AN OVERVIEW OF A DEMOGRAPHIC STUDY OF UNITED STATES EMERGENCY MANAGERS

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RESPONSE TO WEATHER WARNINGS. The National Weather Service (NWS) is responsible for issuing public warnings for all hazardous weather events across the United States. Advances in technology and basic scientific research over the years have allowed for significant improvements in this assignment. But while the NWS continues to focus much of its strategic planning toward improved warnings, most of those associated with the process are aware that there are a number of steps beyond increased accuracy to make their warnings effective. These include assuring that the target audience hears their message, understands it, believes it, and responds to it properly. One useful means of addressing these issues involves working directly with community response organizations, whose job it is to direct and allocate emergency services during catastrophic events.

Often, the primary responsibility for identifying risks and managing vulnerabilities within a community is entrusted to a local emergency manager. With an emergency management system in place, disaster response can be more coordinated, flexible, and professional. However, one crucial factor in effectively managing emergencies is collaboration with organizational partners, and breakdowns in collaboration can adversely impact outcomes. In recent weather-related incidents, communications between the NWS and emergency managers have become confused. For example, in the case of the 2008 Windsor, Colorado, tornado, NWS forecasters tried to convey the urgency of a developing situation, while emergency managers awaited confirmation that a damaging event was actually underway. In that situation, it appears that emergency managers didn't entirely understand how strongly forecasters felt about the potential threat, and NWS forecasters didn't understand why emergency managers were not implementing emergency response immediately.

The premise of the present study is that NWS forecasters can benefit from knowing more about their emergency management counterparts, including a general overview of the nature of that community, along with characteristics that might influence collaboration. To this end, a nationwide survey was conducted to learn more about the diversity of individual emergency managers and of the communities they serve.

THE SURVEY AND ITS RESULTS. More than 3,500 invitations were e-mailed, yielding 1,062 (30.3%) completed responses from across the country. Most of the 35 questions comprising the survey were presented in a Likert-scale format. A few required more complex answers.[1] There were five categories of questions addressing such topics as personal demographics, education and experience, salary and agency funding, community settings, emergency situations, and response to a hypothetical tornado situation.

Means, standard deviations, and Pearson correlation coefficients were calculated for basic demographics and are presented in Table 1a.[2] There were numerous correlations. An overview of results for the various categories follows.

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[1] A pdf version of the survey questions can be found online at DOI:10.1175/BAMS-D-12-00183.2.

[2] Table 1a—correlations between 16 of the variables collected in this study—can be found online in a document called, "Tables for Demographics Study," at DOI:10.1175/BAMS-D-12-00183.3.

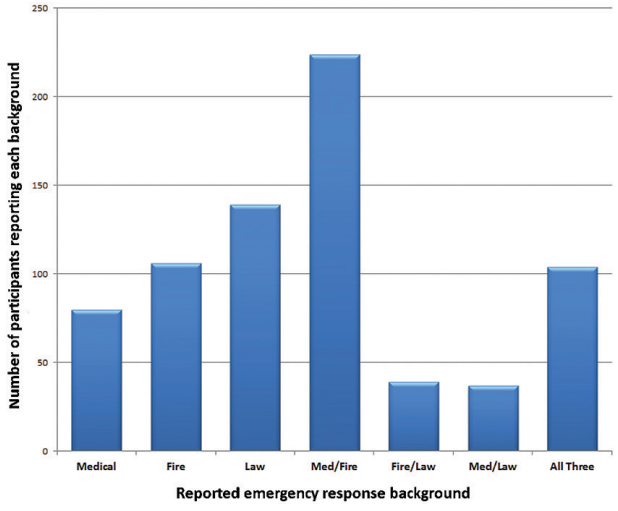

Fig. 1. Bar chart showing type of emergency response background for the 729 respondents who reported having emergency responder training. See text for detailed explanation.

Personal demographics. Out of the 1,058 respondents to the demographic questions, 80.8% were male and 94% listed their race as Caucasian. Female emergency managers were, on average, 10 years younger than their male counterparts. Participants' ages ranged from less than 26 years old to greater than 55, but 72% of those responding were older than 45. Though females represented about 19% of the entire population, there were 26% within the group that were younger than 46 years old, suggesting a trend toward increasing gender diversity in this community.

