



Testimony

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and Emergency Management, Committee on
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DISASTER ASSISTANCE

FEMA Can Improve Its Cost-Effectiveness Determinations for Mitigation Grants

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G A O

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Madam Chairman and Members of the Subcommittee:

We are here today to discuss how the Federal Emergency Management Agency (FEMA), in conjunction with the states, ensures the cost-effectiveness of projects funded under the Hazard Mitigation Grant Program. We conducted this work at the request of this Subcommittee and of the Chairman and Ranking Minority Member of the Subcommittee on VA, HUD, and Independent Agencies, Senate Committee on Appropriations.

FEMA has made disaster mitigation a primary goal in its efforts to reduce the long-term costs of disasters. Under its Hazard Mitigation Grant Program, state and local projects to mitigate the impact of future disasters must be cost-effective, as required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act. However, the act does not specify how to determine cost-effectiveness. According to the Office of Management and Budget's (OMB) guidelines and FEMA's guidance, benefit-cost analysis is the recommended approach for determining cost-effectiveness. Benefit-cost analysis is used to determine how the anticipated dollar savings gained through implementing a project compares with its cost. To be considered cost-effective under benefit-cost analysis, a project must return more money over its life than it cost.

Our statement, which is based on the report we are issuing today,¹ provides (1) an overview of the approaches FEMA and the states use to ensure that the program's grants are targeted to cost-effective mitigation projects and (2) our findings on whether the approaches ensure that the mitigation measures are cost-effective.

In summary, we found the following:

- The states and FEMA work together, using different approaches, to help ensure that hazard mitigation grants are awarded for cost-effective projects. The states in our review² established procedures and priorities for identifying and selecting mitigation projects; however, not all of them conducted formal analyses of their projects' cost-effectiveness before submitting applications for their projects to FEMA. FEMA uses benefit-cost

¹Disaster Assistance: Opportunities to Improve Cost-Effectiveness Determinations for Mitigation Grants, (GAO/RCED-99-236, Aug. 4, 1999).

²We performed work in Florida and in FEMA's Region 6 (for Arkansas, Louisiana, and Texas). We selected Florida primarily because of the state's role in analyzing projects for cost-effectiveness. We selected the states in Region 6 because they have addressed a wide range of disasters and have thus gained varied experience in hazard mitigation.

analysis as its primary approach for ensuring that mitigation projects submitted by the states are cost-effective. However, FEMA also exempts certain types of hazard mitigation projects from benefit-cost analysis, including projects that fund the removal of certain structures from floodways and floodplains and mitigation planning efforts. FEMA officials stress a need for flexibility in assessing these projects, suggesting that benefit-cost analysis does not always apply to all mitigation projects, because of difficulties in quantifying the benefits of some projects and the time needed to gather data for conducting the analyses.

- Our review of \$20.1 million in funding for hazard mitigation projects in four states found that projects receiving the majority of this funding (\$11.7 million) were considered cost-effective on the basis of the benefit-cost analyses conducted. However, the best available information—such as flood damage information available from past insurance claims and updated information on flood hazards—was not always used in conducting the analyses. Our review also found that projects receiving over one-third of the funding (\$8.4 million) were exempt from benefit-cost analysis, even though no established analytical basis supported the exemption of the majority of these projects. FEMA officials explained that some projects were difficult to evaluate against traditional quantitative benefit-cost criteria and the exemptions were meant to speed the delivery of grants to the states. Establishing the basis for exempting these acquisition projects and reviewing the cost-effectiveness of other exempt projects after they have been implemented would help FEMA better ensure that these mitigation projects are cost-effective.

Background

FEMA is working to reduce disaster costs through mitigation activities that reduce losses from disasters or prevent such losses from occurring. The activities include providing grants and training for state and local governments, funding for preventing damage to public facilities and for purchasing structures in flood-prone areas, and federal flood insurance. While a number of FEMA programs and initiatives provide funding for hazard mitigation assistance, our review focused on hazard mitigation measures funded under the Hazard Mitigation Grant Program.

