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Hazard Mitigation and Its Place within Comprehensive Emergency Management and the National Response Plan

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Hazard Mitigation and Its Place Within Comprehensive Emergency Management and the National Response Plan

The Pre-Disaster Mitigation Program and Its Relationship to Other Programs

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Introduction

With the enactment of the Disaster Mitigation Act of 2000, Public Law 106-390 (DMA 2000 or DMA2K), Congress concluded that the state and local governments needed to place a greater emphasis on awareness of the risks and vulnerabilities to natural disasters that threaten their communities. To stimulate this awareness, Section 203 of the Stafford Act, as amended by DMA 2000, authorized the Pre-Disaster Mitigation (PDM) program, administered by the Federal Emergency Management Agency (FEMA). Did DMA 2000 affect hazard mitigation? Did DMA 2000 affect hazard mitigation’s place and role within comprehensive emergency management? Did the National Response Plan affect hazard mitigation’s place and role within comprehensive emergency management?

Five years after the enactment of DMA 2000, the list of FEMA-Approved Multi-Hazard Mitigation Plans, which is part of the PDM program, would appear to be an excellent publicly available barometer for both hazard mitigation and comprehensive emergency management, relevant to hazard mitigation at the state and local government level. To take part in the PDM program and other FEMA programs, states and local governments need FEMA-Approved Multi-Hazard Mitigation Plans [1-3].

That means that 87,525 local governments1 (jurisdictions) in the nation must have a local hazard mitigation plan or be part of a multi-jurisdictional plan [6, 7]. That is not counting most universities and colleges (both public and private) and private nonprofit organizations (PNPs) that are eligible for the program and could submit individual plans.

Before we examine the FEMA-Approved Multi-Hazard Mitigation Plans, we should define “mitigation” and why we should care.

Mitigation Defined

Prior to defining mitigation, the terms “hazard,” “exposure,” “risk” and “vulnerability” need clarification, since they are not defined in DMA 2000. [1]

FEMA recommends that during the initial phase of the hazard mitigation planning process for a FEMA-Approved Multi-Hazard Mitigation Plan, a community conduct a preliminary vulnerability assessment using NOAA’s Community Vulnerability Assessment Tool (CVAT) [1, 8, 9]. The NOAA Coastal Services Center defines the above terms as:

- **Hazard**: “An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss.” [10]

- **Exposure**: “The number, types, qualities and monetary values of property or infrastructure and life that may be subject to an undesirable or injurious hazard event.” [10]

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1 44 CFR ß 201.2 Definitions: Local government is any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity. Emergency Management and Assistance/Mitigation Planning, 44 CFR ß 201 (2005). Revised Oct. 1, 2005; available from http://www.access.gpo.gov/nara/cfr/waisidx_05/44cfr201_05.html.

This is similar to the 44 CFR ß 206.2 Definitions: (a)(16) Local government:

(i) A county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government;

(ii) An Indian tribe or authorized tribal organization, or Alaska Native village or organization; and

(iii) A rural community, unincorporated town or village, or other public entity, for which an application for assistance is made by a State or political subdivision of a State. Emergency Management and Assistance/Federal Disaster Assistance for Disasters Declared On or After Nov. 23, 1988, 44 CFR ß 206 (2005). Revised Oct. 1, 2005; available from http://www.access.gpo.gov/nara/cfr/waisidx_05/44cfr206_05.html.
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- Risk: “The potential for losses associated with a hazard, defined in terms of expected severity and/or frequency, and locations or areas affected.” [10]

- Vulnerability: “The level of exposure of human life, property, and resources to impact from hazards.” [10]

Additionally, Hill and Cutter, in Methods for Determining Disaster Proneness, point out “that vulnerability varies by location (or space) and over time – it has both temporal and spatial dimensions.” Of the many types of vulnerability, the most significant are individual, social and biophysical. [11]

The NOAA Coastal Services Center also defines a disaster as “a crisis event that surpasses the ability of the affected individual, community or society to control or recover from its consequences.” [10]

During the hazard mitigation planning process that is part of a FEMA-Approved Multi-Hazard Mitigation Plan, the hazards, risks (probability of occurring and severity), exposures and vulnerabilities of a community are determined – and at least a pre-disaster mitigation strategy should be the result [8-10, 12-16].

