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

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

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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 turn downs 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 turn downs.
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 turn downs 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 presidency 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.