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WELCOME FROM THE CO-PRESIDENTS

Welcome to this edition of HazNet.

Ernie MacGillivray - CRHNet Co-president - and I extend to each of you our Board's greetings and well wishes. We at CRHNet are again delighted to offer you free of charge our latest "newsletter," which thanks to its editorial staff and contributors has grown to become a major tome.

CRHNet exists to promote dialogue, increase awareness, and advance collaboration towards disaster risk reduction in Canada. Our association's continued growth is a reflection of the increasing importance of this area of practice or research, within *all* facets of life regardless of sector (i.e., public, private, NGO, or voluntary). It also reflects the recognition by a growing number of stakeholders of both the need and value of informed collaboration, which requires shared awareness.

This newsletter is a reflection of our continued effort to advance knowledge and promote the necessary linkages within a growing body of stakeholders. It supports our evolving E-book – the Canadian Disaster Management text (on our website), which aims to be a growing repository of knowledge. This book complements the recently-published book "**Disaster Risk and Vulnerability: Mitigation through Mobilizing Communities and Partnerships**" that reflects our first symposium.

As a "permanent member" of the Canadian Platform on Disaster Risk Reduction (DRR), CRHNet is actively involved in the Platform activities through its deliberations, committee work, and annual Roundtable activities. We are proud of our collaboration at that level and have continued our effort to connect with other associations or agencies that contribute to this field. On that note, we welcome you and *all* others who wish to belong to or collaborate with CRHNet, to advance Canada's resilience to disaster.

CRHNet will soon deliver its 9th annual symposia, which is expected to again broaden its coverage of topics as well as stakeholder involvement. This symposium is once again linked with the national Roundtable on DRR and will allow participants to attend both. We invite you to both events; learn more about them at ***www.CRHNet.ca***.

Our website is now undergoing a major review. The revisions we are expecting should facilitate better access to available knowledge, greater opportunity for virtual "dialogue", and the incorporation of available web or social media tools to bring stakeholders closer together. Your suggestions and feedback are always welcome.

An old Chinese proverb states: "may you live in interesting times." We are there! The field of disaster risk reduction, including emergency management and business continuity, is evolving both significantly and quickly; this is a reality in Canada as elsewhere. We are seeing some related organizations emerge and others fade out. While CRHNet is proud of its continued contributions, it well recognizes that its success is based on the increasing involvement of a growing and diverse

group of partners. To each of them we say "Thank you! We are strong and capable because we stand together"

Ron Kuban and **Ernie MacGillivray**,
CRHNet Co-Presidents

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NOTE FROM EXECUTIVE DIRECTOR

Greetings and a warm welcome to current and new members of the Canadian Risk and Hazards Network to the 7th edition of *HazNet*.

This newsletter provides an overview of events and research that is underway in, and outside, of Canada and is our attempt to keep you, our audience, aware and up to date on issues of importance. It is a reflection of the efforts of the many who are like-minded and who wish to enhance disaster risk reduction and build a robust and resilient community.

To say it has been busy since the last edition of HazNet is an understatement. The planning for the 9th CRHNet Symposium, scheduled for Vancouver, on the October 24-26, 2012, at the Sutton Place Hotel, has been consuming much of my time as well as the time of others on the Symposium Committees. The Executive Committee, headed by our Honorary Co- Chairs Becky Denlinger (Fire and Emergency Management Commissioner, Emergency Management British Columbia) and Jack McGee, the President of the Justice Institute of British Columbia and ably directed by Bert Struik, from Natural Resources Canada, and assisted by yours truly, has been hard at work for the past 16 months putting together a dynamic and outstanding symposium.

Our program committee headed by Laurie Pearce, JIBC and Stephanie Chang, UBC, has attracted over 100 abstracts on a wide variety of issues based on the symposium theme "Life Line Connections and Gateways for Resilience." Please check out our web site **www.crhnet.ca/annual symposium** to view the program and register for the 9th Symposium.

