

**Collaboration and Partnership:**  
**Preparing Local Networks for Emergency Situations**

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## **Abstract**

Recent governmental responses to domestic disasters have emphasized the important role played by a sometimes extensive network of decentralized, voluntary organizations in emergency response. While we are just beginning to grasp the extent to which volunteers and voluntary organizations *react* to disasters in concert with local governments, we still understand very little about how local governments *proactively* plan to work with these private organizations. This article uses a national survey of county-level emergency planning agencies to describe the role of voluntary organizations in local disaster planning. Network and collaborative theories provide frameworks for understanding the role of joint planning, volunteers and other resources in predicting emergency preparedness. Findings of note include the strong contributions made by private voluntary organizations to perceptions of government managers that their counties are prepared for emergencies and disasters.

## **The Role of Voluntary Organizations in Emergency Management**

Emergency response includes a sequence of mitigation, preparedness, response and recovery activities. This approach is commonly described as “comprehensive emergency planning or management” (CEP or CEM). It depends principally on public agencies but is also understood to work best when a broad range of private actors are included in the planning and relief efforts (Hoetmer 1991; McEntire et al. 2002, p. 268; Waugh 2000). Most recently, the theoretical development of the emergency management field has been characterized by a greater emphasis on disaster prevention rather than response (McEntire 2004; McEntire et al. 2002; Waugh 2000). For example, McEntire et al. (2002, p. 276) have suggested the need for a

“paradigm shift” in emergency management scholarship to put a greater emphasis on proactive efforts to identify and reduce community vulnerabilities.

The role of voluntary organizations in this progression of activities has changed over time. The increased scope of terror threats and natural disasters in recent years has generated many new voluntary organizations created to support disaster response. The field has increasingly emphasized the dynamic, collaborative nature of emergency response systems, and so both by design and necessity has paid greater attention to private sector partners (Waugh and Streib 2006).

In the hierarchy of the nonprofit disaster response community, the American Red Cross and its chapters top the ranks in both funding and scope of authority to work with public officials. The Red Cross is the only private organization designated by Congressional Charter to provide disaster relief services, but thousands of other charitable, religious and civic organizations do so as well. An additional 50 or more national organizations, and hundreds more at the state level, comprise a level of response known as VOADs, or Voluntary Organizations Active in Disaster. Still other organizations created to promote volunteerism generally, such as the Corporation for National and Community Service, and the Points of Light Foundation and Volunteer Center National Network, have supplemented the efforts of VOADs by targeting some of their resources at improving volunteer coordination during disasters.

In sum, practitioners now understand emergency planning activities to work best when they involve a broad diversity of institutions. These organization encompass hospitals, museums, schools, libraries, universities, civic associations, youth groups, ethnic associations, neighborhood groups, membership associations, charities that serve dependent and frail

populations, and banks, manufacturers and small businesses (Comfort et al. 2004; Points of Light Foundation 2004).

Federal emergency planning appears to be moving in a similarly inclusive direction. New federal initiatives such as the Citizen Corps and the Medical Reserve Corps were created under Executive Order in 2002 to supplement the pre-existing activities of VOADs (Brudney and Gazley 2003). Emergency response in the United States is foremost a local activity, but when the scope of the emergency requires a larger response, all governmental resources are coordinated through the National Response Plan (NRP). The NRP, in turn, is governed by the overarching structure, doctrines and principles of the National Incident Management System (NIMS), administered by FEMA through the Department of Homeland Security. Both the NIMS and the NRP have been revised since the 2005 Gulf Coast hurricanes to place more emphasis on collaborative incident management and to recognize the large role played by private sector and voluntary organizations in emergency response. The updated federal response plan, entitled the Federal Response Framework (FRF), reflects the more comprehensive, flexible and inclusive nature of current federal emergency planning.

Although the normative focus has shifted toward more inclusive emergency management models, the research on the efficacy of such models still lags behind (Drabek 2006). One of the challenges is that a large portion of the literature on charitable, voluntary involvement in disaster response comprises retrospective examinations of the role of volunteers and these organizations in relief and recovery (Boris and Steuerle 2006; Comfort 1999; DeVita 2006; Drabek et al., 1981; Dynes and Tierney 1994; Kapucu 2006). The research has not kept pace with the frequency and extent of joint planning efforts. At present, we have only a weak understanding of the ways in which local jurisdictions and nonprofits plan *proactively* to meet future emergencies,

or of the *scope* of joint planning. Yet the need for a more proactive system of emergency response is described explicitly in Congressional Reports, which acknowledge that “80 percent ...of the problem lies with planning” (Chertoff 2005).

Sufficient detail about *joint* efforts is also lacking. Where surveys of local planning efforts have been implemented, they sometimes rely on general questions about the status of inter-agency coordination without distinguishing primary from secondary responders, or public from private agencies (Baldassare and Hoene 2002). The research is most helpful when it is comprehensive -- including voluntary organizations beyond the Red Cross -- and clearly distinguishes both affiliated from unaffiliated volunteers, and voluntary organizational responses from the efforts of individual volunteers. Distinguishing the planning process from the resulting plans can also help to clarify private sector involvement (Perry and Lindell 2003).

Thus far, findings from retrospective studies suggest that the role of the voluntary sector may be both misunderstood and underestimated. The Homeland Security Institute (2006) produced a comprehensive report on the relief efforts of more than 1,000 charities and other tax-exempt organizations during Hurricanes Katrina and Rita. The report concludes that “faith-based organizations and nongovernmental organizations undertook a surprisingly large, varied, and demanding set of activities with extraordinary effectiveness,” well beyond the expectations of the researchers or of local governments (p. 1). This report was also noteworthy in its attempt to capture the contributions made by “unheralded” (p. 7) organizations, those not widely recognized for their role in emergency response. The report documented a range of relief services in addition to the areas assumed to be “traditional” areas of charitable service (p. 7).<sup>1</sup> Other independent studies of the relief response to the Gulf hurricanes and a series of reports produced by the Government Accountability Office have found similar levels of charitable

activity that surpassed the expectations – and planning models – of local jurisdictions (DeVita 2007; Pipa 2006).

