

SUPPLEMENTAL LITERATURE REVIEW, September 2012

ERG researched and compiled recent peer-reviewed literature and white papers with a focus on risk perception and communication related to storm surge. As there are the limited numbers of published studies specific to this topic, we broadened our search to include recent papers on flooding and hurricanes. To leverage the recent media coverage of tropical storm Isaac, we explored news clips, articles, and visuals that were employed to warn vulnerable populations of potential risks from storm surge with Hurricane Isaac. The first section of this summary includes short reviews of the more relevant studies for the storm surge marketing work. Media clips relevant to Isaac are included in Section II. Additional resources are included in the last section.

I. Storm Surge and Risk Perception/Communication Studies

The research studies described below reveal a good deal of complexity among people's perspectives, attitudes, behaviors, and decisions about disaster risk-related issues. Knowledge about risk is important, but people's feelings, emotions, and values gained through experience, including the experiences of their social networks, have a major effect on their decisions. People also tend to get information from multiple sources to evaluate their risk and make protective decisions. The public is not a homogeneous entity. Therefore, it is not sufficient to simply provide the same message to all individuals at risk because they will perceive this information differently and will subsequently respond in different ways. It is instead important to use community-based participatory approaches when designing and disseminating risk communication for at-risk populations and to offer messages in multiple modes that are locally and personally relevant. The research also emphasizes how important it is for there to be private-public collaboration in communicating hurricane risk information to the public. Collaboration can ensure all parties understand each other's needs and constraints. This partnership is also important given that people access weather information from many sources, both private and public.

Risk Awareness, Perceptions, and Disaster Preparedness/Response

Donahue, A. Disaster risk perception, preferences, and preparedness. (2012). University of Connecticut, Department of Public Policy, West Hartford, Connecticut. <http://dpp.uconn.edu/PDFs/Risk-Perceptions-and-Preparedness-Volume-3.pdf>

This report describes the results of a survey of U.S. residents about their perceptions of risk and their disaster preparedness. The report represents the first phase of a multi-year research project to characterize perceptions of disaster risk held by individual household decision-makers and local government decision-makers in various U.S. regions. Relevant key findings from this study include:

- Most people nationwide are most concerned about protecting their families and their health and physical safety, as compared to other concerns such as possessions, friends, pets, and jobs.
- People generally feel that they are able to "bounce back" when bad things happen to them.
- Of people who have taken actions to prepare, most people say they have done so because they've been through a disaster before, they have people they need to take care of, or they think being ready is worth the time and effort.
- Of the respondents who said they had done nothing to prepare for a natural disaster, coastal respondents are more likely than non-coastal residents to attribute this to procrastination or not wanting to think about a disaster, while non-coastal residents are more likely to think a disaster won't happen to them and that preparing isn't worth the cost.
- A majority of people nationwide said they are very likely to take action to prepare their household for disaster if there were a law that required them to prepare.

- Coastal residents are much more concerned about natural disasters than non-coastal residents. Level of concern with respect to other kinds of disasters is comparable.
- Coastal residents are more likely than non-coastal residents to think that the things people do to prepare make it easier for them to recover, and feel more prepared and more informed about what to do during a disaster than non-coastal residents.
- When a disaster occurs, non-coastal residents are more likely to follow directions from federal, state, and local officials than are coastal residents.
- Coastal residents appear more likely to respond to government initiatives designed to improve preparedness than non-coastal residents.

Kellens, W., T. Terpstra, and P. De Maeyer. (2012). Perception and communication of flood risks: a systematic review of empirical research. *Risk Analysis*, 33:1.