I hasten to say that CRHNet members receive a sizable discount on symposium registration. Therefore, if you are not yet a member, don't delay, please join and save your money and support the Network! Membership can be obtained on line by visiting **crhnet.ca/membership**

Whilst speaking of the symposium, it reminds me to announce that the 10th CRHNet Symposium is scheduled for 2013, and will be held in Regina Saskatchewan. More information will be available at the 9th Symposium and as more details unfold check in with our web site

Canada's National Platform for Disaster Risk Reduction has been held in conjunction with the symposium for the past two years will once again be featured and hosted by Public Safety Canada. They will be holding their 3rd annual event on Tuesday the 23rd of October 2012, at the Sutton Place Hotel in downtown Vancouver. Registration for the Platform is free and can be found on the CRHNet web site under annual symposium/registration. Please read the article by **Public Safety Canada** on page 31 of this edition of HazNet.

In addition, the Senior Officials Responsible for Emergency management (SOREM) will hold their annual meeting on the Mon. 22 Oct 2012 at the Sutton Place Hotel.

As part of CRHNet's mandate to promote and increase the network, once again I went to Ottawa to attend the CRTI summer symposium to ensure that the "CRHNet Banner" is front and centre, and to promote the upcoming 9th CRHNet Symposium. I was pleased that Board member Valerie Cere was able to join me.

I attended in July the Natural Hazards Workshop in Broomfield, Colorado (formerly held in Boulder Colorado). Over the years, CRHNet has formed a strong bond with our American counterpart who is, and continues to be, very supportive of CRHNet. The Natural Hazards Workshop compliments our efforts in many ways and supports our efforts toward disaster risk reduction. Many of the articles in this edition were solicited during my attendance at the workshop; the thrust of my efforts to give HazNet an international flavor.

I also attended the National Hazard Mitigation Association (NHMA) Practitioners' Workshop (which followed the Hazards Workshop) and I have joined the NHMA International Advisory Committee which is very focused on mitigation and risk reduction measures in regards to natural hazards.

Many folks, in particular students, have said that CRHNet was somewhat of a mystery to them. So I am especially pleased to say that the network has now established the "Committee of Young Professionals" and students will be showcased at the 9th symposium in Vancouver this October. Also, I believe CRHNet has now begun to resonate within Canada with our governments, local officials and many business leaders. In no small way, this is due to the efforts of the Board of Directors and the co-presidents Ron Kuban and Ernie MacGillivray.

I know I have said this before but it is worth repeating; **Membership**, **Membership!** –The more the merrier they say. There is a continuing need to increase our membership to support CRHNet's initiatives, one that requires all of us to urge our colleagues to join CRHNet. Although we have done well, more students are needed and while we have made strides in reaching out to some critical corporate members, more needs to be done. Now that folks can join on-line it is easy - just a few clicks and Voila! You're a member.

I was also very proud to hear that long-time Board member, Marion Boon, was awarded the Emergency Management Award by the World Disaster Management Conference in June 2012. Marion is the Coordinator for the Emergency Management Program, at the Northern Alberta Institute of Technology. Congratulations Marion!

Don't miss out on this year's great symposium! Come on down and join us in Vancouver, a memorable city, a city you'll never forget!

Larry Pearce
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September 2012

CRHNET would like to take this opportunity to wish **Jack McGee**, the current President and CEO of the Justice Institute of British Columbia, all the best in his upcoming retirement! Jack is one of the Co-Chairs for this year's symposium and has been a strong supporter of CRHNet..

What's Up in the Research World?