Multivariate analyses of variance (MANOVAs)[3] were used to test cross-sectional differences between all variables. Results indicate significant differences between age groups when comparing salaries with education, years worked in the response field, years worked as an emergency manager, and first-responder training. Not surprisingly, older participants had worked longer in both the response field and in an emergency management position. They also appear to have spent more time in the emergency response field prior to becoming emergency managers than their younger counterparts. This may be a result of the growing role of higher education in training emergency managers.

There are a number of regional and state differences within the personal demographics data that were not explored in this article.[4] As an example, the highest percentage of female emergency managers are in the West within the younger grouping, while the South has the least, overall (see Table 3).[5]

Education and experience. Most emergency managers (77.9%) are college-educated. Table 4 lists the 10 most common degrees for different educational levels.[6] Among the undergraduate degrees, 34.6% are related to emergency response, medical, or criminal justice, while the majority of the master's degrees or Ph.D.'s tend toward administration. There were few majors in the physical sciences, though the survey asked no questions concerning elective courses within majors. MANOVA analyses indicate emergency managers who have pursued higher education are younger ($f = 9.55$, $p < 0.001$), earn more money ($f = 46.92$, $p < 0.001$), service larger populations ($f = 25.24$, $p < 0.001$), and work in more urban and suburban settings ($f = 19.10$, $p < 0.001$). Participants reporting lower levels of college education have significantly more first responder training as EMTs ($f = 8.44$, $p < 0.001$), firefighters ($f = 20.17$, $p < 0.001$), or in law enforcement ($f = 7.65$, $p < 0.001$). Overall, 68.6% of emergency managers have emergency responder training (Fig. 1).

While only 37% of participants report having been an emergency manager for more than 10 years, 48% worked in the response field for multiple years before becoming an emergency manager. Of the 52% who had not worked in the response field prior to becoming an emergency manager, 63% had formal emergency response training. Finally, 71% have attended at least one emergency responder training course per year (see next section, "Community settings").

Community settings. When participants were asked to identify the type of community they serve, 46.7% reported a rural setting, 16.6% suburban, 14.1% mostly urban, and 22.6% mixed. Participants servicing urban

[3] MANOVA provides an F-statistic for each dependent variable that defines significant differences across the groups. Table 2—MANOVA results—can be found in the online "Tables for Demographics Study" document.

[4] More data, charts, and graphs are available for exploration online in a document called, "Some EM Demographics Excel Results," at DOI:10.1175/BAMS-D-12-00183.4, and at www.cira.colostate.edu/projects/socialscience/ssproject.php?id=2.

[5] Table 3—regional comparisons of gender versus age—can be found in the online "Tables for Demographics Study" document.

[6] Table 4—10 most frequent degrees—can be found in the online "Tables for Demographics Study" document.

and suburban communities work with larger populations ($f = 219.43$, $p < 0.001$), are more likely to be college educated than their rural counterparts ($f = 52.73$, $p < 0.001$), are generally younger ($f = 5.65$, $p < 0.05$), and report significantly higher salaries ($f = 231.58$, $p < 0.01$). Lower budgets are skewed toward community settings with lower population density (Fig. 2).

Rural participants report more time in the response field and more time as emergency managers ($f = 15.91$, $p < 0.001$; $f = 5.45$, $p < 0.05$, respectively). More rural participants report training in law enforcement ($f = 5.54$, $p < 0.05$). On the other hand, in answer to the question, "About how often do you attend response training courses or workshops?" most emergency managers seem to attend about the same number of courses per year (Fig. 3).

Salary and agency funding. Participants' incomes are normally distributed across the categorical salary ranges. However, significant differences were found between genders, levels of education, community settings, and certain age groups. Many of these results are expected. Participants having a higher education report higher wages than those who did not ($f = 46.92$, $p < 0.001$; see Fig. 4), those who work in suburban or urban communities report higher wages than those in rural areas ($f = 231.58$, $p < 0.001$), and males report earning higher wages than females ($f = 25.88$, $p < 0.001$). MANOVA statistics indicate differences in salaries exist between age groups ($f = 6.20$, $p < 0.001$). Independent samples t tests find that participants in the 46–55 group earn significantly higher salaries than both the 26–35 cohort and those older than 55.

