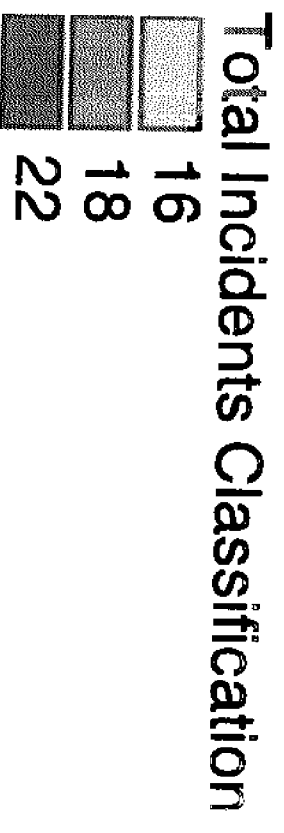
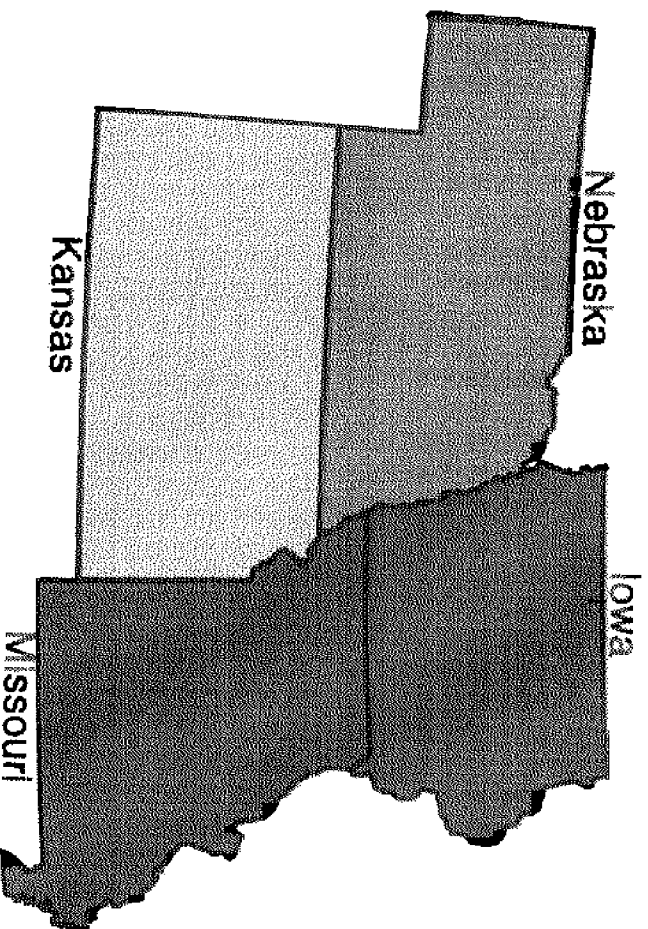
Flood Incidents Classification



Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE  
Data Source: U.S. FEMA DARRIS 8/94



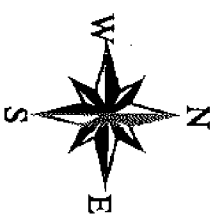
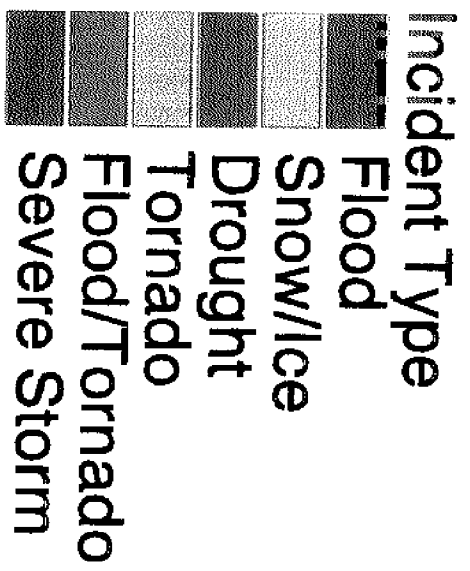
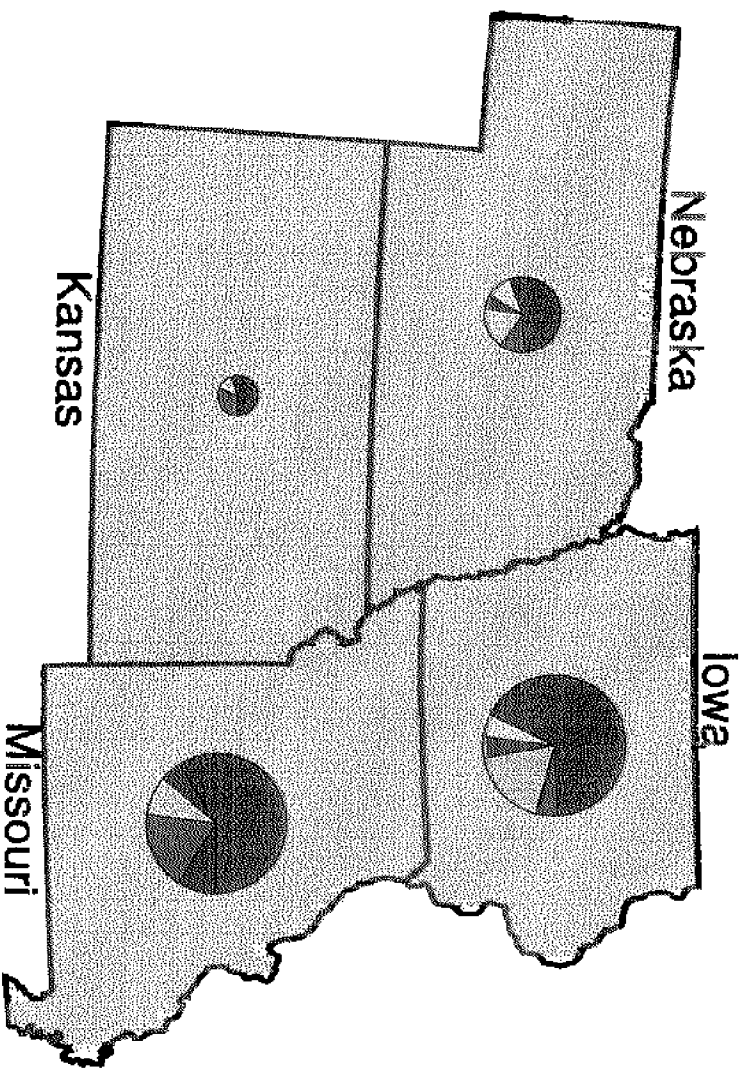
# Central Midwest Region VII States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