http://geoweb.ugent.be/docs/cartogis/people/kellens/phd_kellens.pdf

In recent years, perception of flood risks has become an important topic to policy makers concerned with risk management and safety issues. Knowledge of the public risk perception is considered a crucial aspect in modern flood risk management as it steers the development of effective and efficient flood mitigation strategies. This study presented an overview of the state of the art in the research on perception and communication of flood risks, including 57 studies from 22 different countries. This compilation of research suggests that risk perception has only recently been recognized an important aspect in flood risk management. Nevertheless, research in flood risk perception is emerging rapidly, demonstrating the need to consider the public's concerns, viewpoints and preferences. Inextricably bound up with the growing interest for risk perception is the increased attention for audience-based risk communication and public involvement in the decision-process. The compilation of research suggests it is now widely acknowledged that risk communication can strengthen people's risk awareness and motivate those at risk to take preventive actions and be prepared for an emergency case. It is further accepted that the knowledge of the public's risk perception is an important factor in building effective risk communication strategies. However, only a few studies define recommendations for flood risk communication. Moreover, most of these recommendations are indefinite, and the focus or objective of the risk message often differs from situation to situation. The review cites one study that emphasized the need to elaborate educational programs on flash flood risks. These programs could be accomplished through training sessions, presentations at public functions, informational fliers, etc., which focus on understanding the flood causes and possible consequences, increasing awareness of warning sources, and informing the public about available tools and data. Another study made the case that communication should focus on individual preparedness rather than generally raising awareness and understanding.

Matyas, C., et al. (2013). Risk perception and evacuation decisions of Florida tourists under hurricane threats: a stated preference analysis. *Natural Hazards*, 66(1), pp 97-116.

Though most hurricane evacuation studies have focused on residents, tourists are also a vulnerable population. To assess their perceptions of risk and evacuation likelihood under different hurricane conditions, this study surveyed 448 tourists visiting central Florida. Respondents viewed four maps emulating track forecast cones produced by the National Hurricane Center and text information featuring variations of storm intensity, coast of landfall, centerline position relative to the survey site, time until landfall, and event duration. Highly-rated scenarios featured a Category 4 hurricane making landfall along the Gulf Coast with the centerline passing over the sampling site. Overall, tourists that indicated the highest risk and evacuation ratings were not previously affected by a hurricane, had a trip duration of less than 6 days, and had checked for the possibility of a hurricane strike before departure. However, results for other tourist attributes differed between tourists in coastal and inland locations. Although somewhat knowledgeable about hurricanes, tourists misinterpreted the track forecast cone and hurricane conditions, which led to a lower perception of risk and subsequent likelihood to evacuate. The study concluded that tourists, particularly those from outside of Florida, need to be better educated about the risks they face from hurricanes that make landfall.

Morrow, B. (2009). Risk behavior and risk communication: synthesis and expert interviews. SocResearch Miami. Final report for the National Oceanic and Atmospheric Administration, Coastal Services Center, Charleston, SC. http://www.csc.noaa.gov/digitalcoast/_pdf/risk-behavior-communication-report.pdf. When responding to coastal risks, it is not sufficient to know which risk-averse actions are most effective. Public will is required. Decision-makers at all levels need to understand the issues, including the risks, and to become motivated toward risk minimizing action. The first phase of this research project focused on developing a synthesis of existing social science research on risk behavior, risk communication, and resilience-related outreach and education. The research indicated that knowledge about risk is important, but people's "experiential system" also comes into play. The feelings, emotions, and values people gain through experience, including the experiences of their social networks, have a major effect on their decisions. This second part of the research involved interviews with people active in the risk analysis and communication arena to gather hands-on examples of effective ways to promote behavior that reduces the risk to lives and property. This research indicated that the crux of risk communication is understanding how risk is perceived, and then knowing what it takes for people to be concerned enough to take mitigating action.

Scolobig, A., B. De Marchi, and M. Borga. (2012). The missing link between flood risk awareness and preparedness: findings from case studies in an Alpine Region. *Natural hazards*, 1:22. <http://www.springerlink.com/index/20371817r4v4351h.pdf>.

This paper focused on 400 residents in four communities exposed to flood risk in the Eastern Italian Alps. The study examined their overall risk awareness, as well as the correlation between the residents' risk awareness and their level of preparedness. The study revealed great complexity among residents' perspectives, attitudes, behaviors, and decisions about risk-related issues. There was a clear discrepancy between the actual adoption of household preparatory measures and the willingness to take self-protection actions. Overall, the risk awareness was significantly higher among those residents who had been personally affected by a flood in the past, were living in isolated (vs. urban) communities, in the most risky areas or had a lower level of trust in local authorities. The improvement of residents' knowledge about their environment and the residual risk seemed to be crucial to increase risk awareness, but the link between risk awareness and preparedness was not at all straightforward.