Reports such as these can help local governments to plan by illustrating how public agency capacities can be augmented by a substantial amount of nongovernmental support during emergencies. However, many challenges remain unaddressed in building local collaborative capacity for disaster response across the sectors. The first issue is the willingness of partners to develop joint planning and communication systems in advance of disasters.

Research on the response to the 9/11 attacks finds frequent interaction between actors within their own sectors (i.e., government to government, nonprofit to nonprofit), but infrequent cross-sector communication (Comfort 2002). Some public managers report little incentive to involve secondary responders in training and simulations. And they may view some voluntary efforts with suspicion; private groups can participate because of their own political or organizational agendas rather than for public benefit. Both public emergency managers and VOAD managers can also consider the efforts of secondary responders and spontaneous volunteers to be of poor quality and hardly worth the trouble. Some nonprofits may fit the profile of a relief agency but may be constrained by mission from participating. And some organizations may be willing to support relief efforts but unwilling to work alongside public agencies when they do (Boris and Steuerle 2006; Getha-Taylor and Brudney 2005; Waugh 2000; Wenger and James 1994).

Moreover, some scholars have expressed concern about how local planning systems, with their current emphasis on inclusion, transparency and collaboration, will fit into the National Response Plan and the centralized federal and state Homeland Security system. They fear that the culture of command and control in such a system is inconsistent with the “bottom-up” nature

of localized planning and response, and could derail local planning efforts (Waugh 2003; Waugh and Sylves 2002). The value in a local plan is that “communities [can be] resistant to solutions imposed upon them externally” (Comfort, 1999, p. 4). Although we have noted above the efforts of federal agencies to make these response plans inclusive and flexible, scholars have also observed the limited ability of command and control systems such as the federalized Incident Command System (ICS) to address the necessary coordination activities of local communities (Buck, Trainor and Aguirre 2006).

The second issue is one of capacity to collaborate. Integrated emergency response systems take time and money; public agencies have not yet secured even for themselves the necessary inter-governmental communication and coordination systems, much less worked out how to include a broad array of private actors in these systems. Voluntary organizations may not be prepared for the scope of the disaster: relief organizations in the Gulf are still under-resourced two years after Katrina (Boris and Steuerle 2006). And public agencies may not possess the right skills to manage voluntary resources: “we are a disaster management agency, not a volunteer management agency,” said one state official faced with implementing the Citizen Corps program (Brudney and Gazley 2003, p. 520).

### **Building collaborative capacity in emergency planning and response**

Several areas of scholarship lend themselves to an understanding of emergency planning and management as a decentralized, multi-organizational and multi-sectoral endeavor.

Emergency management is a developing field that incorporates a range of disciplines and social science theories. Comfort (2002), Drabek (2004; 2006), McEntire (2004) and Waugh (2003) offer a comprehensive discussion of the field. For the purposes of this article, we focus on three

areas relevant to our research questions: network and collaborative theories, and theories of volunteer management.

Scholars recommend that emergency managers look to network theories and practices to understand the dynamics of horizontally linked institutions (Waugh 2003). They observe that network cultivation and maintenance should be a familiar activity for many emergency managers, who may already understand better than national policymakers the value in building their community response capacity locally and from the bottom up (Waugh 2003, p. 383). “Dynamic network theories” can help to describe the characteristics of the adaptive, flexible response systems that are especially germane to emergency management (Kapucu 2006, p. 206).

Comfort et al. (2004) use theories from the natural sciences to describe emergency management systems as structures that exist on the “edge of chaos”: they require both sufficient structure to engage in joint planning and information sharing, but they also depend on flexibility and adaptability (Kauffman 1993). Such a perspective suggests that hierarchies and rigid protocols can hinder disaster response in catastrophic events (Kapucu and Van Wart 2006). These conclusions beg the question as to the appropriate balance between the structure of joint emergency planning activities and their more intangible characteristics. For example, while research supports the value of training and simulations, the effectiveness of local responses would appear to depend as much on the goodwill and trust built across sectors during joint exercises as it would on the formal agreements and master plans developed in advance of disasters (Drabek 2003).

Information-sharing becomes one of the most critical functions of these networked response systems. Local jurisdictions that need to work with voluntary organizations must create “mechanisms for communication and coordination” (Waugh 2000, p. 45). Effective

communication systems create “sociotechnical systems” that support timely, accurate exchange of information among disaster response partners (Comfort, 1999, p. 5).

The emerging field of collaborative theory and behavior may also be helpful in characterizing the conditions that foster effective joint planning and preparation in advance of disasters. Both capacity considerations (e.g., resources, political support, mutuality of goals) and perceptual/attitudinal issues (e.g., shared norms, past experience, trust) can be captured in models of collaboration. As we argue in the first section of this paper, these considerations are also germane to the emergency management situation.

Studies of collaborative activity find that shared risk, shared experiences and norms, frequent interaction, and a common set of goals and expectations all characterize strong partnerships both within and without the emergency management sector (Gazley 2008a; 2008b; Kapucu 2006; Agranoff and McGuire 2002; Thomson and Perry 2006; Waugh and Streib 2006). Trust between partners is a particularly important element in informal cooperative systems. From outside the field of emergency management, the research of Alter and Hage (1993) and Thomson and Perry (2006) on how collaborative relationships build trust between partners support Kapucu’s observation that “trust is crucial in the uncertain situations caused by an extreme event” (2006, p. 209). Waugh (2000) makes other associations between trust and collaboration by observing that joint planning between local governments and community agencies can also increase citizen trust in the quality of the governmental response.

In post 9/11 interviews, disaster responders identified lack of communication (49% of respondents), lack of trust (13%) and lack of flexibility (11%) as the main barriers to a more effective response (Kapucu and Van Wart 2006). In interviews, public managers have cited local norms and past cooperative experiences as key factors in building trust across the sectors (Gazley

2008b). And Comfort (1999) describes emergency planning as an activity that works best when local communities understand their shared risk and the need for adaptive behavior across the public and private sectors. The most adaptive communities in disasters have developed joint planning and information sharing systems so that they are able to reallocate resources or priorities quickly as circumstances change. Drabek (2003) has found that emergency managers report a greater satisfaction with their response to emergency situations when the following conditions were present: they had lengthy forewarning of the event; they engaged in more interagency coordination; they participated frequently in disaster training; they participated frequently in local service organizations; and they shared a higher level of domain consensus with partners.