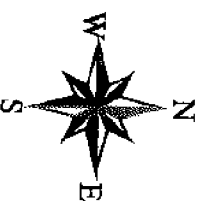
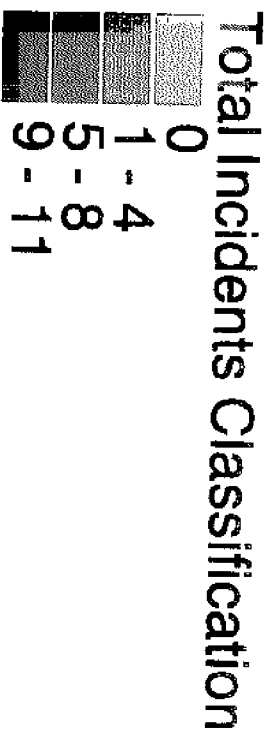
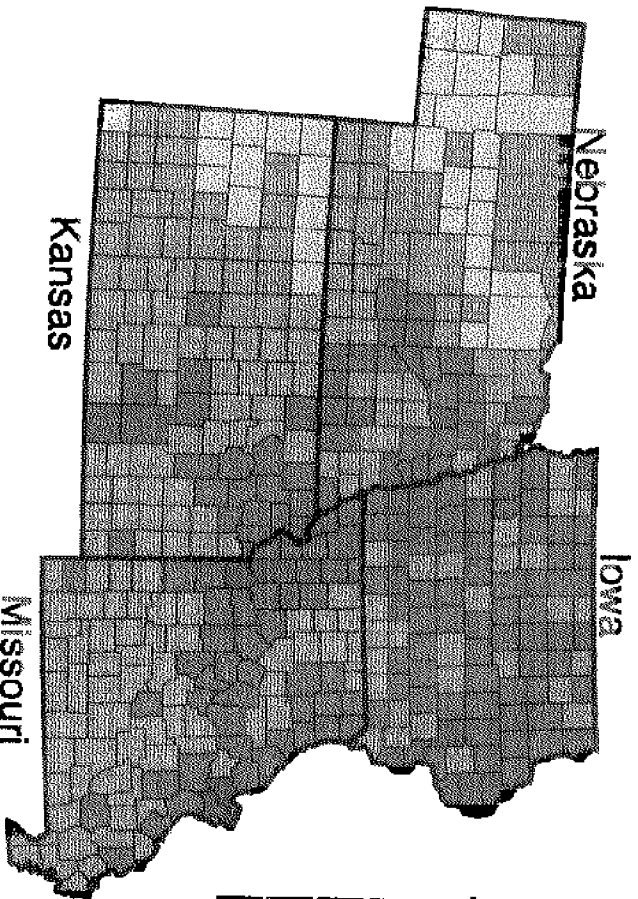
# Central Midwest Region VII States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARRIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

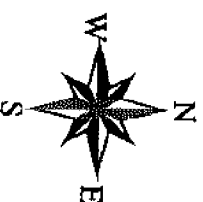
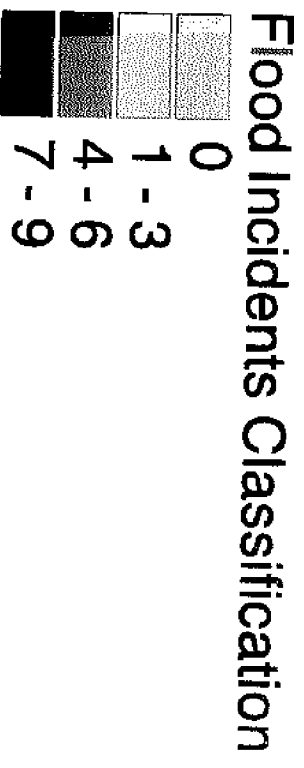
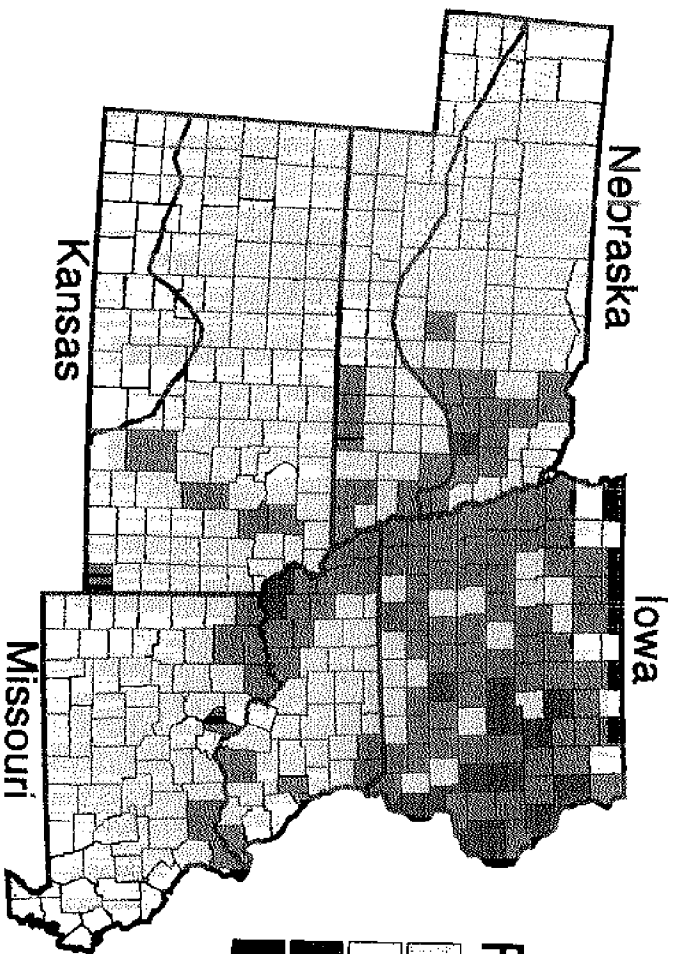
# Central Midwest Region VII Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