Most emergency managers (54.7%) report less than $100,000 annual agency funding (Fig. 2), and 26.7% report having no full-time employees, including themselves (i.e., emergency management is only a part-time position). There are more rural emergency managers in the latter category (34.4%, as opposed to an average of 22.3% for urban/suburban). A number of these describe themselves as either a county sheriff or a fire chief.

Emergency situations. The data suggest that participants' anticipated emergencies differ somewhat from the types of emergencies they have actually faced over the previous decade. When expectations are categorized by weather-related versus nonweather-related disasters, the overall expectation was for 63.2% to involve weather. However, in a later section of the survey, 78% of disasters that had actually taken place were reported to have been weather-related. In fact,

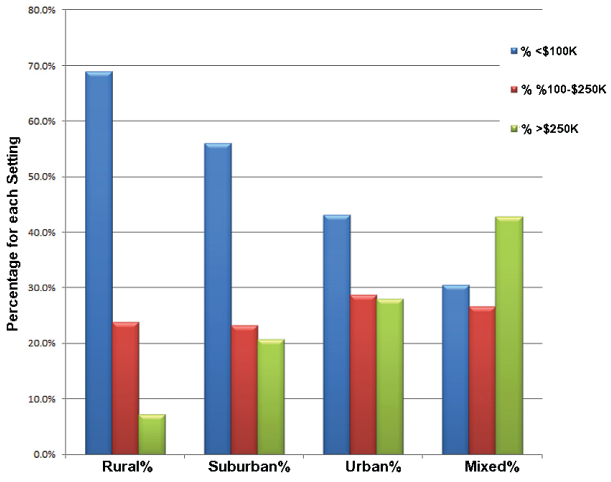

Fig. 2. Ranges of yearly budgets (%) for each category of community setting. For example, nearly 70% of rural emergency managers have less than a $100K yearly budget.

every weather category was underanticipated (when compared with recent history), while most other categories (e.g., terrorism) were overanticipated (Fig. 5). Responses to the question, "If you have attended training courses over the past five years, what was the topic/focus (check all that apply)?" show that, while weather-related events represented 78.3% of actual occurrences and 63.2% of expected events, weather-related topics represent only 31.4% of train-

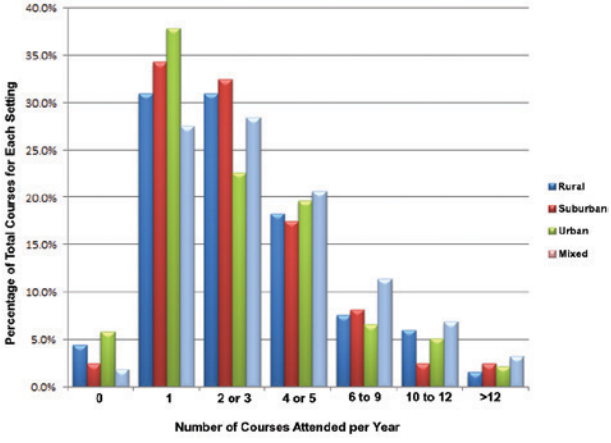

Fig. 3. Graph showing the number of courses/workshops attended vs the percentage of emergency managers attending per each community setting (different colored bars). Data show that most emergency managers attend about 1–3 training courses or workshops per year. Note that the distribution of number of courses attended is similar from setting to setting.

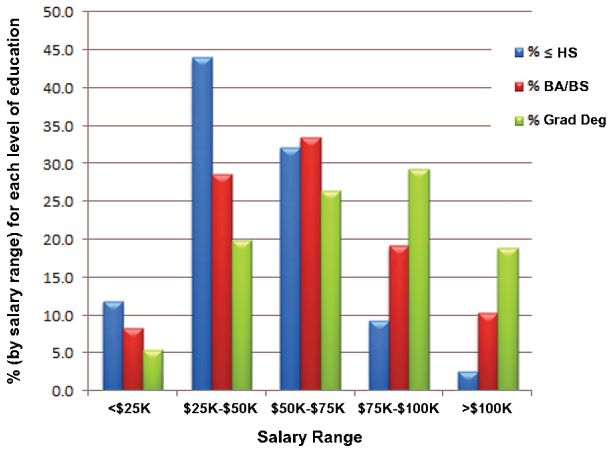

Fig. 4. Percentage of emergency managers in each salary category by education level. Data are presented such that each education level (bar colors) totals to 100% across the various salaries. Note the skewness drift: lower education levels (blue) skewed toward lower salaries, undergraduate degrees (red) are normally distributed across the various ranges, graduate-level degrees (green) are skewed toward higher salaries.