Mitigation is the sustained activity that saves human lives, averts injuries and reduces damage and destruction of property by eliminating or reducing vulnerabilities and exposure to long-term risks [4] (and, I would contend, some short-term, high-consequence risks). Mitigation, however, is not limited just to the built or “brick and mortar” environment or natural hazards [8, 14, 17-25].

Mitigation and the All-Hazards Approach

Mitigation had been the cornerstone of comprehensive emergency management [26, 27], which, in part, the Emergency Management Performance Grants (EMPG) program supports at the state and local levels. The EMPG program encourages the improvement of all emergency management capabilities for all-hazards, with activities such as developing/enhancing comprehensive emergency management plans, developing/enhancing all-hazards mitigation plans and other emergency management activities [28-32].

FEMA defines comprehensive emergency management as: “four interrelated actions: mitigation, preparedness, response and recovery. A systematic approach is to treat each action as one phase of a comprehensive process, with each phase building on the accomplishments of the preceding one. The overall goal is to minimize the impact caused by an emergency…” [31]

Why Should We Care?

Mitigation does not stop at the prevention/preparedness phase. Mitigation should be integrated into prevention/preparedness, response and recovery activities [28, 31-33]. This is also known as the all-hazards approach [18]. The National Incident Management System (NIMS) reinforces this thinking by repositioning mitigation and stating that mitigation activities are “a critical foundation across the incident management spectrum from prevention through response and recovery.” NIMS further calls for the identification of mitigation activities “...taken prior to, during or after an incident.” [34]

This change – the repositioning of mitigation from the cornerstone to the foundation of the prevention, preparedness, response and recovery phases – will affect state and local governments’ level of NIMS compliance, mandated by Homeland Security Presidential Directive (HSPD)-5 and their access to federal funding [32, 35]. Tom Ridge, in the preface to the National Response Plan (NRP), noted that the NRP will tie “together a complete spectrum of incident management activities to include the prevention of, preparedness for, response to and recovery from terrorism, major natural disasters and other major emergencies.”

This and the creation of the NRP reinforces the NIMS philosophy, as it is based on the template created by NIMS [28, 29]. This philosophy, that made mitigation the foundation of comprehensive emergency management or the all-hazards approach, is reflected by the NRP institutionalizing the Community Recovery and Mitigation Branch in Operations Section of the Joint Field Office (JFO) and the creation of Emergency Support Function (ESF) #14 (Long-Term

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2 This is not the Federal legal definition. At the state level, there are 58 variations of the definition. At the local level, there could be 87,525 variations. However, for the purposes of the Stafford Act:

44 CFR § 206.2 Definitions. (a) (17) Major disaster: 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 this 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 Management and Assistance/Federal Disaster Assistance for Disasters Declared On or After Nov. 23, 1988, 44 CFR § 206 (2005). Revised Oct. 1, 2005; available from http://www.access.gpo.gov/nara/cfr/waisidx_05/44cfr206_05.html.
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Community Recovery and Mitigation) and the ESF #14 Long-Term Community Recovery and Mitigation Annex [28]. However, there is an assumption that congressionally mandated and locally developed hazard mitigation plans are in place. These plans are known as the FEMA-Approved Multi-Hazard Mitigation Plans [28].

Approved Multi-Hazard Mitigation Plans

The Federal Emergency Management Agency’s (FEMA) Web site noted, as of mid-August 2005, that 57 of the 58 state entities have approved Multi-Hazard Mitigation Plans; the plan of the Federated States of Micronesia is pending adoption. Only three states, Missouri, Washington and Oklahoma, have “enhanced” plans. Additionally, there are only six approved tribal plans posted [36].