Altogether, these streams of research suggest the following positive associations between the characteristics of emergency planning systems and their potential outcomes:

- A link between the amount of inter-agency coordination and the perceived effectiveness of the disaster response (Drabek 2003).
- A link between the scope of community involvement in disaster planning and the level of disaster preparedness (Comfort 1999; Dynes 1998).
- A link between joint training and increased confidence in partners (Perry 2004).
- A link between the amount of information exchange and confidence in preparedness (Comfort 1999; Waugh 2000).

Our research model, described in the following section, focuses on how joint planning and preparedness activities with volunteers and voluntary organizations support a manager's confidence in partners and in a county's emergency plan.

## **Research Model**

Figure 1 presents the model guiding the analysis. We focus on the involvement of volunteers and voluntary organizations in county emergency operations and its impact on planning and preparedness for emergencies and disasters. We conceive of county emergency preparedness as a function of jurisdictional and managerial characteristics related to capacity, training, and risk level, and of the extent of joint planning activities with volunteers and nonprofit organizations. Based on our review of the relevant literature, we anticipate that controlling for these other factors, the level of volunteer and voluntary organization involvement in emergency planning and response will increase the overall preparedness of U.S. counties.

**Figure 1 here**

## **Methods and Data**

We test this hypothesis using 2006 data from the National Survey of Emergency Management in County Government. This survey was implemented by the National Association of Counties (NACo) and the Center for the Study of Counties at the University of Georgia's Carl Vinson Institute of Government. The researchers participated in survey design and data analysis with faculty from the University of Georgia, University of North Texas, and Indiana University. To our knowledge, this survey is the first to examine county-level emergency planning activities across the United States. County governments play a crucial role in implementing emergency management systems (Comfort 1985; Waugh 1994; McGuire and Silvia, 2007). The use of counties rather than cities as the unit of analysis also supports a more geographically inclusive examination of emergency management activities.

The survey was sent by postal mail to all U.S. county clerks, with a request to forward the survey to designated county emergency managers (Clarke 2006). The survey included a comprehensive set of questions about logistical preparedness, professional training, joint planning efforts and the extent to which emergency managers feel their jurisdiction is prepared for future untoward events. The role of the nonprofit is addressed through questions about volunteers and voluntary organizations in emergency planning, including the scope of joint planning, formal and informal agreements, and funding and training for nonprofit partners. Nonprofit partners identified in this survey include the American Red Cross, hospitals, faith-based organizations and other nonprofits. Altogether, the survey offers the opportunity for a rich exploration of the dimensions of joint planning between nonprofits and government partners in emergency planning.

Responses were obtained from 564 out of 3,066 U.S. counties, representing all Census divisions and 46 of the 50 states. After removing cases with substantial missing data, our sample was reduced for statistical analysis to 407 cases. This sub-sample is geographically representative when compared to U.S. regions, but slightly oversamples larger counties (see Table 1; cases have not been weighted in data analysis). These data have also been analyzed in Clarke (2006), McGuire (2008), and McGuire and Silvia (2007).

### **Table 1 here**

#### Independent Variables

Table 2 displays all variables used in the analysis with detailed operationalization. Table 3 displays descriptive statistics for the same variables. The measures of **Governmental**

**Emergency Management Capacity** include both those pertaining to the county emergency management organization and to the head of the emergency management (EM) agency. With respect to the former, the variables consist of the *Annual Budget* of the agency (transformed to a natural logarithm to account for outliers) and *Additional Duties of the Office or Department Beyond EM*. The latter is measured by the survey item, “Do employees of the EM office or department have any duties beyond emergency management?” The code 0 for “no” gives an indication of a single-minded focus on emergency management and, hence, greater agency capacity; conversely, the code 1 or “yes” signifies that other duties are assigned to the office, with a possible corresponding decrease in EM capacity.

**Table 2 here**

**Table 3 here**

The first agency head variable tapping Governmental EM Capacity, *Additional Trainings of the Emergency Manager*, counts the number of special training units completed by this official. The possible training opportunities presented in the survey consist of: Certified Emergency Manager (IAEM), Associate Emergency Manager (IAEM), State Certification, and the Federal Emergency Management Agency (FEMA) Professional Development Series. The variable ranges from 0 (no additional trainings completed) to a maximum of 4 additional training units. This variable is more specific to the Emergency Management context and more strongly related to the dependent variables used in the analysis than the emergency manager’s level of formal education. The final variable tapping governmental capacity is *Time of the Manager*

*Allocated to EM* by this official, calculated as a percentage and, again, an indicator of the focus of the county agency (and its head) on emergency management.

The model includes two measures of **Community Capacity**. *Median Household Income* is an indicator of the wealth of the county. *County Population* is likewise a measure of the resources available to the county. County size by population level has been linked to greater expenditures on emergency management budgets (Choi 2004; Drabek 2003).

The model also includes two independent variables assessing the **Emergency Risk Level** of the county. The *Social Vulnerability Index (SoVI)* was created by Cutter, Boruff and Shirley (2003) and has been tested in an emergency planning context by McGuire and Silvia (2007). The index uses a principal components analysis to create dimensions of geographic vulnerability related to socioeconomic indicators such as wealth, race and poverty, and infrastructure indicators such as quality of the housing stock. The resulting index attempts to demonstrate “where there is uneven capacity for preparedness and response” (McGuire and Silvia 2007, 19). The index has not yet been tested widely, but offers a comprehensive indicator reflecting a community’s ability to prepare for, respond to, and recover from hazards. It fits well with our model in its ability to capture indicators of community health that are also of interest to social service nonprofits and other voluntary organizations active in disaster. In this analysis, we expect to find that a higher national percentile score on the Social Vulnerability Index, indicating greater county vulnerability, will be associated positively with both volunteer/voluntary involvement in county emergency management and the overall preparedness of the county for emergencies and disasters.