Stein, R. M., L. Dueñas-Osorio, D. Subramanian, (2010). Who evacuates when hurricanes approach? The role of risk, information, and location. *Social Science Quarterly*, 91(3), pp 816-834.

This article describes how evacuation decisions are influenced by a heterogeneous set of parameters, including perceived risk from wind, influence of media and neighbors, and awareness of evacuation zones. The study suggests that perceived risk and its influence on evacuation behavior is a local phenomenon more readily communicated by and among individuals who share the same geography, as is the case with residents living inside and outside official risk areas. Who evacuates and why is partially dependent on where one lives because perceptions of risk are not uniformly shared across the area threatened by an approaching hurricane. In addition, the same sources and content of information do not have the same effect on evacuation behavior. Hence, efforts to persuade residential populations about risk and when, where, and how to evacuate or shelter in place should originate in the neighborhood rather than emanating from blanket statements from the media or public officials. Link to related presentation (PDF):

http://www.nationalevacuationconference.org/files/presentations/day2/Stein_Robert.pdf

Stewart, A. E. (2011). Gulf coast residents underestimate hurricane destructive potential. *Weather, Climate, and Society*, 3(2), pp 116–127. Retrieved from <http://journals.ametsoc.org/doi/pdf/10.1175/2011WCAS1077.1>

Most people do not realize that hurricane destructiveness increases nonlinearly with increases in storm intensity. This research presents the results of three studies to examine people's perceptions of hurricane destructive potential and their likelihood of evacuation:

- One study asked 349 undergraduate students to provide damage ratings of hurricanes in each Saffir–Simpson category. A majority (84 percent) of students produced only linearly increasing damage profiles by hurricanes.
- In the second study, a simple random sample of 402 Gulf Coast residents who participated in a telephone survey when a tropical storm was affecting the East Coast revealed that a majority (77 percent) thought hurricane damages increased linearly with hurricane category and hence underestimated the damage major hurricanes could produce.
- In the third study, a random sample of 396 Gulf Coast residents participated in an experiment over the telephone during an active phase of the 2008 hurricane season. One-half of the sample received information about the nonlinearly increasing damage potential of hurricanes; the other half received the Saffir–Simpson hurricane scale category alone. The group in which hurricane damages were framed nonlinearly reported significantly greater self-reported likelihood of evacuation than residents who received the Saffir–Simpson hurricane category information.

Studies 1 and 2 suggest that the public needs to learn more about the nonlinear relationship between hurricane intensity and the corresponding damages that may result. Study 3 suggests that framing possible storm damages in the nonlinearly increasing multiples of damages produced relative to a minimal hurricane may increase compliance with evacuation orders.

Communicating Hurricane Risk Information

Demuth, J.L., R.E. Morss, B. Morrow, and J.K. Lazo. (2012). Creation and communication of hurricane risk information. American Meteorological Society. *Bull. Amer. Meteor. Soc.*, 93, pp 1133–1145.

doi: <http://dx.doi.org/10.1175/BAMS-D-11-00150.1>

To understand and improve hurricane risk communication, this article examined how National Weather Service (NWS) forecasters at the National Hurricane Center and local weather forecast offices, local emergency managers, and local television and radio media create and convey hurricane risk information. Data from in-depth interviews and observational sessions with members of these groups from Greater Miami were analyzed to examine their roles, goals, and interactions, and to identify strengths and challenges in how they communicate with each other and with the public. Together, these groups succeed in partnering with each other to make information about approaching hurricane threats widely available. Findings included:

- NWS forecasters sometimes find that the information they provide is not used as they intended.
- Media personnel want streamlined information from NWS and emergency managers that emphasizes the timing of hazards and the recommended response and protective actions.
- Emergency managers need forecast uncertainty information that can help them plan for different scenarios.