At first glance, the 57 approved State Multi-Hazard Mitigation Plans would appear to be acceptable performance for the Pre-Disaster Mitigation (PDM) program after five years. However, based on the data posted on the FEMA Web site, there have only been 1,142 local plans approved covering 5,704 jurisdictions [6, 36].

Despite the fact that the Pre-Disaster Mitigation (PDM) program grants are competitively awarded on a national ranking and a national evaluation basis, still only 6.52 percent of the 87,525 local governments (jurisdictions) in the nation have FEMA-Approved Multi-Hazard Mitigation plans after five years [6, 36, 37].

A preliminary analysis of the data on FEMA’s Web site showed that the states have taken different approaches to implementing their hazard mitigation planning programs for local governments [36]. Four states with standard hazard mitigation plans were selected, arbitrarily and unscientifically, because their plans were posted on their Web sites. Some were easily searchable; others were selected due to their unique characteristics, personal knowledge or response to personal communications.

Analysis of Selected States

- **Alabama**, with 67 counties and 1,171 local governments, has 63 FEMA-approved local plans covering 331 jurisdictions (many are multi-jurisdictional plans). Alabama may be the only state other than Florida, struck by Hurricanes Katrina and Rita, in which almost all of the counties have multi-jurisdictional plans [6, 36, 38, 39].

- **Texas**, with 254 counties and 4,784 local governments, has 22 FEMA-approved local plans covering 223 jurisdictions. Texas has the largest number of counties and the least populated county in the nation. Texas also was another state seriously affected by Hurricanes Katrina and Rita [6, 36, 38, 39].

- **Indiana**, with 92 counties and 3,085 local governments, only had one FEMA-approved local plan covering two jurisdictions. It was noted that “many of the plans involving HAZUS are still under review” [6, 36, 40].

- **Ohio**, with 88 counties and 3,636 local governments, only had 10 FEMA-approved local plans covering 92 jurisdictions.

The State Hazard Mitigation Officer (SHMO) reports, “In a few short years, we now have 14 countywide plans approved, 21 countywide plans approved pending adoption by local communities, and 52 in some stage of development. In fact, 87 of 88 Ohio counties have mitigation plans either approved or in the process of being developed.” [6, 36, 41].

Alabama

Alabama took the county-based multi-jurisdictional approach with the support of the Alabama Association of Regional Councils and its 12 regional planning councils, which assisted Alabama’s 67 counties with producing local plans. Both the state and counties were developing their plans simultaneously. The state’s Hazard Mitigation Plan noted that the Emergency Operations Plan (EOP) was being revised due to the National Response Plan (NRP) and National Incident Management System (NIMS) [42].

Texas

Texas jump-started the process prior to the publication of the FEMA Planning Guidance because geographically, Texas felt it had a high probability of natural disasters. Texas developed Checklist P, a single checklist “with the ultimate goal of having one plan that would satisfy the state and federal requirements.” In February 2002, with the first publication of FEMA’s Interim Planning Guidance for DMA 2000, Texas met or exceeded most of the requirements [43]. Texas also took the collaborative and consolidated regional approach by having 17 of their Regional Councils of Government (COG) apply “for grants (HMGP and PDM grant funds) to either do a regional plan or to assist their counties with doing countywide plans.” Other regional groups within Texas also followed the COGs’ example [44].

Additionally, the state standards require an Emergency Support Function (ESF) and hazard mitigation annex (typically designated as Annex P) in local emergency management plans. This annex identifies the members of the team and the team leader; defines tasks and responsibilities; describes the mitigation process and procedures

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for pre-incident, incident response and post-incident activities; and facilitates the collection of and access to hazard-related resource data. This state’s ESF and the local ESF would be the interface with the NRP’s ESF #14. However, like Alabama, the state and counties were developing their plans simultaneously [28, 43, 45].