ing courses attended. That said, managers attended courses for no other given subject more often. Mass transport disasters represented 3.5% of actual occurrence, 8.6% of expectation, and 13.6% of training. Terrorism represented only 1.9% of reported actual occurrences, 6.7% of expectation, and a full 25.4% of training courses attended over the past 5 years.

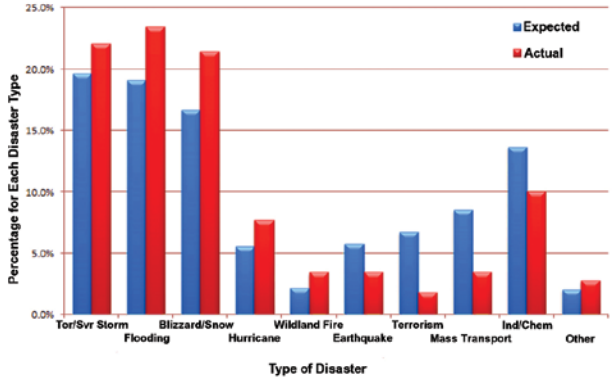

Fig. 5. Chart showing the number of disaster types anticipated by emergency managers for various categories (blue) vs disasters that were reported to have actually occurred during the prior 10 years (red). Results are expressed as a percentage. Note that occurrences outnumber expectations in weather-related categories. (Note: "Ind/Chem" stands for industrial or hazardous chemical incidents.)

Response to a hypothetical situation. The last section posed a hypothetical, rapidly evolving weather situation in three steps: (a) a tornado is inferred by Doppler radar about 15 miles away and is approaching the respondent's area at 25 mph; (b) the tornado is 12 miles away and confirmed by law enforcement officers; and (c) the tornado is 8 miles away, still headed in the respondent's direction and looking fairly ominous on live-television broadcasts. Through this series of questions we wanted to learn at what stage the respondent would activate a full emergency response.[7] In earlier parts of the survey, participants had been reminded of response components (e.g., warnings to schools, businesses, informing local first responders). This set of three questions was meant to look at participants' reticence in gearing up the response system without actual damage occurring in the respondent's community. Of the 883 managers who completed this section, 30.3% said they would activate their entire system with a Doppler-confirmed tornado a little over 30 minutes away. Receiving confirmation from law enforcement brought the statistic up to 57.0%, and when the tornado was roughly 20 minutes away and actually shown on television, the number jumped to 77.8%. The most frequent reason that the remaining 22.2% gave (in a block provided for verbal clarification) for not activating full response was that they would not fully engage until damage had actually occurred in their area (53 such specific answers). This reticence may have to do with survey results that clearly show a large majority of emergency managers to be focused by education, training, and experience to be responders.

CONCLUDING REMARKS. Results from this study provide a general overview of the emergency management community that may help forecasters understand their collaborative partners a little better. In many ways, the emergency management community is a diverse group (e.g., members serve communities of differing sizes, salaries vary considerably). At the same time, the survey found a large number of homogeneities (e.g., the vast majority of emergency managers are white males, older than 45). The survey finds that the vast majority of emergency managers are, first and foremost, responders. This finding is in sharp contrast to NWS forecasters, who spend the majority of their time studying and working within

[7] The definition of "full activation" was intentionally left ambiguous.

the physical sciences and concentrate more on the predictive aspects of developing weather situations. This is important because the survey also shows that 78% of all disasters faced nationwide over the past 10 years have been weather-related. These two communities must work together frequently. Differences in education, training, and focus may be something for both NWS forecasters and emergency managers to consider during both training and actual events, in order to avoid serious misunderstandings at critical times.

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