We label a second measure of the county risk level *Emergency concerns*. This composite variable is developed from county emergency managers’ responses to a battery of

items in the survey which asked, “What emergencies or natural disasters are the greatest concerns for your county?” Respondents gave their answers on a scale from 1 (not at all concerned) to 7 (extremely concerned) across 24 different types of potential emergencies or natural disasters (Clarke 2006). The item is the sum of scores across the types (See Table 2).

The National Survey of Emergency Management in County Government incorporated a variety of questions to assess the involvement of volunteers and voluntary organizations in county emergency planning and management. Table 2 displays the items. *Budget for Volunteers/Voluntary Organizations* is a count of the number of areas in which the county EM budget includes funds for ongoing volunteer involvement and support (in volunteer management, volunteer training, and volunteer mobilization; range 0 to 3). *Volunteer/Voluntary Organizations included in Non-EM Operations* consists of responses to the item, “Does the EM office or department use volunteers on a regular basis to assist in routine, *non-emergency* operations?” (emphasis in original; 0=no; 1=yes).

*Volunteer/Voluntary Organization Involvement in Disaster Assistance* is a summation of the number of ways voluntary organizations participate in or are prepared to support county government-operated disaster assistance activities (i.e., provide an additional workforce for routine clerical work, specialized technical services on a fill-in basis, services to disaster victims through the agency, aid to disaster responders [food, first aid, services, etc.], or other assistance; range 0 to 5). *Volunteer/Voluntary Organization Participation in EM Planning* is a count of how voluntary organizations participate in emergency and disaster planning (i.e., invited to participate in emergency and disaster planning sessions; participate in hearings and council/commission meetings; consulted in the planning process; and provided seats or places in your county’s emergency operations center; range 0 to 4).

*Volunteer/Voluntary Organizations included in EM Plan* constitutes answers to the question, “Does the emergency operations plan incorporate the use of volunteers or voluntary organizations?” (0=no, 1= yes). Finally, *Access to Nonprofit EM Resources in Disaster Situations* is an index constructed from a battery of items that asked about equipment and supplies to which the EM office or department has quick access in the event of an emergency or disaster. The resulting variable is the sum of the types of equipment or supplies available from nonprofit organizations, including potable water supply, electric generators, antibiotic supply, hazardous materials detectors, heavy equipment, and shelter kits/tents/portable housing.

Given the number and similarity of the variables and indices tapping volunteer/voluntary organization involvement in emergency planning and management, we performed a principal components analysis to help us reduce the number of variables and interpret their underlying dimensions. The factor analysis yielded a highly interpretable two-dimensional solution (Kaiser’s criterion with Varimax rotation), which accounted for half of the variance in the six items (49.88%).

On one of the factors, the only variables with appreciable loadings were *Volunteer/Voluntary Organizations included in Non-EM Operations* and *Budget for Volunteers/Voluntary organizations in EM* (minimum loading = .727). Because the first of these items mentions specifically volunteer involvement in non-emergency situations and the other pertains to ongoing budgetary support for volunteers, again without reference to emergencies or disasters, we label the resulting dimension *volunteer/voluntary organization involvement in routine EM operations*. By contrast, the variables with the large loadings on the second factor all pertain to more active volunteer/voluntary organization involvement in emergencies and disasters: *Volunteer/Voluntary Organization Involvement in Disaster*

*Assistance, Volunteer/Voluntary Organization Participation in EM Planning, Volunteer/Voluntary Organizations included in EM Plan, and Access to Nonprofit EM Resources in Disaster Situations* (minimum loading = .512). We interpret the difference between these two dimensions of voluntary activity to be mainly one of level of activity: the first factor describes more passive, routine activities, while the second captures the more active and intentioned EM activities, some of which emerged from planning and others from the experience of disaster response. We use the two factor scores, named accordingly, in the statistical analysis of our model.

### Dependent Variable

For the dependent variable, we created a composite scale that we call *Overall Emergency Management Preparedness of the County*. A total of eight variables and indices developed from the survey responses undergird measurement of this important concept. A detailed description of each measure can be found in Table 2. These variables encompass: *Arrangements for Special Needs Populations in the County, Attention in the EM Plan to Special Populations*, the comprehensiveness of the *County EM Plans* (whether the county has: an emergency operations plan, hazard mitigation plan and evacuation plan; range 0 to 3), the presence of *County EM Alerts and Shelters*, the *Recency of the Last County Disaster Drill*, the range of *County EM Agreements and “rainy day” funds*, and *Access to EM Resources* from the agency, other governmental agencies, and private sector businesses.

The last variable considered, an index labeled *County Prepared for Emergencies*, is based on responses to the following question: “To what extent is each of the following prepared for the types of disasters that have hit your county in the past or are likely to affect the county in the

future?” The index is a summation of the perceived preparedness of major segments of the county rated on a five-point scale (very great extent, great extent, moderate extent, some extent, no extent): “The majority of people in your county; Most government departments, agencies, and offices in your county; Most private corporations and businesses in your county; Most hospitals and health care facilities in your county; The police department in your county; The fire department in your county; and Schools in your county.”

We factor-analyzed this set of eight variables and indexes to evaluate dimensionality and to create resulting scale scores from a weighted combination of the items. The factor analysis yielded a unidimensional solution (Kaiser’s criterion), accounting for slightly more than one-third of the variation among the items (33.64%). The dependent variable used in the analysis, *Overall Emergency Management Preparedness*, consists of the factor scores derived from this procedure. Factor analysis weights each variable in the scale in proportion to the magnitude of its correlation with the underlying factor or dimension.

In our analysis we seek to explain variation across counties in the *Overall Emergency Management Preparedness* scale. In particular, we are interested in how *Volunteer/Voluntary Organization Involvement in EM*, both on a routine basis and in disasters and emergencies, affects overall county EM preparedness, controlling for our measures of governmental EM capacity, community capacity, and emergency risk level (see Figure 1). To that analysis we now turn.