Up to 15 percent of the total grant funds spent on a disaster may be spent under the Hazard Mitigation Grant Program for hazard mitigation measures. Subject to certain dollar limits, the Stafford Act generally allows federal funding of up to 75 percent of the cost of hazard mitigation measures within communities that have been affected by a disaster (the

states or local governments pay the remaining portion of the costs).³ As a condition of receiving a program grant, a state must prepare an administrative plan that establishes its procedures and priorities for identifying and selecting mitigation projects. FEMA, however, has the final authority to approve the funding for these projects. In fiscal year 1998, FEMA approved and obligated over \$415 million in Hazard Mitigation Grant Program grants.

The States and FEMA Work Together, Using Different Approaches to Ensure That Cost-Effective Projects Are Funded

The states in our review established procedures and priorities for identifying and selecting mitigation projects; however, not all of them conducted formal analyses of their projects' cost-effectiveness before submitting applications for their projects to FEMA. FEMA uses benefit-cost analysis—an approach recommended by OMB—as its primary approach for ensuring that mitigation projects are cost-effective. However, FEMA also exempts certain categories of projects from benefit-cost analysis for a number of reasons, including the fact that some projects do not have proven or clearly measurable benefits.

The state administrative plans we reviewed exhibited a broad range of approaches for identifying and selecting mitigation projects. In general, the states screened their projects using various criteria, such as the overall costs of the projects, their potential environmental effects, and their cost-effectiveness. For example, Louisiana calculates an initial benefit-cost ratio for projects, which it uses as a part of its criteria for evaluating and scoring them. The state's scoresheet consists of three components—engineering (50 points), effectiveness (100 points), and environmental impact (50 points)—which combine to produce a total possible score of 200 points. Projects that receive the highest scores are then given priority for funding.

Several FEMA officials noted that the agency is initiating changes to improve the states' planning efforts. For example, FEMA has developed a checklist of elements for a model state plan, which will help the states identify cost-effective projects. Among other things, the checklist addresses whether the state plan ranks projects on the basis of the "greatest opportunity for loss reduction." FEMA uses benefit-cost analysis to assess whether the expected costs of investing in a hazard mitigation

³In an Oct. 10, 1997, Federal Register notice, FEMA announced that for disasters declared after Apr. 6, 1997, eligibility for program funding would be statewide rather than limited to the communities affected by the disaster. FEMA was attempting to give the states enhanced flexibility in using the funding for priority projects across the states and to close out the funding from older disasters as soon as possible.

project are justified. That is, to what extent will the project help avoid the costs of damage expected from future disasters (the benefits)? FEMA generally conducts the benefit-cost analysis for the projects that states submit for approval.⁴ FEMA developed several computer programs (known as modules) to simplify the calculations needed to determine a project's benefit-cost ratio. Each module employs established economic principles, OMB guidance, and risk calculations to determine the benefits (discounted to present-day dollars) of a proposed project over its expected life. FEMA has provided these computer programs to regional, state, and local mitigation staff and taught them how to use the modules.

Certain Categories of Mitigation Projects Are Exempted From Benefit-Cost Analysis

Since September 1996, FEMA has exempted the following four categories of Hazard Mitigation Grant Program projects from benefit-cost analysis:

- projects involving the purchase of substantially damaged structures in 100-year floodplains;
- up to 5 percent of the Hazard Mitigation Grant Program's funding for a variety of hazard mitigation measures, such as disaster warning systems or the application of new, unproven mitigation techniques;
- hazard mitigation planning projects for older disasters; and
- an additional 5 percent of the Hazard Mitigation Grant Program's funding for tornado-related projects.

FEMA's rationale for the exemptions varies, although the agency's policy guidance indicates that two of the exemptions were established because some mitigation projects were often difficult to evaluate against traditional quantitative criteria for determining cost-effectiveness and eligibility. FEMA officials stress a need for flexibility in assessing these projects, suggesting that benefit-cost analysis models do not always apply to all mitigation projects. For example, the benefits of some projects are difficult to quantify and compare with the projects' costs. Thus, it may be difficult to determine the benefits of an educational program that uses brochures to inform the public about the risks of living in a floodplain, because it is hard to predict the changes in public behavior that may occur when people read the brochures. However, without any measurement and subsequent comparison of a project's expected benefits with its expected costs, it is unclear what criteria the agency is using to determine cost-effectiveness.