REFLECTIONS ON THE GOLDEN ANNIVERSARY OF THE DISASTER RESEARCH CENTER

By: ***William A. Anderson***
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Like many of my colleagues in the hazards and disaster research community, I am a proud alumnus of the Disaster Research Center (DRC), founded in 1963 at Ohio State University by sociologists Russell Dynes, Eugene Haas, and Henry Quarantelli who became its first co-directors. Fortunate persons like me who were in one of DRC 's early cohorts of graduate students find it difficult to believe that it will soon be celebrating its 50th anniversary until we think about all that it has accomplished over the years, especially under the career-long guidance of the legendary Russell Dynes and Henry Quarantelli.

DRC was the first center devoted to the social scientific study of disasters, including organizational responses to such events, and it very soon built on earlier research efforts. This was particularly true, for example, of disaster studies conducted in the 1950s at the National Opinion Research Center at the University of Chicago where Quarantelli had worked with pioneering disaster researcher Charles Fritz, and later studies conducted by the U.S. National Research Council, where after leaving Chicago Fritz also played a major role as study director.

Disaster field studies have always taken center stage at DRC, even though some important laboratory simulation research was also carried out during its early days as part of Tom Drabek's dissertation work. Few regions of the world have not been visited by DRC field teams, whether to study natural, technological, or human-induced disasters. As a result, the upcoming anniversary should include a celebration of all the knowledge that such field studies have produced over the years and the concerted efforts by DRC staff to make that knowledge available to not only academics but also to policy makers and disaster reduction professionals worldwide.

Certainly worthy of celebration, too, has been DRC's unparalleled success in training several generations of disaster professionals. Many of the most prominent researchers in the field today are DRC alumni, including directors of other research centers, such as Kathleen Tierney, director of the University of Colorado's Natural Hazards Center. Others are playing important roles in nonacademic positions, such as former DRC co-director Dennis Wenger, now director of the National Science Foundation's Infrastructure Management and Extreme Events program after serving for many years as director of the Hazard Reduction and Recovery Center at Texas A&M University.

DRC has adjusted to many challenges and changes during its first 50 years, suggesting that it will be around to celebrate many more anniversaries. It moved from Ohio State to the University of Delaware in 1985, where Dynes and Quarantelli were reunited after being apart for some years when Dynes became chair of the sociology department at Delaware. DRC has continued its research and educational excellence in the years since its relocation. This has been enabled by a succession of able DRC directors after Dynes and Quarantelli's tenure, including Joanne Nigg, Kathleen Tierney, Havidán Rodríguez, Sue McNeil, and current director James Kendra who, while continuing to carry out social science field studies on the

emergency period of disasters, have also championed interdisciplinary research on the full range of the disaster cycle: mitigation, preparedness, response and recovery. An outstanding core faculty and capable graduate students have also greatly contributed to DRC's continuing success.

I would be remiss if I didn't mention some of the Canadian connections in the DRC story, beginning with the fact that, like sociologist Samuel Prince, Russell Dynes was born in Canada and comes from a long line of Canadians, including both parents and grandparents. Dynes grew up in the U.S. south, where he acquired his trademark southern accent, but returned to Canada during many summers with his family.

From its inception, DRC appreciated the insights provided by the study of the 1917 Halifax, Nova Scotia disaster conducted by Canadian sociologist Samuel Prince. This study, which was Prince's dissertation work at Columbia University, is considered to be the first social science disaster investigation carried out in North America and was published under the title *Catastrophe and Social Change* (Prince, 1920; Scanlon, 1988). The study informed the work of DRC, particularly since it raised the issue of disasters serving as social change agents. And for me personally, it influenced my decision to conduct my dissertation work on organizational change in Anchorage, Alaska following the 1964 earthquake (Anderson, 1969).

An example of another DRC link to Canada is that Canadian students financed by the Canadian government have received their training at DRC. And Canadian DRC alumnus Tricia Wachtendorf is the DRC associate director and a member of its core faculty. Also, as in other parts of the world, DRC teams have studied Canadian disasters. For example, I was part of a DRC team that studied a Montreal fire. More frequently, however, DRC has learned much about Canadian disasters from the work carried out there for dozens of years by Joe Scanlon and his students at Carleton University's Emergency Communications Research Unit. Over the years Scanlon has spent considerable time at DRC, including when on sabbatical there from Carleton University. He has always considered Quarantelli and Dynes mentors.