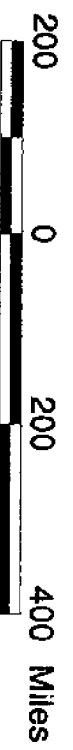
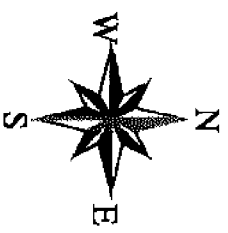
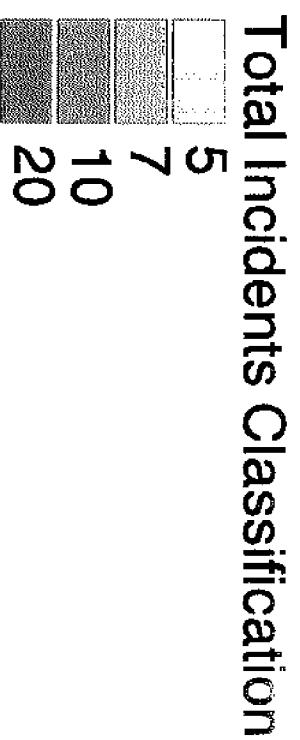
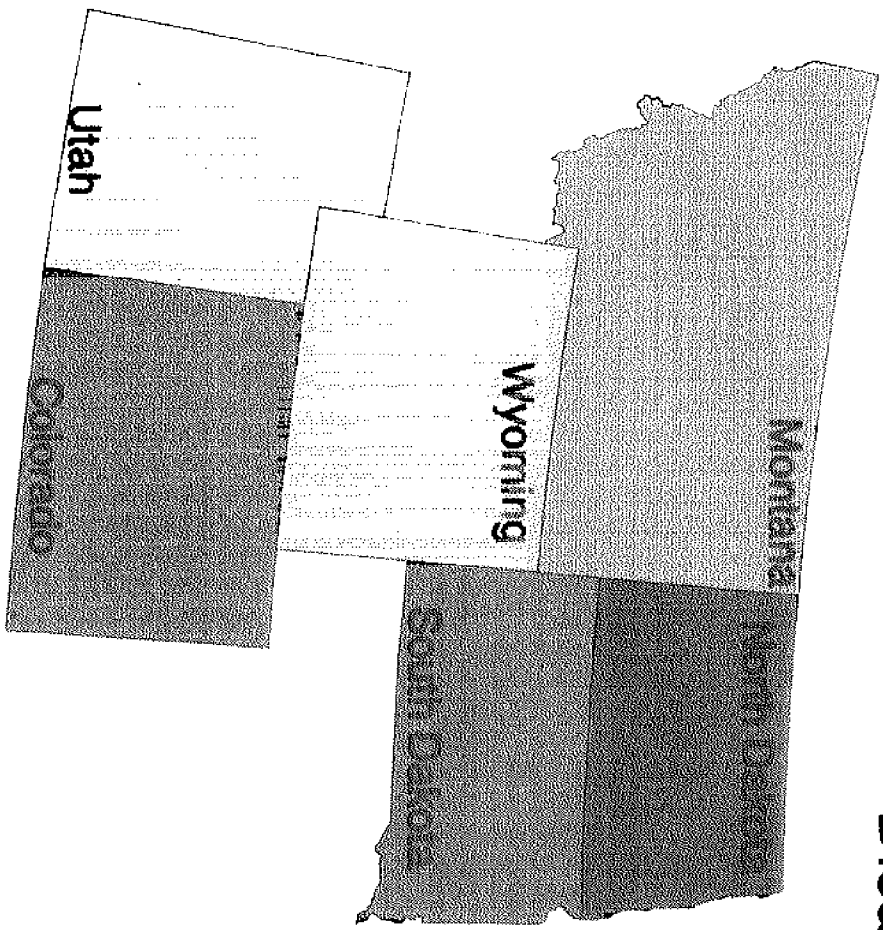
# Central Midwest Region VII Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



Data Source: U.S. FEMA DARRIS 8/94

Cartography by Richard Sykes and Inwhan Jung,  
University of Delaware, Newark, DE

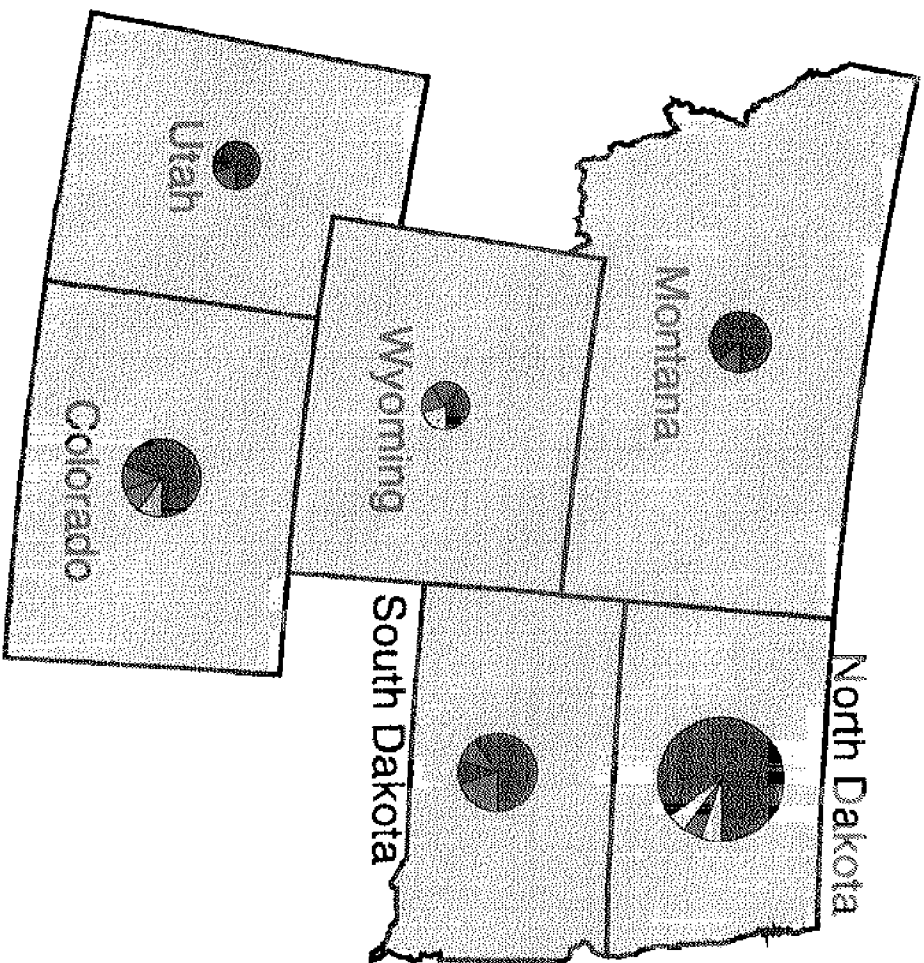
# Mountain Region VIII States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



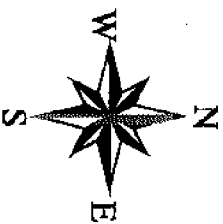
Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