⁴As participants in a pilot program called the "managing state concept," three states (Florida, North Dakota, and Ohio) typically conduct benefit-cost analyses for projects from their communities and submit summaries of the analyses for FEMA's review.

Projects Involving the Purchase of Substantially Damaged Structures

Through policy guidance established in September 1996, FEMA exempted projects that involved purchasing structures located in floodways and floodplains if the cost of restoring the damaged structures equaled or exceeded 50 percent of the structures' market value and the structures were located in a 100-year floodplain. A senior FEMA mitigation official explained that under the National Flood Insurance Program, these substantially damaged structures had to be either elevated or relocated. Thus, the Hazard Mitigation Grant Program was simply following the policy already established by the flood insurance program. The official also stated that the exemption was intended to speed the delivery of hazard mitigation grants to the states. This particular exemption has been criticized by FEMA's Inspector General. In a March 1998 report,⁵ the Inspector General noted the lack of analytical data supporting the exemption's contention that acquisition projects involving substantially damaged properties in a 100-year floodplain were cost-effective. While FEMA officials have begun to retroactively analyze some of the acquisition projects exempted under this policy and agency officials expect to complete this analysis by the end of August 1999,⁶ the agency is currently unable to provide data that would support the exemption. Without this analytical basis, it is difficult for FEMA to demonstrate the cost-effectiveness of the exempt acquisition projects it is funding.

The 5-Percent Initiatives

In September 1996, FEMA established another policy that exempted certain projects from benefit-cost analysis. Known as the "5 percent Hazard Mitigation Grant Program initiatives," this policy allows the states to use up to 5 percent of their Hazard Mitigation Grant Program project funding for a variety of hazard mitigation projects, including new, unproven mitigation techniques and technologies and hazard identification or mapping efforts.

Projects eligible for funding under this initiative can have unproven or not clearly measurable benefits, making it difficult to evaluate the projects under traditional criteria for determining cost-effectiveness and eligibility. To be eligible, a project type had to be identified in the state's hazard mitigation plan and had to reduce or prevent future property damage, injury, or loss of life. The policy's intent was to provide the states with discretion in deciding which mitigation measures to fund, as well as make

⁵Improvements Are Needed in the Hazard Mitigation Buyout Program, FEMA OIG, Inspection Report I-01-98 (Mar. 1998).

⁶The officials explained that FEMA would be reviewing acquisition projects in communities within three states. These projects encompass thousands of individual properties.

the states responsible for providing the rationale for the cost-effectiveness of the projects. FEMA officials explained that the policy was meant to spur creativity and avoid the time and expense involved in conducting benefit-cost analyses.

FEMA's guidance instructs prospective grantees to apply for 5-percent funding if a project was previously denied funding because of difficulty in measuring its cost-effectiveness. However, projects denied funding for other reasons may also be submitted under the 5-percent funding policy. For example, a project to retrofit a homeless assistance center with items such as shutters, a generator, a well, and a storage tank was originally denied funding by FEMA because it was submitted more than 2 years past the agency's deadline for submitting projects. However, after the project was resubmitted under the 5-percent initiative, it was approved for over \$220,000 in federal funding.

The 5-percent initiative policy states that instead of conducting a benefit-cost analysis, the states are to include a narrative that identifies the project's mitigation benefits and establishes a reasonable expectation that future property damage, injury, or loss of life will be reduced or prevented. While FEMA's guidance instructs the states to identify a project's benefits, it does not specifically suggest any comparison of the benefits with the project's costs or with the benefits and costs of competing alternative projects. Without any measurement and subsequent comparison of a project's expected benefits and expected costs, the criteria the agency is using to determine cost-effectiveness are unclear. Additionally, the 5-percent initiative allowed for funding projects that were difficult to evaluate against traditional program eligibility criteria, thus providing the appearance that any project could be funded under the 5-percent initiative. For example, a mitigation project to develop a "Hurricane Information Center/Partnership in Education" was denied funding three times by FEMA. FEMA initially ruled that because the project was an "education and awareness campaign," it did not meet the Hazard Mitigation Grant Program's eligibility requirements and was thus ineligible for funding. However, after the project was submitted for funding under the 5-percent initiative, it was approved for \$4,700 in federal funding.