The article recommends that warning system partners 1) build understanding of each other's needs and constraints; 2) ensure formalized, yet flexible mechanisms exist for exchanging critical information; 3) improve hurricane risk communication by integrating social science knowledge to design and test messages with intended audiences; and 4) evaluate, test, and improve the NWS hurricane-related product suite in collaboration with social scientists. URL link to related presentation (PowerPoint):

http://www.ucar.edu/educ_outreach/ulw/Demuth%20--%20Social%20science,%20societal%20impacts%20and%20weather%206-13-12.pptx

Lazo, J.K., R. Morss, and J.L. Demuth. (2009). 300 billion served: sources, perceptions, uses, and values of weather forecasts. American Meteorological Society. *Bull. Amer. Meteor. Soc.*, 90(6), pp 785–798. Retrieved from http://radiometrics.siteoperations.com/wp-content/uploads/2012/11/lazo_bams09.pdf.

Individuals vary in their attitudes and behaviors regarding weather forecast information. To deepen knowledge about these variations, this research explored 1) patterns in people's sources, perceptions, uses, and values everyday weather forecasts. Of the 1,520 individuals surveyed, 1,465 (96 percent) said they used weather

forecasts. Of those 1,465, 87.1 percent reported getting a forecast at least once a day on average, while 9.2 percent reported doing so once a day or less on average. The study found that weather forecasts are a daily part of the lives of the vast majority of the U.S. public. Members of the public obtain 300 billion or more forecasts each year with a total estimated value of \$31.5 billion per year. Except perhaps for current news events, there is probably no other type of information that is obtained on such a routine basis. The study also showed that people obtain weather forecasts from a variety of sources, but that the vast majority of people obtain forecasts from media sources instead of directly from NWS Web pages or NOAA Weather Radio. The most common source for forecast information is local television stations, with individuals obtaining forecasts 33.7 times per month on average. Cable television and radio are the next most popular sources. Web pages and newspapers were less common sources overall, but both are a daily or more frequent source of forecasts for 27 percent of respondents. Most private sector weather forecasts are either directly or indirectly based on NWS data or forecasts. Moreover, the distinction between the public and private sector components of the weather enterprise probably is not very salient to most members of the public. This suggests that it does not make sense to think of the NWS and the private sector as competing interests. Instead, given that the public and private sectors work in tandem to create and disseminate the forecasts that people obtain from the multiple available sources, the weather enterprise should be developed as a collaborative effort. The survey found that as of late 2006, only a minority of respondents were obtaining weather forecasts from cell phones, PDAs, and other portable electronic devices, but that with new technologies and services developing more content for such devices, location-specific and time-sensitive weather forecasts have growing potential to provide significant societal benefits. It is important to understand and potentially anticipate these changes. The study also revealed people's curiosity about the weather, with 85 percent of respondents saying that more than half the time they obtain forecasts simply to know what the weather will be like. Many people use forecasts for planning specific activities, such as vacations, and routine daily activities, such as deciding what to wear and how to get to work or school. The peak periods for accessing forecasts are the early morning, early evening, and late evening.

Lazrus, H., Morrow, B. H., Morss, R. E., & Lazo, J. K. (2012). Vulnerability beyond stereotypes: context and agency in hurricane risk communication. *Weather, Climate, and Society*, 4, pp 103-109. Retrieved from <http://journals.ametsoc.org/doi/abs/10.1175/WCAS-D-12-00015.1>

Risk communication may accentuate or alleviate the vulnerability of people who have particular difficulties responding to the threat of hazards such as hurricanes. The process of risk communication involves how hazard information is received, understood, and responded to by individuals and groups. Thus, risk communication and vulnerability interact through peoples' knowledge, attitudes, and practices. This study explores risk communication with several groups that may be at particular risk of hurricane impacts: older adults, newer residents, and persons with disabilities. Focus groups conducted in Miami, Florida, examined how members of these groups express their own vulnerability or agency in terms of receiving, interpreting, and responding to hurricane risk information. Findings indicate that people's interactions with risk information are deeply contextual and are facilitated by their individual agency to cope with their vulnerabilities.

Lee, K. L., Meyer, R. J., & Bradlow, E. T. (2009). Analyzing risk response dynamics on the web: the case of Hurricane Katrina. *Risk Analysis*, 29(12), pp 1779-1792. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2009.01304.x/full>.