## Findings

### Correlation Analysis

Table 4 presents the correlations of the *Governmental EM Capacity*, *Community Capacity*, and *Emergency Risk Level* variables with the factor scores measuring *Volunteer Involvement in Emergency Management* (routinely, and in disasters and emergencies) and *Overall Emergency Preparedness*. All figures are reported as Pearson correlation coefficients using a two-tailed test of statistical significance. We first examine the relationship of the explanatory variables to *Volunteer Involvement in Emergency Management*. Larger county EM offices and departments by budget size ( $r = .119, p < .05$ ), and those that are focused exclusively on EM (i.e., whose employees do not have additional duties beyond EM;  $r = -.116, p < .05$ ) are more likely to involve volunteers in emergency management on a routine basis. These departments are more likely to be headed by an EM official who has completed additional training ( $r = .121, p < .05$ ). In addition, they tend to be located in counties with higher median household incomes ( $r = .153, p < .01$ ); research by the Corporation for National and Community Service (2007) shows that cities with lower poverty tend to have higher rates of volunteering (data for counties not available). Because a reported 98% of county governments use volunteers (Brudney, 1999), we did not expect to find a strong correlation between routine volunteer involvement and the measures of the county risk level, the SoVI vulnerability score and concerns about emergencies. By contrast, we would expect those counties with a more hazardous risk environment to enlist volunteers more often to assist them in emergency and disaster situations.

A somewhat different pattern of relationships emerges for volunteer involvement in emergencies and disasters. The level of emergency concerns of the county emergency manager is related to this type of volunteer involvement ( $r = .228, p < .01$ ), albeit the SoVI measure is not.

Volunteer involvement in this domain could depend on the training and work behavior of the chief emergency manager. Emergency managers who have completed more professional trainings ( $r = .156, p < .01$ ), and who allocate a larger percentage of their time on the job to emergency management ( $r = .161, p < .01$ ), appear to be more likely to involve volunteers in emergencies and disasters. As was the case with the routine involvement of volunteers, wealthier counties as measured by the median household income are also likely to involve volunteers in emergencies and disasters ( $r = .169, p < .01$ ). Although we find statistically significant bivariate associations throughout this level of analysis, the correlations are relatively weak.

**Table 4 here**

The correlations in Table 4 show preliminary support for all of our hypotheses concerning the key dependent variable, *Overall Emergency Preparedness of a County*. With respect to *Governmental EM Capacity*, as expected, those county EM offices and departments that have larger budgets ( $r = .121, p < .05$ ) and that focus exclusively on EM ( $r = -.150, p < .01$ ) tend to score higher on overall preparedness. To the degree that the head of this EM unit has completed additional trainings ( $r = .193, p < .01$ ), irrespective of formal educational attainment, and allocates a greater percentage of her or his time on the job to EM duties ( $r = .165, p < .01$ ), overall preparedness likewise increases. Both measures of *Community Capacity* are related to the criterion as well: Larger ( $r = .191, p < .01$ ) and wealthier ( $r = .166, p < .01$ ) counties generally score higher on overall preparedness. Finally, and predictably, the variables pertaining to the emergency risk level of the county are associated positively with county EM preparedness.

Counties situated in more vulnerable settings, as measured by the SoVI national percentile ranking ( $r = .133$ ,  $p < .05$ ) and the manager's perceived emergency concerns ( $r = .241$ ,  $p < .01$ ), demonstrate higher levels of overall emergency preparedness.

### Regression Analysis

The guiding question of our analysis is whether the involvement of volunteers and voluntary organizations in emergency management contributes to the overall preparedness of the county for disasters and emergencies, taking into account the effects of other relevant explanatory variables. Because the findings in Table 4 demonstrate that voluntary involvement in EM, both routinely and in disasters and emergencies, is related to a number of other important explanatory variables, we next control for them in multivariate analysis. Accordingly, Table 5 presents the results of a multiple regression analysis (OLS) of overall county emergency preparedness. As shown in Figure 1, the explanatory variables consist of the indicators of government EM Capacity, Community Capacity, Emergency Risk Level, and—our major focus—Volunteer/Voluntary Organization Involvement in EM.

### **Table 5 here**

The regression analysis bears out our central hypothesis: Controlling for the effects of the other explanatory variables, as county EM offices and departments involve volunteers routinely ( $b = .170$ ,  $p < .001$ ) and in emergencies and disasters ( $b = .325$ ,  $p < .000$ ) they are more likely to have higher levels of overall EM preparedness. The risk level of the counties is also related to preparedness. As scores increase on the emergency concerns scale ( $b = .005$ ,  $p < .042$ )

and on the SoVI index ( $b = .007, p < .001$ ), counties appear to have responded with a higher level of overall emergency preparedness. In addition, larger ( $b = .00000015, p < .075$ ) and wealthier ( $b = .0000111, p < .075$ ) counties tend to demonstrate higher overall EM preparedness. By contrast, among the measures of Government EM Capacity, only the additional training completed by the chief emergency manager ( $b = .131, p < .018$ ) is related to this criterion. In all, the regression model attains statistical significance ( $F=11.071, p < .0001$ ) and accounts for about one-quarter of the variation in overall county emergency management preparedness (adjusted  $R^2=.258$ ).<sup>2</sup>

Although the model leaves much more to be explained and explored in further research, it offers support for our guiding proposition that a dense network of volunteers and voluntary organizations can help county emergency management offices not only in disaster response, as the literature shows, but also in planning and preparation. The latter function is equally, if not more important to the overall state of county emergency preparedness, yet it has received far less research attention. The present analysis shows that by planning for and involving volunteers/voluntary organizations on a routine basis, for example, through provisions in the EM budget and in ongoing, non-emergency operations, counties stand to improve their emergency management preparedness. Moreover, as counties utilize volunteers/voluntary organizations in preparing for possible emergencies and disasters, for example, by including them in their planning activities and making arrangements with them to provide resources should disaster or emergencies occur, their overall level of EM preparedness increases.

## Summary and Implications

This article presents an analysis of data from the first National Survey of Emergency Management in County Government, using a large dataset and a rich set of variables related to emergency planning. Our analysis tests the influence on emergency planning and preparedness of characteristics of local government related to risk level and emergency planning capacities, and joint emergency planning with volunteers and voluntary organizations. We find predicted associations between most of our variables of interest, and conclude that county emergency preparedness is a function of a set of related jurisdictional characteristics associated with governmental capacity, risk level, and also volunteer/voluntary organization involvement in emergency planning. Our study suggests that both structural characteristics such as county size, wealth, and EM budget, and informal features including planning for disaster and emergency response with and through a network of local volunteers and voluntary organizations, contribute to overall county EM preparedness. The findings suggest that by budgeting for the involvement of volunteers and making them part of routine operations, county EM offices and departments elevate their level of emergency preparedness. Such routine involvement may lead to the development of trust and collaboration with volunteers that may facilitate their inclusion in EM planning and response. Including volunteers in this manner, in turn, also raises the overall level of emergency preparedness of the county.