Hazard Mitigation Planning Projects for Older Disasters

In October 1997, FEMA exempted hazard mitigation planning projects associated with older disasters. FEMA decided that in the interest of expediting the closeout of funding for disasters that occurred on or before June 10, 1993, the agency would make program funds remaining from

these disasters available for hazard mitigation planning purposes.⁷ The policy memo stated that planning projects would be considered cost-effective measures.

Tornado-Related Projects

In August 1998, FEMA announced a policy that temporarily exempted tornado-related projects from benefit-cost analysis. In announcing this exemption, FEMA noted that tornado mitigation projects, such as warning systems, were often difficult to evaluate against traditional quantitative criteria for determining cost-effectiveness and eligibility. The policy memorandum stated that in lieu of conducting a benefit-cost analysis, FEMA would allow the states to include a narrative that identified a project's mitigation benefits and established an expectation that the project would reduce or prevent future property damage, injury, or loss of life. To receive funding, a project had to be identified in a state's hazard mitigation plan and needed to reduce or prevent future damage to property, injury, or loss of life from tornadoes. Additionally, among other requirements, states had to develop a comprehensive plan for warning citizens. This policy will remain in effect until FEMA adopts a proposed regulatory change that warning systems will be funded only from the original 5-percent set-aside. FEMA officials expect that the regulatory changes will be made final in August 1999.

FEMA Cannot Quantify the Number and Dollar Value of Exempt Projects

For a number of reasons, FEMA is unable to quantify the actual number and dollar amount of the projects exempted from benefit-cost analysis. FEMA officials explain that, to present accurate data, headquarters would need to make a special effort to gather the information directly from regional project files. However, FEMA officials estimate that the maximum amount that has been or could be spent for three categories of exempt projects is approximately \$258 million. This \$258 million estimate includes \$113.5 million for exempt 5-percent initiative projects, \$56.5 million for exempt tornado-related projects, and \$88.3 million for planning projects using funding from older disasters. FEMA does not know the maximum potential funding for the fourth category of exempt projects—acquisitions of substantially damaged properties—although agency officials state that

⁷When the Hazard Mitigation Grant Program was established, it provided federal matching grants on a cost-share basis of up to 50 percent for a project. Thus, FEMA refers to these mitigation projects as "50/50 planning" projects. With the 1993 amendments to the Stafford Act, the federal cost share was changed from up to 50 percent to up to 75 percent.

some portion of an estimated \$1.6 billion⁸ in Hazard Mitigation Grant Program funding will be spent on these projects.

FEMA's Approaches Do Not Always Ensure That Mitigation Projects Are Cost-Effective

FEMA's use of benefit-cost analysis appears to demonstrate that certain hazard mitigation projects are cost-effective, although the agency could provide better information to the officials conducting benefit-cost analyses for some projects. Several factors are limiting the agency's ability to demonstrate the cost-effectiveness of projects that are exempt from benefit-cost analysis. For example, our review of \$20.1 million in funding for hazard mitigation projects in two FEMA regions⁹ found that projects receiving over one-third of the funding were exempt from benefit-cost analysis, even though there was no established analytical basis supporting the exemption for the majority of these projects. Establishing the basis for exempting these acquisition projects and reviewing the cost-effectiveness of other exempt projects after they are implemented would help FEMA better ensure that these mitigation projects are cost-effective.

FEMA's Use of Benefit-Cost Analysis Appears to Demonstrate Projects' Cost-Effectiveness, Although the Best Available Data Are Not Always Used

Forty-one (75 percent) of the 55 projects we reviewed were evaluated using benefit-cost analysis. The projects included wind retrofits (shutter projects), drainage improvements, and seismic retrofits of buildings. These projects, which accounted for 58 percent of the funding we reviewed (\$11.7 million of \$20.1 million), were judged as cost-effective. However, we also found that the best available information—such as flood hazard information from flood insurance studies and flood damage information from past insurance claims—was not always used in benefit-cost analyses on flooding projects, because the best data were not readily available. The quality of this information can influence the outcome of a benefit-cost analysis because overestimating the frequency or severity of a flood, or the damage associated with a previous flood event, can inflate the estimated benefits attributed to an acquisition project. FEMA officials have acknowledged the shortcomings and understand the importance of providing the best available data for analyzing the cost-effectiveness of proposed flood hazard mitigation projects.