Indiana

Indiana took the county-based all-hazards multi-jurisdictional approach. The planning process has been integrated with HAZUS-MH, a tool for multi-hazard loss estimation and risk assessment into the planning process that is “strongly encouraged” by FEMA, and an online planning tool called “Mitigationplan.com” which enables local jurisdictions to input information into a centralized database. These tools, along with others, permit the state and local jurisdictions to produce all-hazard mitigation plans that are compliant with DMA 2000 requirements [40, 46]. This will make the plans more efficient, given that FEMA knows the foundation of the source data [40]. HAZUS-MH and the robust and comprehensive nature of the data collected also can be used in preparedness, response and recovery operations and planning [19, 21, 47-50].

This approach permits the integration of a local jurisdiction’s mitigation planning data and state mitigation planning data into preparedness plans, response plans, emergency operations plans, post-disaster recovery plans and reconstruction plans as needed [19, 31, 51]. This is the process recommended by FEMA’s Guide for All-Hazard Emergency Operations Planning: State and Local Guide (SLG) 101 and by the APA Planning Advisory Service’s Planning for Post-Disaster Recovery and Reconstruction (PAS 483/484), promoted by NIMS and planned for by NRP [19, 28, 31, 32].

The Indiana state plan noted that at the local level “[d]ata concerning risk and vulnerability assessment is developed or reproduced for no less than three plans just for the purposes of emergency management activities.” One of the goals of the state plan was to reduce or prevent this duplication of efforts while improving local planning. A number of their local plans are under review. An emphasis was placed on counties that had been part of past disaster declarations for mitigation planning funding. In the past, the state requested planning funding for 16 counties from the Pre-disaster Mitigation Competitive Grant program; however, only five counties were approved [46].

Ohio

Ohio took the regional and the county-based all-hazards multi-jurisdictional approach. Ohio also is developing its state plan in four stages, with the first stage covering the top five hazards in the state – floods, tornadoes, landslides, winter storms and dam failures – followed by the other identified hazards over the next three years.

For planning purposes, the state has been subdivided into three regions, based on similarities for risk and vulnerability. The state had tried to use HAZUS-MH for flood-loss estimates for the three major Ohio Rivers. However, the data was skewed, and “the software developer confirmed the inaccuracy,” which would be corrected by the end of 2004.

Ohio also developed an all-hazards local mitigation planning guidebook. Project Impact gave the first funding for local mitigation plan development in the state, which involved three counties and two municipalities [52]. Prior to DMA 2000, there were no local comprehensive mitigation plans in the state. Now 87 counties have plans approved or under development [41].

A “Cursory” Review Of Some State Plans

Both the Alabama and Texas state plans currently only address natural hazards. Alabama, Texas and Ohio noted that the short deadlines mandated by DMA 2000 and lag in the release of the Interim Final Rule had resulted in minor inconsistencies in format and data between the state plans and their local plans, which would be corrected by the next required update. Alabama and Texas noted that their concern was to have as many local plans approved as possible before the deadline and the recurring annual hurricane season [42, 43].

The Ohio state plan, like the Alabama and Texas state plans, currently only addresses natural hazards; however, Ohio has a plan in place to transition to an all-hazards mitigation plan over time. One of their concerns was the recurring annual hurricane seasons. They also were impacted by a number of active disasters during the planning process that drained state resources. Also, there was an issue of questionable performance by a FEMA-supplied consulting firm during the risk and vulnerability assessment phase for the state plan [52]. Coordination and integration between the state and local mitigation plans is reported to be “cursory” at best, but there are high hopes for all-hazards mitigation in the future [41].

All four states indicated they plan to pursue and submit state enhanced plans to FEMA. Unlike Texas, however, Alabama, Indiana and Ohio did not clearly indicate any tight integration of their state or local mitigation plans with emergency operations or response plans (i.e., the National Response

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Plan or NIMS). However, other federal, state and regional plans and mechanisms were noted. In some cases, the state emergency operations plan was mentioned a few times, but not with the level of detail and integration that Texas provided [42, 43, 46, 52]. This was not required by DMA 2000 or dictated by the Interim Final Rule or the program guidance [1, 4, 24, 44].

Only four states were reviewed, and there is a probability that other innovations have been developed and are not noted here. It also should be noted that at the time this was written, FEMA still had not updated the FEMA-Approved Multi-Hazard Mitigation Plans Web page since mid-August 2005 [36]. However, this all may be moot since the release of the FY 2006 Pre-Disaster Mitigation Program guidance.