This study documented the hourly web-surfing behavior of over 140,000 Internet users in five southeastern states in August 2005. A general finding is weather-site web traffic generally tracked the timing and scale of the storm threat experienced by a given area. There was, however, considerable variation in this responsiveness. Residents in Florida counties that had been most directly affected by Hurricane Dennis just a month earlier, for example, displayed more active visitation rates than those who had been less affected. The study also found that male users displayed a disproportionately larger rate of visitation to weather sites given the onset of storm warnings than females.

Meredith, L., et al. (2008). Analysis of risk communication strategies and approaches with at-risk populations to enhance emergency preparedness, response, and recovery. RAND Health for the U.S. Department of Health and Human Services, Office of Disability, Aging and Long-Term Care Policy. Link to full report: http://www.rand.org/pubs/working_papers/WR598.html

Communication is a critical component of helping individuals prepare for, respond to, and recover from emergencies. However, there is limited knowledge about how to best communicate with at-risk populations in emergencies. This study sought to understand the communication needs and to identify strategies with potential for improving risk communication with at-risk populations. Findings from the evaluation suggest that the field, defined by the intersection of public health emergency risk communication and at-risk populations, is relatively new. Only a small proportion of the literature in this domain addresses at-risk populations within the context of public health risk communication; most is descriptive in nature, suggesting a need for more rigorous evaluations of risk communication strategies that target at-risk populations. Findings also suggest that using community-based participatory approaches to designing and disseminating risk communication for at-risk populations, and offering messages in multiple modes that are locally and personally relevant, would have many benefits for strengthen emergency preparedness, response, and recovery for at-risk populations, but are currently underutilized. In addition, training through exercises and drills that include risk communication for at-risk populations may improve response to future disasters.

Morss, R.E. and M.H. Hayden. (2010). Storm surge and “certain death”: interviews with Texas coastal residents following Hurricane Ike. *Weather, Climate, and Society*, 2(3), pp 174–189. Retrieved from <http://journals.ametsoc.org/doi/abs/10.1175/2010WCAS1041.1>.

Hurricane Ike made landfall near Galveston, Texas, on 13 September 2008 as a large category 2 storm that generated significant storm surge and flooding. This article presents findings from an empirical case study of Texas coastal residents’ perceptions of hurricane risk, protective decision making, and opinions of hurricane forecasts related to Hurricane Ike. The results are based on data from interviews with 49 residents affected by Hurricane Ike, conducted approximately five weeks after landfall. While most interviewees were aware that Ike was potentially dangerous, many were surprised by how much coastal flooding the hurricane caused and the resulting damage. For many—even long-time residents—Ike was a learning experience. As the hurricane approached, interviewees and their households made complex, evolving preparation and evacuation decisions. Although evacuation orders were an important consideration for some interviewees, many obtained information about Ike frequently from multiple sources to evaluate their own risk and make protective decisions. Given the storm surge and damage Ike caused, a number of interviewees believed that Ike’s classification on the Saffir–Simpson scale did not adequately communicate the risk Ike posed. The “certain death” statement issued by the NWS helped convince several interviewees to evacuate. However, others had strong negative opinions of the statement that may negatively influence their interpretation of and response to future warnings.

II. Communication during Hurricane/Tropical Storm Isaac: Media Coverage

In September 2012, ERG reviewed several media articles and blogs posted during or just after Hurricane/Tropical Storm Isaac focusing on NWS/NHC storm surge communication. This press showed that even though the storm surge forecast was accurate, many people underestimated the storm surge risk. One reason given for this underestimation was that the storm was a low category on the Saffir–Simpson scale, and people tended to correlate low rankings on the scale to low risk. A number of articles focused on the need for better storm surge forecast visuals, as well as the problems with all-text advisories, which can be difficult to read and also bury the storm surge forecast. Several articles described the social science efforts underway by NWS/NHC toward improving forecast communication. In addition, the Weather Channel published a series of interactive maps after the storm showing all the wind, storm surge, flood, heavy rain, and tornado reports submitted by NWS during Isaac. The maps allow a user to zoom in on the map and click on the icons to see the time, location, and

more information on each report (<http://www.weather.com/news/weather-hurricanes/isaac-storm-reports-20120828>).