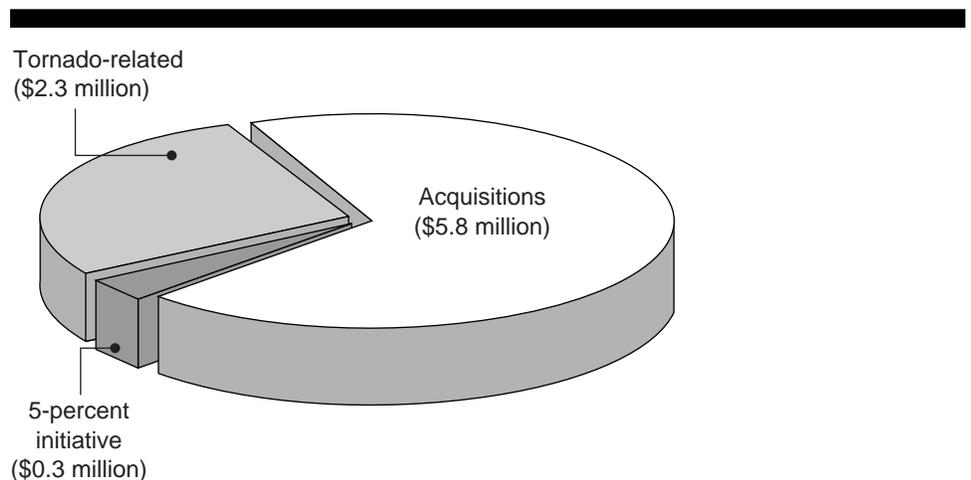
⁸FEMA's estimate of \$1.6 billion is based on total program funds (i.e., \$2.5 billion) minus (1) \$626 million for two large projects that underwent benefit-cost analysis and (2) \$258 million in potential funding for projects in the other exempted categories—5-percent initiative, tornado-related, and planning.

⁹The states in our review are located in FEMA's regional offices in Atlanta, Georgia (Region 4), and Denton, Texas (Region 6).

Several Factors Are Limiting FEMA's Ability to Demonstrate the Cost-Effectiveness of Projects Exempt From Benefit-Cost Analysis

While FEMA has explained its reasons for exempting four types of mitigation projects, there are factors limiting its ability to demonstrate that these mitigation measures are, in fact, cost-effective. Of the 55 projects we reviewed, 14 underwent no benefit-cost analysis. Certain factors, such as the lack of an analytical basis supporting the exemption for acquisition projects and a broad approach for determining cost-effectiveness, limit FEMA's ability to demonstrate cost-effectiveness. The 14 projects account for \$8.4 million (42 percent) of the funding, and they include funding for emergency satellite communications, all-weather radios, emergency alert systems, a public awareness campaign, and property acquisitions. Figure 1 shows the breakout of the \$8.4 million in funding for these exempt projects.

Figure 1: Breakout of the \$8.4 Million in Funding for Exempt Mitigation Projects Reviewed by GAO



Note: This figure does not include a category for exempt planning projects because the 55 projects we selected did not include any such projects.

As figure 1 shows, the majority (\$5.8 million of the \$8.4 million, or 69 percent) of the funding for exempt projects in our review went for property acquisition projects. FEMA's Inspector General reported in March 1998 that FEMA had not produced the data or analysis to demonstrate the cost-effectiveness of buying substantially damaged structures in the floodplain, adding that the agency lacked an analytical basis for exempting such projects from benefit-cost analysis. While FEMA officials have begun initiating efforts to address this concern, over a year

has passed since the Inspector General's report was issued, and the analytical basis has still not been established.

For two other categories of exempt projects—the 5-percent initiative and tornado-related projects—states are asked to provide a narrative that identifies their potential mitigation benefits and establishes a reasonable expectation that the projects will reduce or prevent future property damage, injury, or loss of life. For example, one of the exempt projects involved the development of a tornado warning network and a tornado mitigation demonstration project. The project, which was approved for \$2.3 million in Hazard Mitigation Grant Program funding, was expected to reduce storm-related damages. Another exempt project involved \$45,000 in funding for the development of a public awareness campaign and a brochure, which were intended to educate residents about the hazards of living in a floodplain. While these projects may be cost-effective—because they could reasonably be expected to reduce or prevent future property damage, injury, or loss of life—it is difficult to determine their cost-effectiveness. Given such a broad approach for determining a project's cost-effectiveness, it is difficult to provide an example of a project that would not be considered cost-effective.