# Mountain Region VIII States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



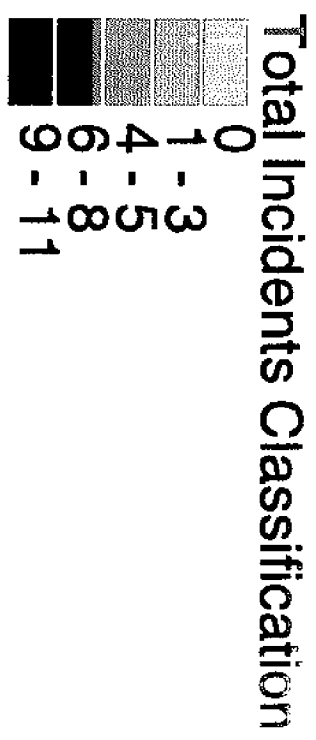
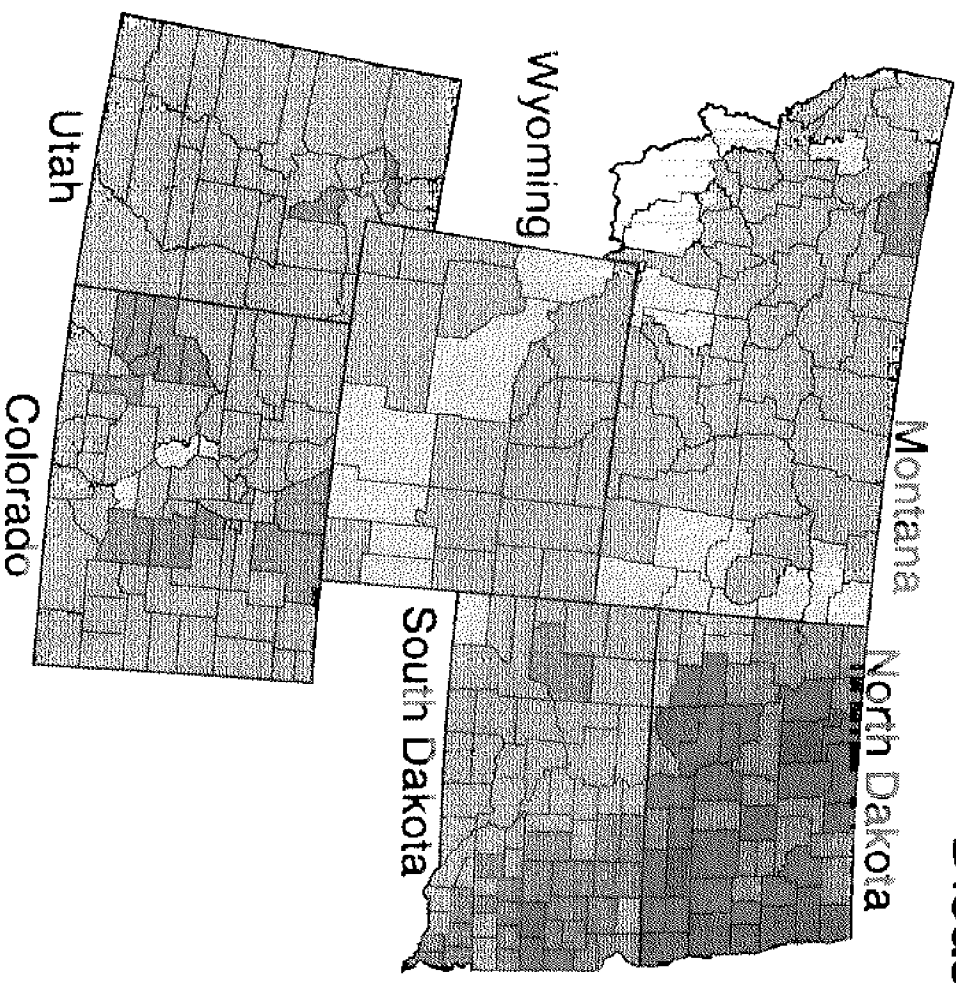
- Incident Type**
- Flood
  - Snow/Ice
  - Drought
  - Toxic Substances
  - Severe Storm
  - Tornado
  - Flood/Tornado
  - Dam/Levee Break



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

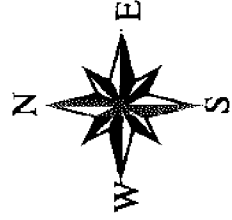
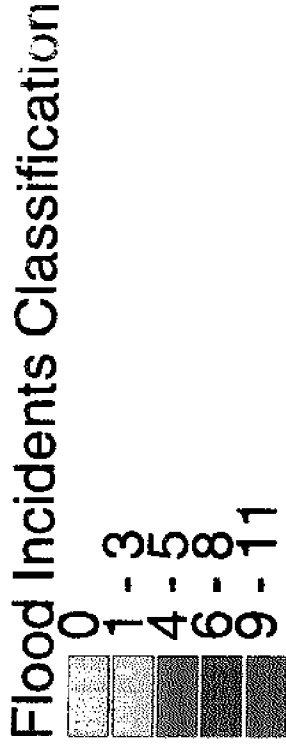
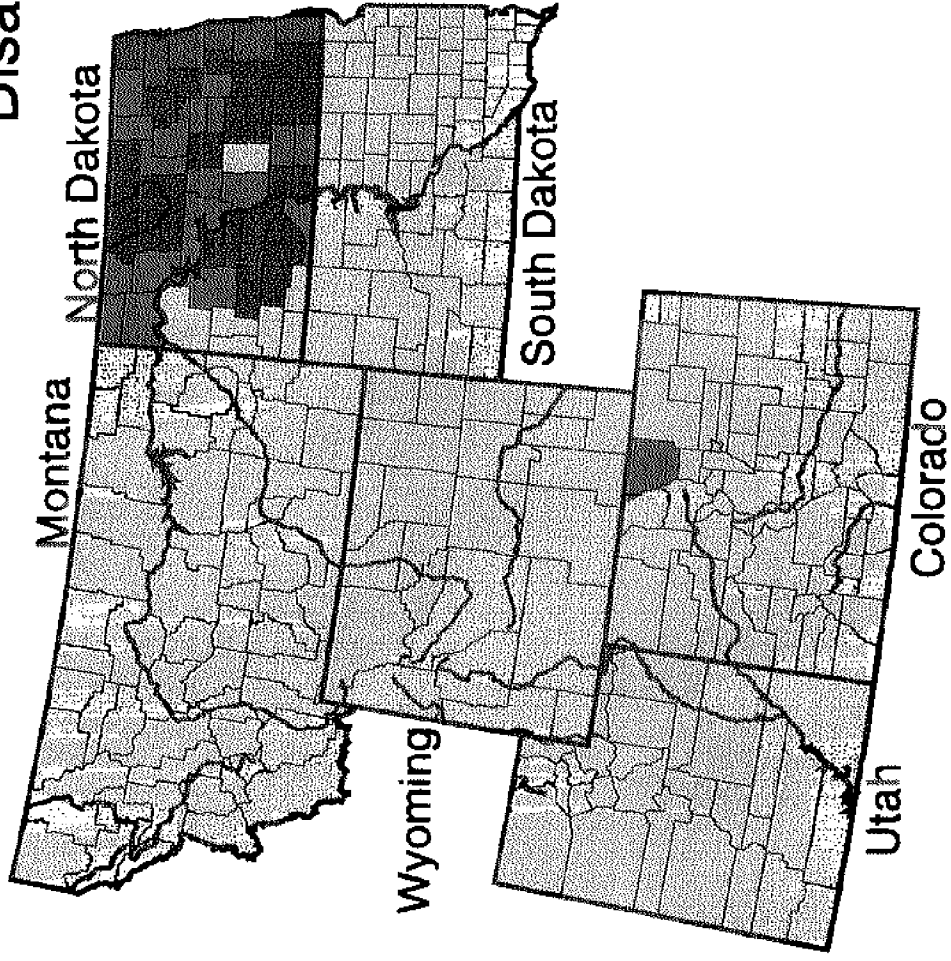
# Mountain Region VIII Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
 Center for Energy and Environmental Policy,  
 University of Delaware, Newark, DE