These historical connections to Canada, then, give Canadian disaster researchers and disaster reduction professionals a special reason to join in with their colleagues south of the border to celebrate the Disaster Research Center's upcoming Golden Anniversary. That milestone date, 2013, is just around the corner.

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William A. Anderson

Anderson has been an independent consultant since retiring from the U.S. National Research Council, where he was associate executive director of the Division on Earth and Life Studies and director of the Disasters Roundtable. He received a PhD in sociology from Ohio State University and conducted disaster research there while field director at the Disaster Research Center and later

at Arizona State University while professor of sociology. Outside academia, Anderson worked at the National Science Foundation for more than twenty years, including as head of the Hazard Mitigation Section, and was a senior advisor in the Disaster Management Facility at the World Bank. He is the author or co-author of books, research monographs and journal articles on the societal response to natural and human-induced disasters. His awards include the Charles E. Fritz Award from the International Research Committee on Disasters for career contributions to disaster research and the Special Recognition Award from the Earthquake Engineering Research Institute, where he also served on the board of directors.

HOW SOCIAL MEDIA IS SHAPING MODERN EMERGENCY MANAGEMENT: ADVANTAGES AND CHALLENGES AHEAD

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Abstract

This paper reviews the current trends in social media use and its impacts on modern emergency management practices. There are many examples where citizen participation in social media facilitated emergency management actions such as increased warning, situational awareness, evacuation, and resource mobilization among the public and response organizations. Research is only beginning to investigate and make sense out of the patterns and trends in public usage of media during crises and emergencies. There are many steps to be taken and barriers to be broken by emergency management organizations in order to integrate social media into their everyday practices.

Introduction

As we entered the second decade of the 21st century we have been witnessing the vast infiltration of social media into our daily lives. Social networking took a new meaning with the use of virtual platforms such as Facebook, Twitter, YouTube, Flickr and MySpace, among many others. Over the past several years, and more recently in an increasing rate, people all across the world have been engaging in social interactions with no time or location constraints via online social networking sites. Friends, family members, or colleagues are only a few clicks away regardless of whether they might be thousands of miles away physically.

Indeed, social media has revolutionized the world in many fronts including citizen awakening against authoritarian regimes across the world; informing and mobilizing the masses against regime changes. The Arab Spring of 2011 is an example where citizens of several Arab countries including Egypt, Tunisia, and Algeria created and shared news stories that would not otherwise be covered by broadcast media which is usually owned and/or controlled by their governments (Howard, 2012). In Iran for example, the opposition movement is conducted and facilitated through social media (Howard, 2012). In Russia and in China, social activist groups are flourishing through digital activism and slowly uprising against the authoritarian actions imposed upon citizens by their central governments (Howard, 2012). Across the world, in many countries social media is being used as a medium for two-way communication among the public and between the public and the state. In many ways this is liberation for the public as well as a facilitator for democratic governance and citizens' right to know.

What is fascinating about social media is its low cost and ease of access. With the technological

advances and the economies of scale, internet access is widespread and many social networking sites have free access requiring only basic personal information and password protection. Not only desktop or laptop computers but the mobile phones support the usage of social media applications. The portable nature of the technology makes the access much faster and convenient.