FEMA also exempted planning projects associated with older disasters, although the agency has not demonstrated that such projects are cost-effective. While we agree that it is difficult to determine the cost-effectiveness of planning projects and that certain planning projects could prove to be cost-effective, exempting all planning projects allows for a wide range of project approvals.

One means of determining the cost-effectiveness of exempt projects would be to conduct periodic reviews of selected projects after they have been implemented. For example, FEMA could undertake targeted reviews of projects that funded local efforts to establish mitigation strategies or plans. These reviews could be used to demonstrate the value of the projects—whether they enabled the localities to better identify future mitigation projects or helped reduce potential disaster-related damage by alerting residents to certain hazards. To the extent that the reviews demonstrated the cost-effectiveness of the projects, they would establish a basis for exempting similar projects in the future.

In conclusion, Madam Chairman, the majority of the projects that underwent benefit-cost analyses appeared to be cost-effective, though we also found that the best available information—such as flood hazard

information from flood insurance studies and flood damage information from past insurance claims—was not always used in analyzing proposed mitigation projects. FEMA could assist the officials performing the analyses by conducting postdisaster reviews of flood hazards that could be used to update flood hazard information and by making information on past insurance claims more readily accessible.

Additionally, while FEMA has explained its rationale for exempting certain types of projects from benefit-cost analysis, it is limited in its ability to demonstrate their cost-effectiveness because it lacks an analytical basis for exempting acquisitions of certain floodplain properties, uses a broad approach to determine the cost-effectiveness of other projects, and seldom reviews the cost-effectiveness of projects after they have been implemented. FEMA estimates that approximately \$258 million could be spent on exempt projects, not counting the funding for exempt acquisition projects. Our review of \$20.1 million in funding for 55 mitigation projects found that \$5.8 million, or 29 percent of the funding, was for acquisition projects that FEMA had exempted from benefit-cost analysis. Until FEMA establishes an analytical basis supporting the cost-effectiveness of these projects, it cannot ensure that it has allocated this funding cost-effectively. Although FEMA officials have begun initiating efforts to address this concern, over a year has passed since the Inspector General questioned the cost-effectiveness of exempt acquisition projects, and an analytical basis remains to be established.

The report we are issuing today includes recommendations designed to improve how FEMA determines the cost-effectiveness of projects funded under the Hazard Mitigation Grant Program including conducting periodic reviews of projects after they have been implemented to determine whether they were cost-effective. We look forward to working with you, Madam Chairman and Members of the Subcommittee, as you consider various means of ensuring that hazard mitigation funding is targeted to cost-effective mitigation measures.

This concludes my prepared remarks. We will be pleased to respond to questions that you or other Members of the Subcommittee may have.

Contact and Acknowledgments

For information about this testimony, please contact Stan Czerwinski at (202) 512-7631. Individuals making key contributions to this testimony included Pat Moore and R. Tim Baden.

Related GAO Products

Disaster Assistance: Opportunities to Improve Cost-Effectiveness Determinations for Mitigation Grants (GAO/RCED-99-236, Aug. 4, 1999).

Disaster Assistance: Information on the Cost-Effectiveness of Hazard Mitigation Projects (GAO/T-RCED-99-106, Mar. 4, 1999).

Disaster Assistance: Information on Federal Costs and Approaches for Reducing Them (GAO/T-RCED-98-139, Mar. 26, 1998).

Disaster Assistance: Information on Federal Disaster Mitigation Efforts (GAO/T-RCED-98-67, Jan. 28, 1998).

Disaster Assistance: Information on Expenditures and Proposals to Improve Effectiveness and Reduce Future Costs (GAO/T-RCED-95-140, Mar. 16, 1995).

GAO Work on Disaster Assistance (GAO/RCED-94-293R, Aug. 31, 1994).

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