# Mountain Region VIII Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only

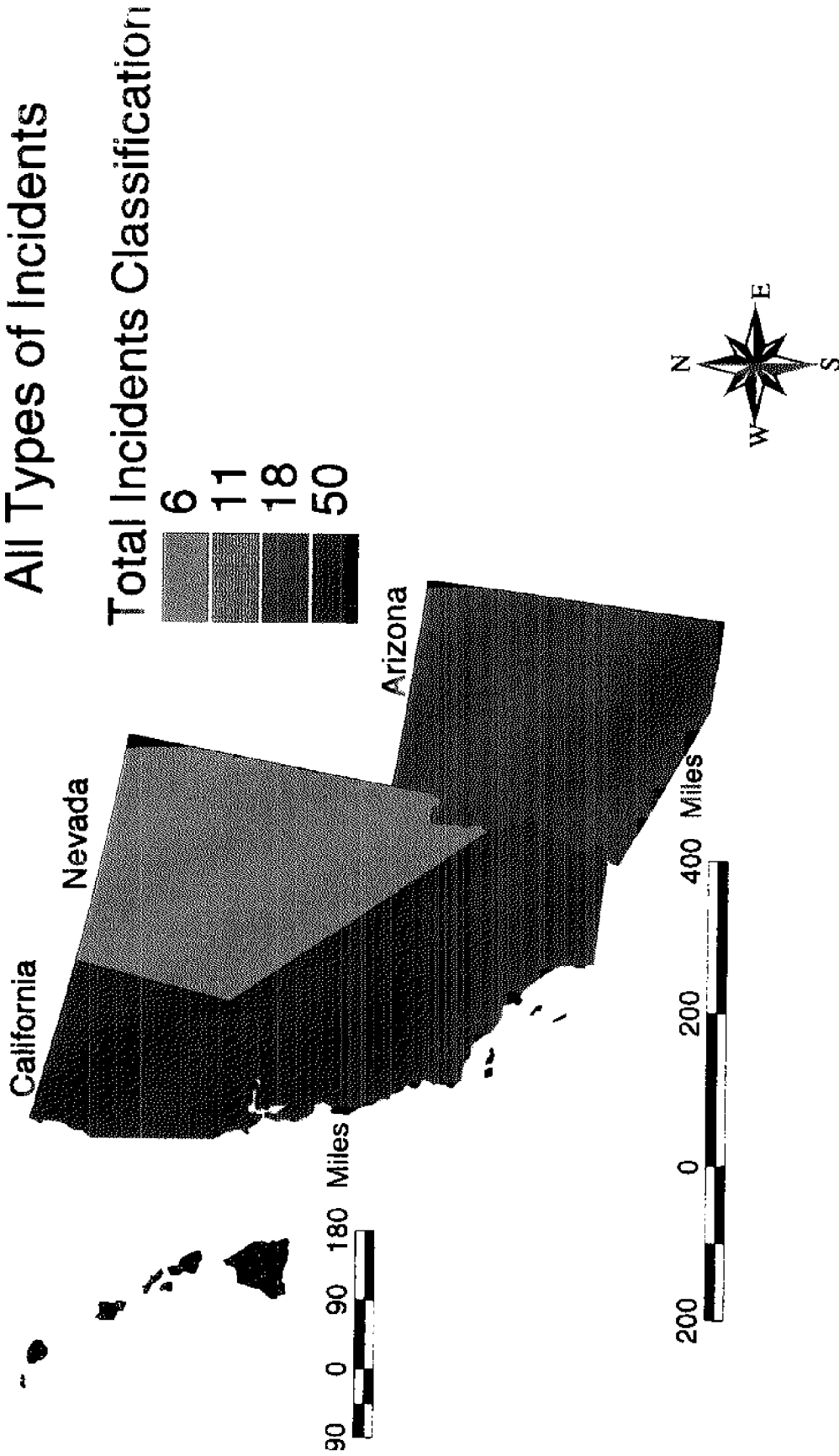


Cartography by Richard Sylves and Inwhan Jun, Center for Energy and Environmental Policy, University of Delaware, Newark, DE

Data Source: U.S. FEMA DARIS 8/94



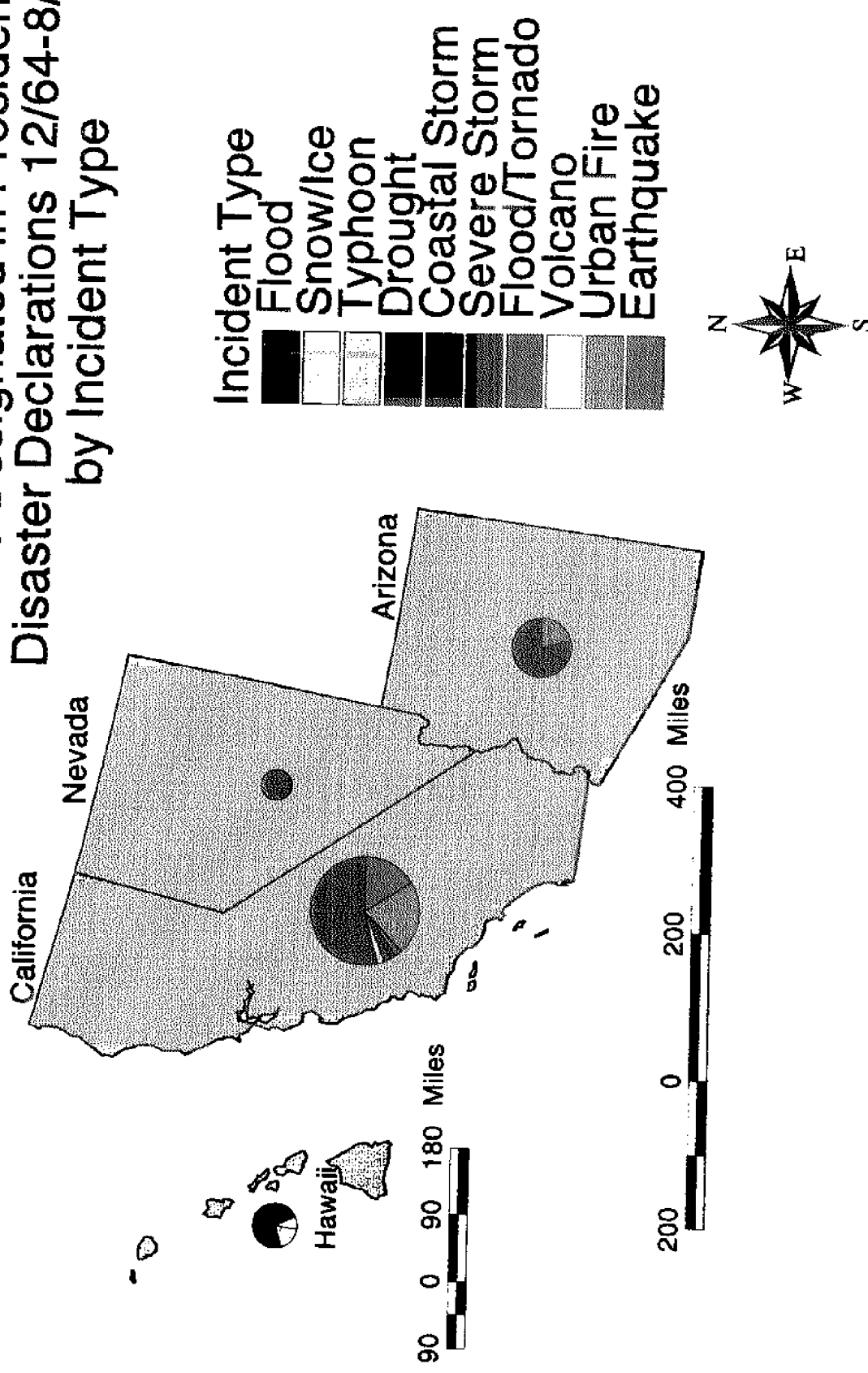
# Southwest Region IX States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