We note two limitations to this study. The survey instrument included four categories of nonprofit organization: the Red Cross, faith-based organizations, hospitals, and other nonprofits. Our review of the literature elaborated the foundations and advantages of more comprehensive listings and analyses of voluntary efforts. Secondly, emergency planning happens at both vertical and horizontal levels (Waugh 2000). In this article, we are interested in the horizontal,

cross-sectoral and local dimensions of emergency planning, but we note that these efforts occur in a system that depends for some funding and statutory authority on vertical, inter-governmental levels of authority. Further understanding of county emergency preparedness must take into account capacity considerations that depend on both dimensions.

Despite these qualifications, our study contributes to theory development in collaborative emergency management in several ways. We have illustrated the value in modeling successful emergency management network relations as a function of positive joint experiences, collaborative capacity, and perceived need. We offer a prospective rather than retrospective look at collaborative emergency planning that is lacking from much of the literature -- although we caution that the actual experiences of responders following disasters may vary. Finally, for the practitioner, we offer useful information for communities interested in planning more effectively before emergencies and disasters strike. Emergency managers will benefit by understanding from their peers which resources and activities contribute most directly to emergency preparedness. Voluntary organizations active in disaster planning can benefit from the opportunity to understand the extent of current collaborative efforts, their role in emergency response as anticipated by public managers, and the perceived barriers to broadening joint activity.

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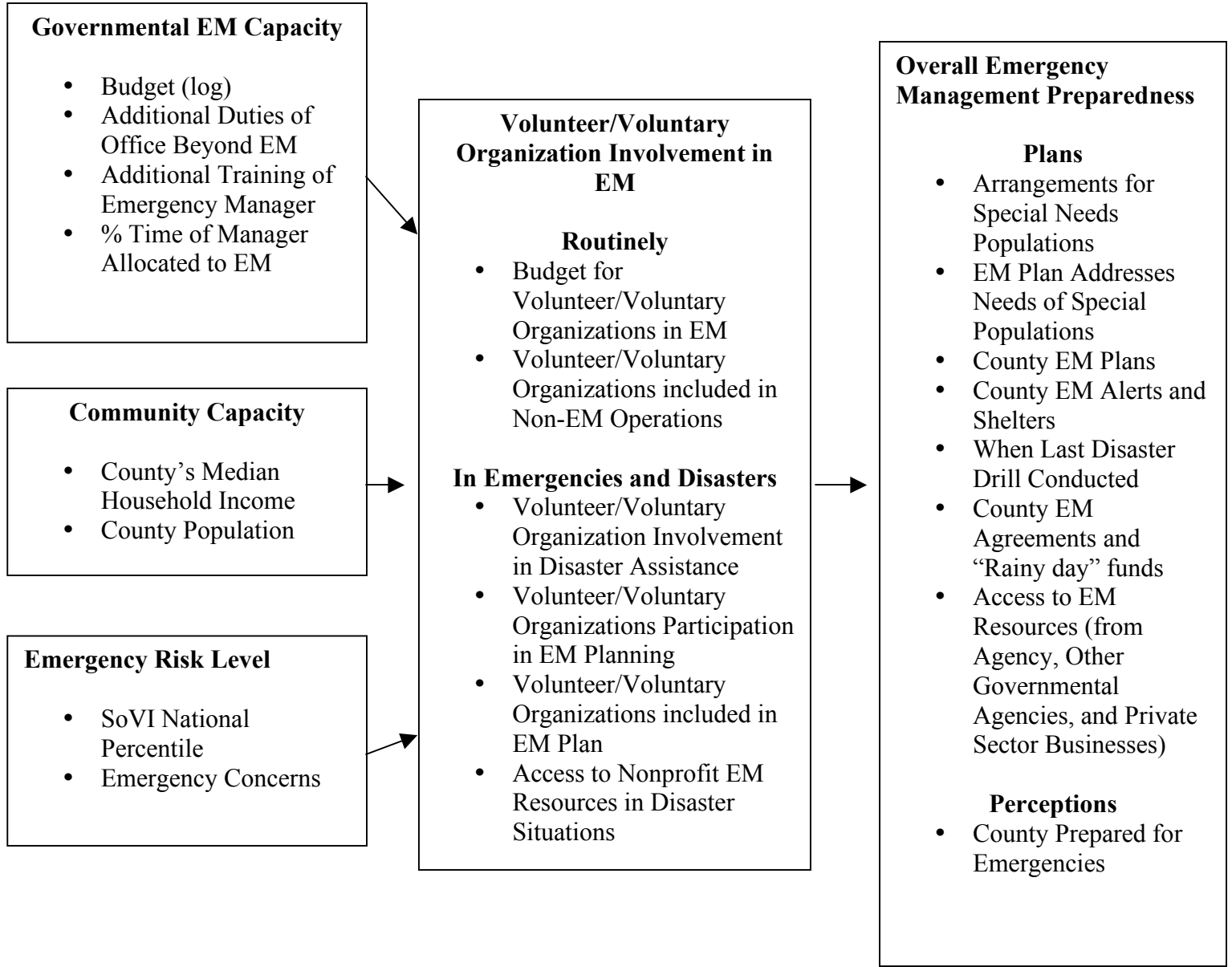
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Figure 1. Model of Overall County Emergency Preparedness



**Table 1. Comparison of Sample Counties with U.S. Counties\***

<u>Classification</u>	<u>Percent of Population</u>	
	<u>All U.S. Counties</u>	<u>Responding Counties</u>
<i>Population Group</i>		
Over 500,000	3 %	6 %
250,000-499,999	4	8
100,000-249,999	9	16
50,000-99,999	13	15
25,000-49,999	21	19
10,000-24,999	29	20
Under 10,000	22	16
<i>Census Region</i>		
Northeast	6 %	9 %
Midwest	35	35
South	45	40
West	14	16

\*Source: McGuire and Silvia (2007).