- <https://www2.ucar.edu/atmosnews/opinion/7834/hurricane-storm-surge-category-its-own>
- http://www.miamiherald.com/2012/09/15/3004734_p3/rethinking-hurricane-ratings-post.html
- <http://articles.latimes.com/2012/aug/27/nation/la-na-nn-storm-surge-questions-20120827>
- http://www.nola.com/hurricane/index.ssf/2012/09/surge_warnings_went_out_before.html
- http://www.scilogsg.com/from_the_lab_bench/hurricane-isaac-and-the-big-storm-surge/
- <http://www.wittassociates.com/news/archive/in-the-news/2012/09/10/in-isaac-the-surge-trumped-the-wind-a-guest-column-by-james-lee-witt/>
- <http://www.wunderground.com/blog/bnorcross/comment.html?entrynum=12>
- <http://news.blogs.cnn.com/2012/08/27/isaac-looking-stronger-but-still-a-tropical-storm/>
- http://www.nytimes.com/2012/08/31/us/concerns-arise-over-defining-storms-by-category.html?_r=0

III. Additional Resources

- Bird, D., & Dominey-Howes, D. (2008). Testing the use of a “questionnaire survey instrument” to investigate public perceptions of tsunami hazard and risk in Sydney, Australia. *Natural Hazards*, 45(1), 99–122. Retrieved from <http://www.springerlink.com/index/VL2V8413001W21L4.pdf>
- Bjarnadottir, S., Li, Y., & Stewart, M. G. (2011). Social vulnerability index for coastal communities at risk to hurricane hazard and a changing climate. *Natural hazards*, 59(2), 1055–1075. Retrieved from <http://www.springerlink.com/index/7478634771763404.pdf>
- Brommer, D. M., & Senkbeil, J. C. (2010). Pre-landfall evacuee perception of the meteorological hazards associated with Hurricane Gustav. *Natural hazards*, 55(2), 353–369. Retrieved from <http://www.springerlink.com/index/9256476828J34727.pdf>
- Brown, J. L. (2010). Texas coastal communities ponder storm surge barrier. *Civil Engineering*, 80(8), 34-+. Retrieved from http://apps.webofknowledge.com/full_record.do?product=WOS&search_mode=GeneralSearch&qid=1&SID=4E7E1iGACi4LMM46b1e&page=28&doc=277
- Chang, C. H. (2011). Preparedness and storm hazards in a global warming world: lessons from Southeast Asia. *Natural hazards*, 56(3), 667–679. Retrieved from <http://www.springerlink.com/index/W2P683564371338H.pdf>
- Cutter, S. L., Emrich, C. T., Bowser, G., Angelo, D., & Mitchell, J. T. (2011). 2011 South Carolina hurricane evacuation behavioral study, final report. Retrieved from <https://hazdoc.colorado.edu/handle/10590/309>
- Czajkowski, J. (2011). Is it time to go yet? Understanding household hurricane evacuation decisions from a dynamic perspective. *Natural Hazards Review*, 12(2), 72–84. Retrieved from [http://ascelibrary.org/doi/abs/10.1061/\(ASCE\)NH.1527-6996.0000037](http://ascelibrary.org/doi/abs/10.1061/(ASCE)NH.1527-6996.0000037)
- Czajkowski, J., Simmons, K., & Sutter, D. (2011). An analysis of coastal and inland fatalities in landfalling U.S. hurricanes. *Natural hazards*, 59(3), 1513–1531. Retrieved from <http://www.springerlink.com/index/XN1671H242137051.pdf>
- Deeming, H. (2008). Increasing resilience to storm surge flooding: risks, social networks and local champions. *Flood Risk Management: Research and Practice: Extended Abstracts Volume (332 pages)+ full paper CD-ROM*, 165. Retrieved from <http://books.google.com/books?hl=en&lr=&id=7loZ0X2uCuMC&oi=fnd&pg=PA165&dq=storm+surge&ots=SnIT8M7kbO&sig=mQUcYuRgUGKnszr1vOs2Gqz-xxE>
- Dillon, R. L., Tinsley, C. H., & Cronin, M. (2011). Why near-miss events can decrease an individual’s protective response to hurricanes. *Risk Analysis*, 31(3), 440–449. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2010.01506.x/full>