New Program Guidance

DMA 2000 states, “Each state may recommend to the President not fewer than five local governments to receive assistance.” No limit was stated, since the goal was to place a greater emphasis on awareness of the risks and vulnerabilities to natural disasters that threaten communities.

The FY 2006 Pre-Disaster Mitigation Program guidance now limits each applicant to five sub-applications for planning and/or projects [1, 53]. This will effectively limit the Pre-Disaster Mitigation program to only 290 [58 x 5] plans and/or projects or only 0.33 percent of the nation’s local governments that will have access to the program per grant cycle. How many will be left after the National Ranking and National Evaluation?

Conclusion

First, the Federal Emergency Management Agency (FEMA) and the U.S. Dept. of Homeland Security (DHS) must update and maintain FEMA-Approved Multi-Hazard Mitigation Plans and other mitigation Web pages at least monthly to ensure that the public maintains their perception of the risks and vulnerabilities of hazards. Research has proven that pre-disaster planning and mitigation, which is promoted by DMA 2000, saves human lives, averts injuries, reduces damage and destruction of property by eliminating or reducing vulnerabilities and exposure to risks, and is more cost-effective than post-disaster activities [54].

More Incentives Needed

Instead of being an incentive, the new Pre-Disaster Mitigation (PDM) Program guidance change will most likely stifle state programs. If other funding sources are not found, programs such as Indiana’s and Ohio’s all-hazards mitigation planning approach will be restrained and local participation will be reduced in all states. Additionally, planning grants should be separated from project grants, with a focus on supporting more state/local/privately funded mitigation planning with federal technical support for all all-hazards mitigation planning.

More incentives must be found to promote hazard mitigation planning – like the Community Rating System (CRS), however for all-hazards mitigation planning [12, 52, 55-57]. Furthermore, the Commercial Equipment Direct Assistance Program (CEDAP) should be broadened to include all-hazards mitigation planning or a similar program created for all-hazards mitigation planning equipment and technology [58, 59]. Antiterrorism activities, opposed to counterterrorism, are mitigation activities that provide “…defensive measures used to reduce the vulnerability of people and property to terrorist acts…” [14, 60] Also, in the United States, natural disasters have destroyed or caused failures of more critical, essential or high-potential loss facilities than terrorists [61]. Mitigation and mitigation planning for all hazards will save human lives, avert injuries and reduce damage and destruction of property.

Program And Planning Guidance Changes Needed

In a pre-disaster environment, not all mitigation strategies are cost-effective, are feasible or can be funded. They may not be implemented for other reasons. However, those mitigation strategies that are not implemented might be applied during the event or a post-emergency/disaster environment and should be added to pre-disaster response, recovery and reconstruction plans [19, 28, 32]. This can be promoted by requiring an Emergency Support Function (ESF) and hazard-mitigation annex in state and local emergency management plans, as does Texas. This would aid decision-makers, at a time of crisis, by providing options and alternatives [19].

The FEMA Interim Final Rule and planning guidance for DMA 2000 and the PDM program needs greater continuity and adherence to the tenets of comprehensive emergency management. It also should be updated to include NRP and NIMS. The tools provided, while good, need improved interoperability of plan data that will prevent redundant data collection and planning and reflect the changes in incident management philosophy [62]. This includes increased integration of tools (such as HAZUS-MH and CATS) and mandated federal, state and local planning programs (like the Superfund Amendments and Reauthorization Act, Local Emergency Planning Committees

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(LEPC), Critical Infrastructure Protection (CIP) and all-hazard mitigation planning) [61, 63, 64]. Additionally, planning grants should also require that if consultants are used to prepare the local plan, then on-site regional planning, mitigation or emergency operations staff must be trained to update and maintain the mitigation plan.