Table 2. Variables Used in the Analysis

Independent Variables	Description
<b><i>Governmental EM Capacity</i></b>	
Budget (log)	Natural log of budget variable which asked respondents “What is the dollar amount of the budget for the EM office or department in the current fiscal year?”
Additional Duties of Office Beyond EM	Duties that the EM office or department carries out beyond EM. Question asked respondents to respond yes or no to the following: “Do employees of the EM office or department have any duties beyond emergency management?”
Additional Training of Emergency Manager	Number and types of additional training for agency head. Question asked respondents to check any additional training from the following: Certified Emergency Manager (IAEM), Associate Emergency Manager (IAEM), State Certification, and FEMA Professional Development Series.
% Time of Manager Allocated to EM	Percent of time agency head devotes to EM. Respondents were asked “What percentage of the chief emergency management official’s time is spent on emergency management?”
<b><i>Community Capacity</i></b>	
County’s Median Household Income	Median Household income from 1999.
County Population	Total population from 2000.
<b><i>Emergency Risk Level</i></b>	
SoVI National Percentile	Social Vulnerability Index (SoVI) National Percentile. A higher percentile represents greater vulnerability to hazards.
Emergency Manager’s Perception of County Risk Level	Compute of what emergencies or natural disasters are the greatest concerns for county using Sum function. Question asked respondents: “What emergencies or natural disasters are the greatest concerns for your county? Please rate each category on a scale from 1 (not at all concerned) to 7 (extremely concerned): hurricanes, earthquakes, volcanic eruptions, floods, winter/ice storms,

	tornados/severe winds, lightning, fires, hazardous materials spills (transportation), hazardous materials threat (fixed site), hail, civil disturbance, terrorist attack (nuclear), terrorist attack (biological), terrorist attack (chemical), landslide, subsidence, tsunamis, drought, heat waves, computer/tech failure, air transportation, land, and sea.
<b>Volunteer/Voluntary Organization Involvement in EM</b>	
<i>Routinely</i>	
Budget for Volunteer/Voluntary Organizations in EM	Count of EM budget question “Does the EM budget include funds for the following areas?” Respondents either selected “yes” or “no” for three separate variables: volunteer management, volunteer training, and volunteer mobilization.
Volunteer/Voluntary Organizations included in Non-EM Operations	Respondents were asked “Does the EM office or department use volunteers on a regular basis to assist in routine, <b>non-emergency</b> operations?” and were given the choice to answer either “yes” or “no.”
<i>In Emergencies and Disasters</i>	
Volunteer/Voluntary Organization Involvement in Disaster Assistance	Count of ways voluntary organizations participate in county government operated disaster assistance activities. Respondents were asked “In which of the following ways do voluntary organizations participate in county government operated disaster assistance activities? Check all that apply.” The items listed were: Provide an additional workforce for routine clerical work?, Provide specialized technical services on a fill-in basis?, Provide services to disaster victims through your agency[?], Provide aid to disaster responders (food, first aid, services, etc.)?, and Provide other assistance?
Volunteer/Voluntary Organizations Participation in EM Planning	Count of how voluntary organizations participate in emergency and disaster planning. Respondents were asked “How do voluntary organizations participate in emergency and disaster planning? Check all that apply.” The items listed were: Invited to

	participate in emergency and disaster planning sessions, Participate in hearings and council/commission meetings, Consulted in the planning process, and Provided seats or places in your county's emergency operations center.
Volunteer/Voluntary Organizations included in EM Plan	Respondents were asked "Does emergency operations plan incorporate the use of volunteers or voluntary organizations?" and were given the choice to answer either "yes" or "no."
Access to Nonprofit EM Resources in Disaster Situations	Count of EM's quick access to non-profit's resources in emergency or disaster situations. Respondents were asked "What equipment and supplies does the EM office or department have quick access to in the event of an emergency or disaster? Quick access means that the resources have been identified and that the owner has agreed to make them available. For each resource, please identify its origin. Check all that apply." Equipment and resources listed were potable water supply, electric generators, antibiotic supply, hazardous materials detectors, heavy equipment (subcategories: cranes, bulldozers, and Earth movers), shelter kits/tents/portable housing.
<b>Dependent Variable: Emergency Preparedness</b>	
<i>Plans</i>	
Arrangements for Special Needs Populations	Respondents were asked to select either "yes" or "no" to the question, "Does your county have arrangements for sheltering its special needs populations during a disaster?"
EM Plan Addresses Needs of Special Populations	Count of EM plan addressing the needs of special populations. Respondents were asked "Does your disaster response plan address the needs of these special populations? Check all that apply." Special populations listed were: nursing homes, hospitals, prisoners, schools, minorities, indigent, non-English speaking, sex offenders, homeless, and transportation needy.
County EM Plans	Count of entity's emergency management

	plans. Respondents were asked “Does your entity have the following emergency management plans? Check all that apply.” Items listed were: emergency operations plan, hazard mitigation plan, and evacuation plan.
County EM Alerts and Shelters	Count of county’s EM alerts and shelters. Respondents were asked to respond yes or no to the each of the following three questions: “Does your county have a county-wide emergency alert system employing radio and television stations in your county?”, “Does your county maintain and operate public warning devices such as sirens, horns, or public address systems?”, and “Does your county have public shelters for evacuees from disasters?”
When Last Disaster Drill Conducted	Respondents were asked “When was the last time your county conducted a county-wide disaster preparation drill?” Answer options were: more than 2 years ago, 1-2 years ago, 6-12 months ago, and within the last 6 months.
County EM Agreements and “Rainy day” funds	Count of county’s EM related items. Respondents were asked “Does your county have any of the following items? Check all that apply.” Items listed were: Mutual aid agreements with other jurisdictions to handle emergency and disaster situations, Memoranda of understanding with other governments on matters relating to emergency and disaster situations, “Rainy day” funds to pay for emergencies and disasters, Multi-organizational disaster plans within the county, and Multi-organizational disaster plans that involve other counties.
Access to EM Resources (from Agency, Other Governmental Agencies, and Private Sector Businesses)	Summation of counts of office or department access to EM resources through agency, other government agencies, and private sector businesses. Respondents were asked “What equipment and supplies does the EM office or department have quick access to in the event of an emergency or disaster [from Agency, Other Governmental Agencies, and Private Sector Businesses]? Quick access means that the resources have been identified and that the owner has agreed to make them available. For each resource, please identify its origin.