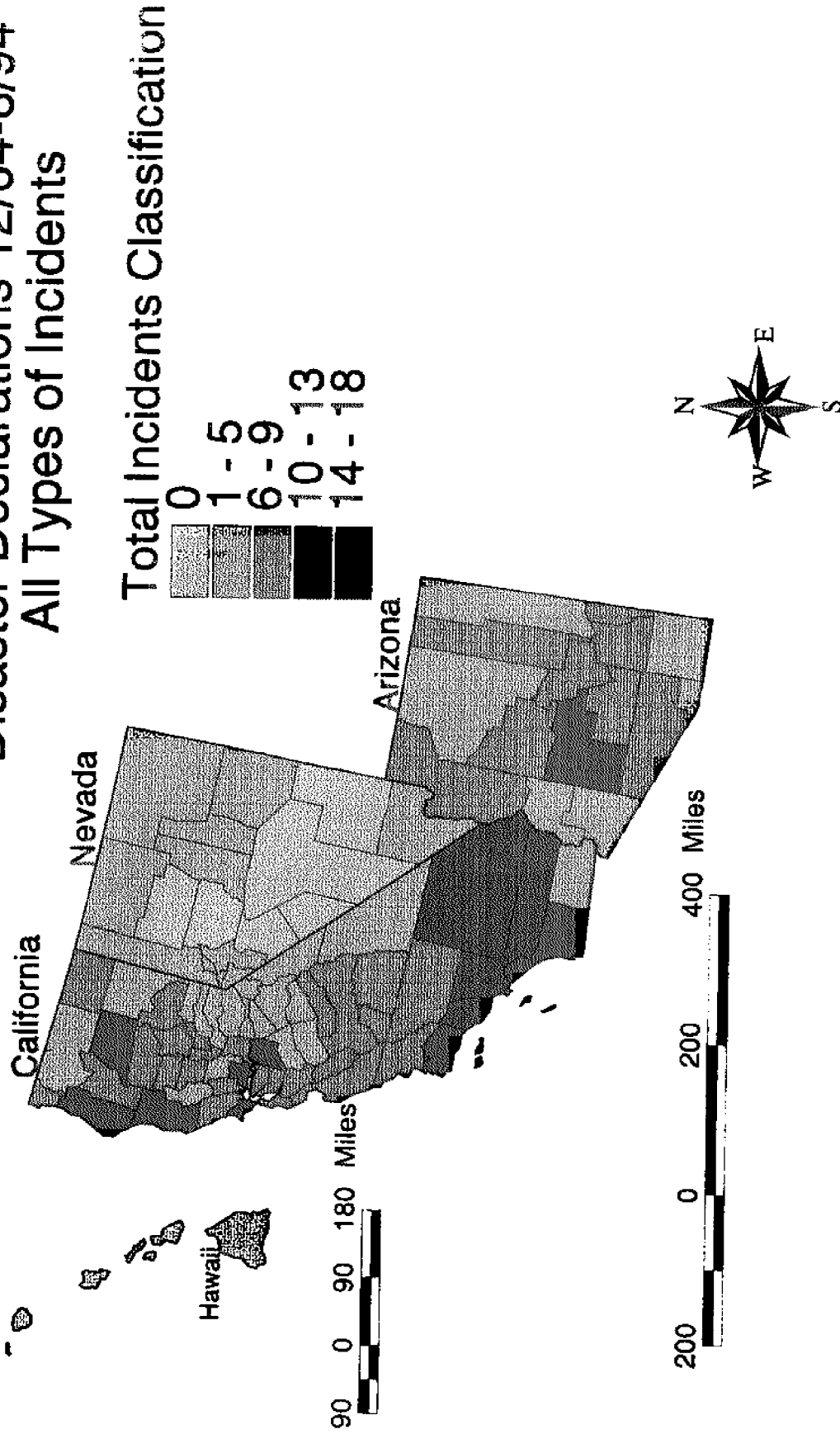
# Southwest Region IX States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