Also, the establishment of a mandated peer-reviewed standardized methodology for all-hazards risk and vulnerability assessments and for all-hazards loss and impact estimations build on the existing work of FEMA, NOAA, EPA, the Defense Threat Reduction Agency (DTRA) and others for all-hazards planning [9, 10, 49, 63-67]. This will reduce confusion about what is a “risk” and what is a “vulnerability.” It will prevent the mixing and mismatching of hazard risk, security risk, program risk, speculative risk and pure risk – and the mismatching and misuse of macro, micro and system level risk, and vulnerability assessments [61, 68]. Just because a community had two 500-year storms last year, does not mean the community will not have a 500-year storm or worse this year. It has even been suggested by an expert in possible maximum loss and probable maximum loss analysis that “[w]hen it comes to protecting property and lives, there should be no room for allocation using probability, for every event does and will always happen. It is always a matter of when, not if.” [68, 69]

Additionally, the guidance for the Benefit-Cost Analysis (BCA) of hazard mitigation projects (including BCA methodologies and assumptions used) should be published and re-examined by peer review, so it can be determined if barriers to participation or approval are valid [24, 54, 68, 70]. Given that, as one security pundit put it when describing average loss expectancy, “...with events that have a very, very high damage [amount], and a very, very low probability of occurrence, you multiply infinity by zero and get whatever you want” [68]. This is suggested to ensure that the program goals of saving human lives, averting injuries and reducing damage and destruction of property are met – and are still cost-effective, pre-disaster and post-disaster [24, 54, 68, 70].

PDM program guidance for hazard mitigation planning should also be divided into two phases. The first phase, the local Risk and Vulnerability Assessments (RVAs), beside the locally identified hazards and developed scenarios called for in the guidance, should utilize State and Local Mitigation Planning: How-To-Guide Number Two: Understanding Your Risks: Identifying Hazards And Estimating Losses (FEMA 386-2), and State and Local Mitigation Planning: How-To-Guide Number Seven: Integrating Manmade Hazards into Mitigation Planning (FEMA 386-7) [4, 8-10, 14, 24].

The local hazard mitigation planning team would also use the 11 scenarios identified in DHS’s National Planning Scenarios to conduct Risk and Vulnerability Assessments (RVAs) for their local community, even if at the local level the probability is “highly unlikely” or little to no probability in the next 100 years [20, 50, 52, 65, 71, 72]. Additionally, if the National Planning Scenarios identify metropolitan areas similar to ones adjacent to or “near” the local area, Risk and Vulnerability Assessments (RVAs) should be also conducted based on the event occurring in those metropolitan areas, with resulting effects on the local area. Both local and national results and raw data would then be forwarded to the state and FEMA.

The subsequent phase would follow the remainder of the PDM program guidance to develop local mitigation strategies to be “...taken prior to, during or after an incident...” based on locally identified hazards and feedback from the state and FEMA for the local multi-hazard mitigation plan or local all-hazard mitigation plan [4, 24, 32]. Program guidance must also be clarified even if the outcome of the hazard mitigation planning is unfunded pre-disaster mitigation projects or no projects. The mitigation strategies should still be incorporated into pre-disaster emergency operations, response, recovery and reconstruction plans – and published so the community has an awareness of the outcomes of the hazard mitigation planning process.

These suggestions, it is believed, would improve the federal, state and local planning processes by: (1) reducing data collection and overall effort involved for the local governments and (2) increasing the cost-effectiveness of hazard mitigation programs and emergency management programs overall, thus satisfying the data needs of national programs such as Critical Infrastructure Protection (CIP) [61].

More Research Needed

Given the dismal number of local governments and jurisdictions (5704 out of 87,525) participating in the Approved Multi-Hazard Mitigation Plans program, more research is needed to define the barriers to participation or approval. Additionally, only four states were reviewed, and there is a probability that there are other innovations in other state plans not reviewed. More research is needed to identify those innovations that may have been developed.

Acknowledgement

Many thanks to the practitioners and academics who I disturbed during the holiday season last year with questions and dyslexic

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messages while researching and composing this article. I hope you all had a peaceful holiday and will have a peaceful New Year.

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National Academies: Washington, D.C.