	Check all that apply.” Equipment and resources listed were potable water supply, electric generators, antibiotic supply, hazardous materials detectors, heavy equipment (subcategories: cranes, bulldozers, and Earth movers), shelter kits/tents/portable housing.
<i>Perceptions</i>	
County Prepared for Emergencies	Compute of extent prepared for disasters in county past and future. Respondents were asked “To what extent is each of the following prepared for the types of disasters that have hit your county in the past or are likely to affect the county in the future?” The preparedness of the following segments was rated by the respondent on a scale of very great extent, great extent, moderate extent, some extent, no extent: “The majority of people in your county, Most government departments, agencies, and offices in your county, Most private corporations and businesses in your county, Most hospitals and health care facilities in your county, The police department in your county, The fire department in your county, and Schools in your county.”

**Table 3. Descriptive Statistics for Variables Used in the Analysis**

<b>Variable</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Standard Deviation</b>
<b><i>Governmental EM Capacity</i></b>					
Budget (log)	362	0	11.51	9.672	2.273
Additional Duties of Office Beyond EM	369	0	1	.57	.496
Additional Training of Emergency Manager	408	0	4	1.16	.969
% Time of Manager Allocated to EM	381	1.0	100.0	68.04	32.464
<b><i>Community Capacity</i></b>					
County's Median Household Income	407	\$16,646.00	\$80,648.00	\$38,511.07	9,737.62
Population	407	67.00	9,519,338	162,866.77	558,087.329
<b><i>Emergency Risk Level</i></b>					
SoVI National Percentile	407	.1	99.2	48.105	27.480
Emergency Concerns	365	0	149	91.07	24.643
<b><i>Volunteer/Voluntary Organization Involvement in EM</i></b>					
F1: Voluntary Involvement/Participation in EM Assistance and Planning	356	-3.54755	4.11297	0	1.0
F2: Voluntary Involvement on Regular Basis	356	-2.50513	1.94022	0	1.0
<b><i>Overall EM Preparedness</i></b>					
F3: Overall EM Preparedness	327	-2.88536	2.12881	0	1.0
<b>Valid N (listwise)</b>	291				

**Table 4. Correlations of Governmental Capacity, Community Capacity, and Emergency Risk Level Variables with Volunteer Involvement and Overall Emergency Preparedness**

		<b>Volunteer Involvement/Participation in EM Assistance and Planning (factor score)</b>	<b>Volunteer Involvement on Regular Basis (factor score)</b>	<b>Overall EM Preparedness (factor score)</b>
<b><i>Governmental EM Capacity</i></b>				
Budget (log)	Pearson Correlation	.106	.119*	.121*
	(N)	(337)	(337)	(309)
Additional Duties of Office Beyond EM	Pearson Correlation	-.105	-.116*	-.150**
	(N)	(339)	(339)	(314)
Additional Training of Emergency Manager	Pearson Correlation	.156 **	.121*	.193**
	(N)	(356)	(356)	(327)
% Time of Manager Allocated to EM	Pearson Correlation	.161**	.094	.165**
	(N)	(352)	(352)	(323)
<b><i>Community Capacity</i></b>				
County's Median Household Income	Pearson Correlation	.169**	.153**	.166**
	(N)	(355)	(355)	(326)
Population	Pearson Correlation	.084	.007	.191**
	(N)	(355)	(355)	(326)
<b><i>Emergency Risk Level</i></b>				
SoVI National Percentile	Pearson Correlation	-.057	.005	.133*
	(N)	(355)	(355)	(326)
Emergency Concerns	Pearson Correlation	.228**	.088	.241**
	(N)	(349)	(349)	(326)

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Table 5. Regression Analysis of Overall Emergency Preparedness with Explanatory Variables Governmental Capacity, Community Capacity, Emergency Risk Level Environment, and Volunteer Involvement**

<b>Explanatory Variable</b>	<b>B</b>	<b>Std. Error</b>	<b>t</b>	<b>Sig.</b>
Constant	-1.678	.436	-3.848	.000
<b><i>Governmental EM Capacity</i></b>				
Budget (log)	.022	.025	.890	.374
Additional Duties of Office Beyond EM	-.068	.116	-.583	.560
Additional Training of Emergency Manager	.131	.055	2.382	.018
% Time of Manager Allocated to EM	.000	.002	.062	.951
<b><i>Community Capacity</i></b>				
County's Median Household Income	.0000111	.000	1.786	.075
Population	.00000015	.000	1.787	.075
<b><i>Risk Level</i></b>				
SoVI National Percentile	.007	.002	3.345	.001
Emergency Concerns	.005	.003	2.038	.042
<b><i>Volunteer Involvement</i></b>				
F1: Volunteer Involvement/Participation in EM Assistance and Planning	.325	.055	5.948	.000
F2: Volunteer Involvement on Regular Basis	.170	.053	3.210	.001

R=.532; R<sup>2</sup>=.283; adjusted R<sup>2</sup>=.258; F=11.071 (p<.0001)  
N=291

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<sup>1</sup> For example, beyond food, shelter and medical care, 80% of agencies surveyed provided some sort of logistics management, 92% provided case management, 87% referred evacuees to other services and 61% provided transportation (Homeland Security Institute, 2006).

<sup>2</sup> As might be expected, *Additional Duties of Office Beyond EM* and *% Time of Manager Allocated to EM* are moderately intercorrelated,  $r = -.425$ . Given the multicollinearity, we re-estimated the regression equation presented in Table 4, first deleting *Additional Duties of Office Beyond EM*, and then deleting *% Time of Manager Allocated to EM*. The two additional regression equations produced nearly identical results. Neither of the variables in question attains statistical significance, and the pattern of statistically significant (and insignificant) coefficients does not change. The  $R^2$  statistics pertaining to explained variation are nearly identical.