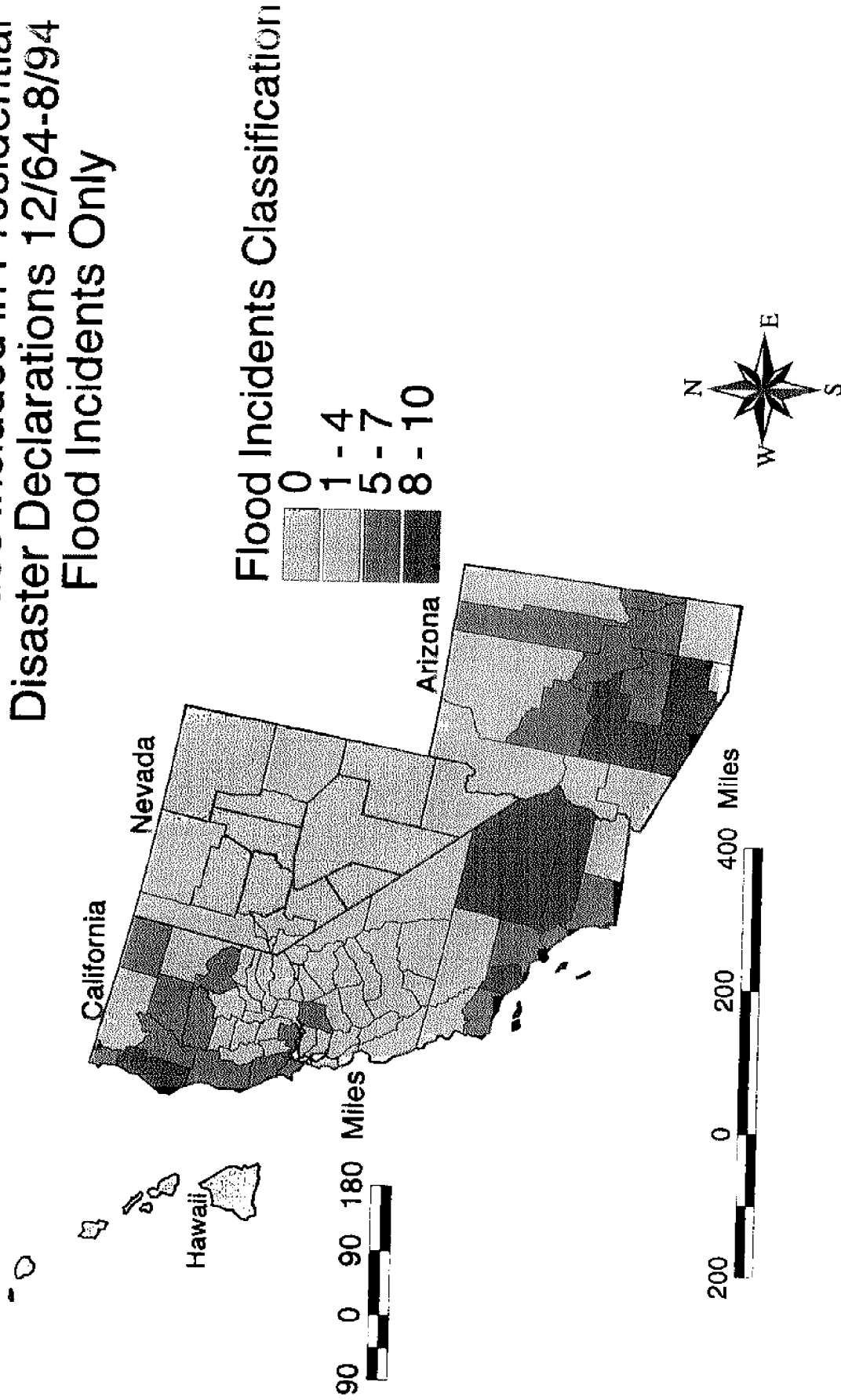
# Southwest Region IX Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

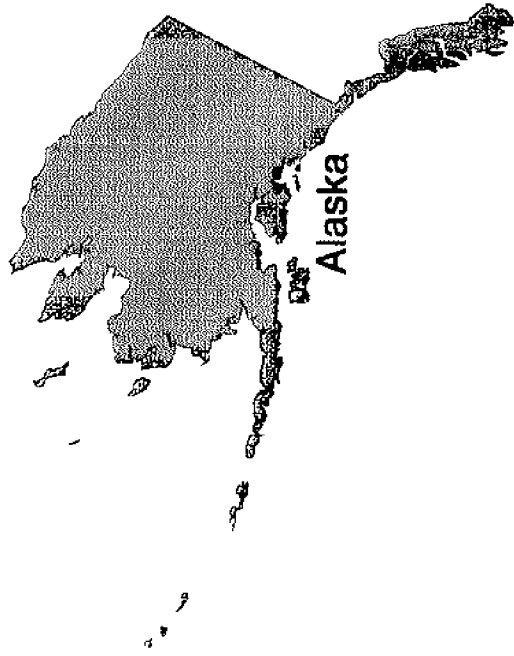
# Southwest Region IX Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



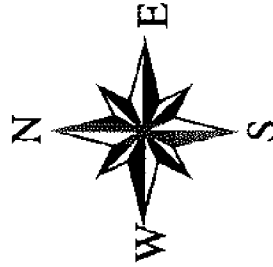
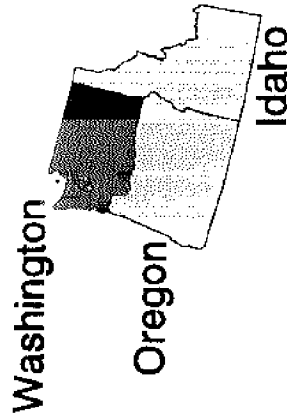
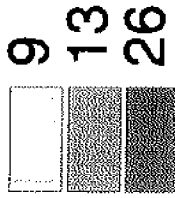
Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

# Northwest Region X States Designated in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents



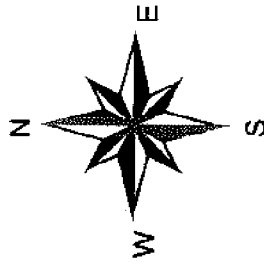
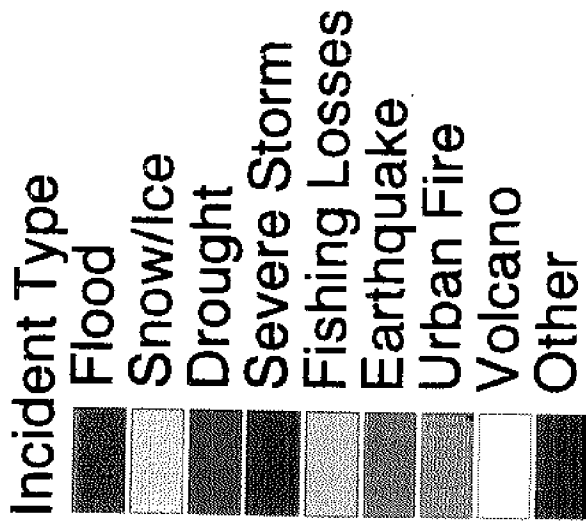
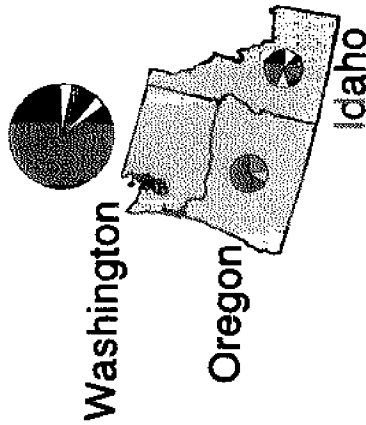
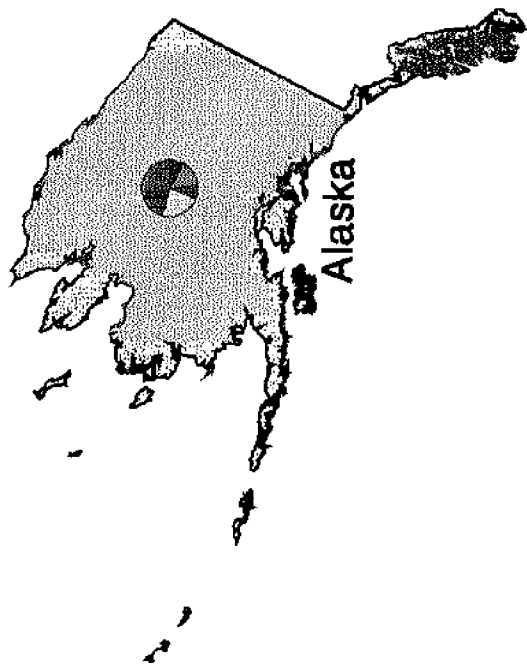
Total Incidents Classification