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- Emrich, C. T., & Cutter, S. L. (2011). Social vulnerability to climate-sensitive hazards in the southern United States. *Weather, Climate, and Society*, 3(3), 193–208. Retrieved from <http://journals.ametsoc.org/doi/abs/10.1175/2011WCAS1092.1>
- Harvatt, J., Petts, J., & Chilvers, J. (2011). Understanding householder responses to natural hazards: flooding and sea-level rise comparisons. *Journal of Risk Research*, 14(1), 63–83. Retrieved from <http://www.tandfonline.com/doi/abs/10.1080/13669877.2010.503935>
- Highfield, W. E., Norman, S. A., & Brody, S. D. (2012). Examining the 100-year floodplain as a metric of risk, loss, and household adjustment. *Risk Analysis*. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2012.01840.x/full>
- Hoffman, R. N., Dailey, P., Hopsch, S., Ponte, R. M., Quinn, K., Hill, E. M., & Zachry, B. (2010). An estimate of increases in storm surge risk to property from sea level rise in the first half of the twenty-first century. *Weather, Climate, and Society*, 2(4), 271–293. Retrieved from <http://journals.ametsoc.org/doi/abs/10.1175/2010WCAS1050.1>
- Horney, J. A., MacDonald, P. D. M., Van Willigen, M., Berke, P. R., & Kaufman, J. S. (2010). Individual actual or perceived property flood risk: did it predict evacuation from Hurricane Isabel in North Carolina, 2003? *Risk Analysis*, 30(3), 501–511. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2009.01341.x/full>
- Jonkman, S. N., Maaskant, B., Boyd, E., & Levitan, M. L. (2009). Loss of life caused by the flooding of New Orleans after Hurricane Katrina: analysis of the relationship between flood characteristics and mortality. *Risk Analysis*, 29(5), 676–698. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2008.01190.x/full>
- Kusenbach, M., Simms, J. L., & Tobin, G. A. (2010). Disaster vulnerability and evacuation readiness: coastal mobile home residents in Florida. *Natural hazards*, 52(1), 79–95. Retrieved from <http://www.springerlink.com/index/b182756447gm5468.pdf>
- Lindell, M. K., Kang, J. E., & Prater, C. S. (2011). The logistics of household hurricane evacuation. *Natural hazards*, 58(3), 1093–1109. Retrieved from <http://www.springerlink.com/index/8N75QM7222666N54.pdf>
- Marchand, J. (2009). Levees, Urbanization and Public Perception: Implications for Southeast Louisiana Wetlands. Retrieved from <http://scholarworks.uno.edu/td/983/>
- Melton, G., Gall, M., Mitchell, J. T., & Cutter, S. L. (2010). Hurricane Katrina storm surge delineation: implications for future storm surge forecasts and warnings. *Natural hazards*, 54(2), 519–536.
- Savelli, S., & Joslyn, S. (2012). Boater safety: Communicating weather forecast information to high-stakes end users. *Weather, Climate, and Society*, 4(1), 7–19. Retrieved from <http://journals.ametsoc.org/doi/abs/10.1175/WCAS-D-11-00025.1>
- Schiller, A. R. (2011). The impact of a storm surge on business establishments in the Houston MSA. *Natural Hazards*, 56(1), 331–346. Retrieved from <http://www.springerlink.com/index/v4504t026415h574.pdf>
- Stein, R. M. (2011). How risk perceptions influence evacuations from hurricanes. Retrieved from <http://www.bakerinstitute.org/publications/POL-pub-SteinHurricaneRiskPerception-080311.pdf>
- Zane, D. F., Bayleyegn, T. M., Hellsten, J., Beal, R., Beasley, C., Haywood, T., Wiltz-Beckham, D., et al. (2011). Tracking deaths related to Hurricane Ike, Texas, 2008. *Disaster Medicine and Public Health Preparedness*, 5(1), 23–28. Retrieved from http://apps.who.int/knowledge/full_record.do?product=WOS&search_mode=GeneralSearch&qid=1&SID=4E7E1iGACi4LMM46b1e&page=18&doc=179
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