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

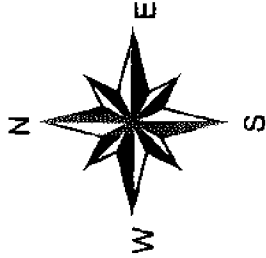
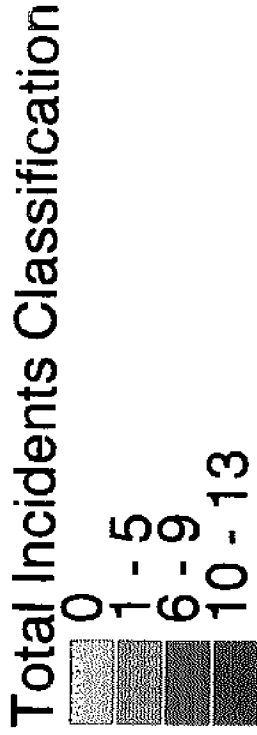
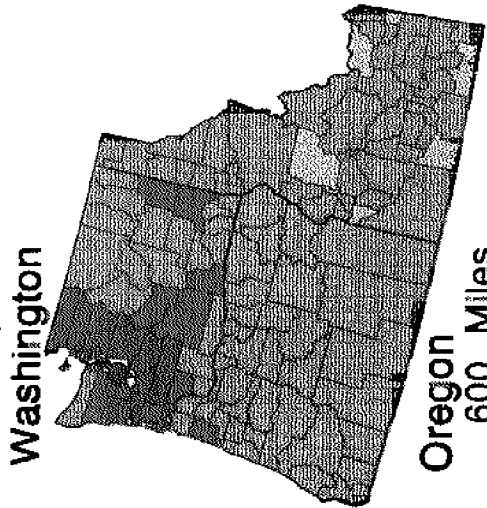
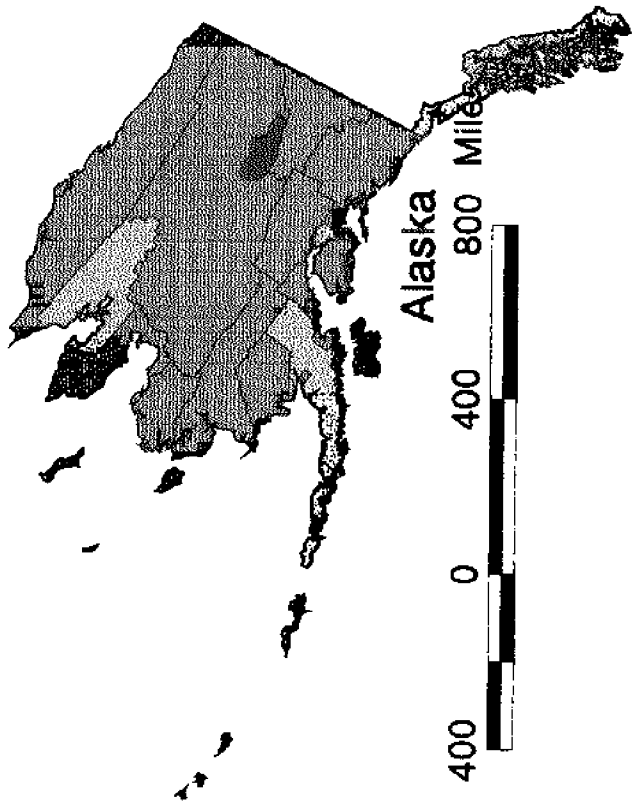
# Northwest Region X States Designated in Presidential Disaster Declarations 12/64-8/94 by Incident Type



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE

# Northwest Region X Counties Included in Presidential Disaster Declarations 12/64-8/94 All Types of Incidents

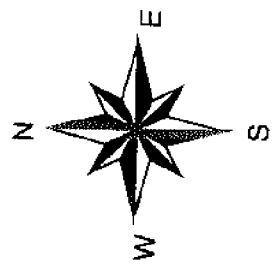
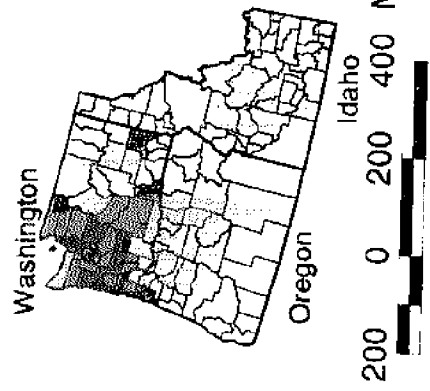
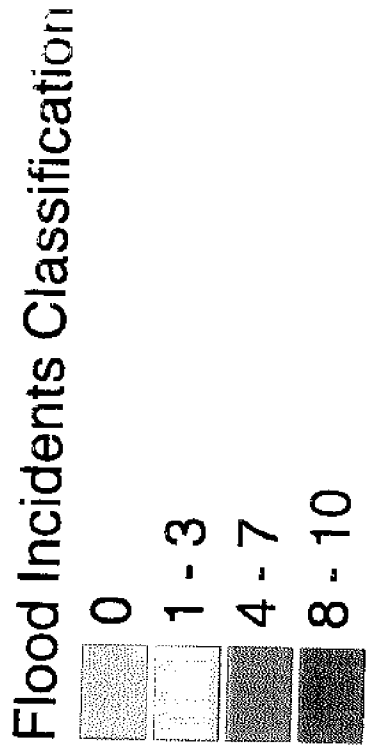
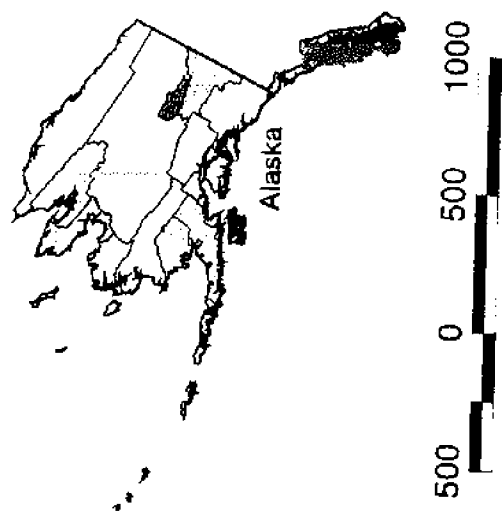


Idaho

Cartography by Richard Sylves and Inwhan Jung,  
Center for Energy and Environmental Policy,  
University of Delaware, Newark, DE

Data Source: U.S. FEMA DARIS 8/94

# Northwest Region X Counties Included in Presidential Disaster Declarations 12/64-8/94 Flood Incidents Only



Data Source: U.S. FEMA DARIS 8/94

Cartography by Richard Sylves and Inwhan Jung,  
University of Delaware, Newark, DE