According to its own website, as of June 2012, the total number of active Facebook users are 955 million (Facebook, 2012); nearly three times as many as the population of the United States (U.S.) and as many as the combined populations of the 4 of the 6 most populous countries which are U.S., Indonesia, Brazil, and Pakistan (excluding China and India). Again according to the same source, approximately 81% of monthly active users are outside the U.S. and Canada (Facebook, 2012). An average user has about 130 friends (Facebook, 2012). The second most popular social networking site in terms of registered users appears to be Twitter. The number of registered Twitter users are reportedly around 106 million as of March 2012, with an average amount of tweets per day around 55 million, and 8,900 tweets coming every second (Twitaholic, Huffington Post, 2012). The number of video viewings on YouTube everyday is reportedly around 4 billion, as of March 2012 (YouTube, 2012). The number of languages YouTube is broadcast in across the world is 54, and every minute a total of 60 hours of videos are uploaded to YouTube (YouTube, 2012). There are many other social networking sites with growing numbers of usage around the world.

Social media is heavily influencing the way emergency management and disaster response is conducted. Today, emergency managers are beginning to understand the importance of social media and how they can utilize it to better communicate with citizens in order to better prevent casualties and property loss. This paper analyzes the recent trends of the social media use and its impacts on modern emergency management practices.

Social Media and Crisis Communication

Wide scale emergencies and disasters require communication with the public for the purposes of informing them of the immediate or anticipated dangers of the situation, the likely causes, and the actions to be taken. Citizens have to adapt their behavior to keep themselves and their property out of harm's way. Since local response agencies are usually the first responders who arrive at the scene, they hold the critical first-hand information regarding the emergency situation along with those citizens who are directly impacted. Traditionally, or rather until the past several years, the rest of the public used to get their information about a disaster situation only through broadcast media such as television, radio, or newspapers. This was and is problematic, since many of the disaster events evolve quickly by transforming into either better or worse or complex situations where the time lag between the media reports and the delivery would make the news report obsolete and irrelevant. With the advances of information technology, the form of social interaction among citizens have changed and evolved significantly. Instead of physically gathering, people can now gather virtually from any location exchanging knowledge regarding a potential disaster in such a way that survival rates or evacuation efficiency could be improved.

In today's modern society, there are many people who wake up and get their first sip of coffee or tea while getting their first news from online news sources including social networking sites like Twitter or Facebook. A study conducted by the American Red Cross revealed the fact that about 63% of the population representing the U.S. population turned to online news to get information about an emergency such as a power outage, severe weather, flash flood, hurricane, earthquake and tornado (American Red Cross, 2011). This does not mean people disregard the traditional media outlets

such as TV news and local radio stations in informing themselves about emergencies, since 90% of the general population still reportedly turn to TVs and 73% to local radio according to the same study (note that the data are not mutually exclusive). This implies that people augment what they learn from the broadcast media with social media. Increasingly, citizens no longer rely solely on broadcast media since the media can, more often than not, use repeated and striking imagery to sensationalize the news out of interest for high viewer ratings. This usually comes at the expense of provision of more relevant risk communication (Latonero & Shklovski, 2011).

As indicated by Latonero & Shklovski recently, the current research on public response to disasters and emergencies highlight the importance of better organizing and deploying crisis and risk communication through more-up-to-date methods and more interactively (See for example Hughes & Palen, 2012; Crowe, 2010; Hui, Tyshchuk, Wallace, Magdon-Ismail, & Goldberg, 2012; Palen, 2008; and Sutton, Palen, & Shklovski, 2008; Jaeger, et al., 2007).

There are many recent examples where social media has been interactively and effectively utilized (1) in order to help emergency response agencies; and (2) where citizen groups benefited by the use of social media during large scale emergencies in the form of either creating situational awareness or altering behavior or mobilizing resources. I illustrate some of the examples indicated in the literature:

2007 Southern California Wildfires

Beginning on October 20, 2007, wildfires starting in Malibu, California spread across Santa Barbara County to San Diego County's border with Mexico. The fires cumulatively destroyed close to 1,500 homes, burned over 500,000 acres of land and resulted in massive evacuations (Sutton, Palen, & Shklovski, 2008). Sutton, Palen, & Shklovski conducted a survey on the affected community members immediately after the disaster. Their survey results indicated that 76% of the respondents sought information through information portals and websites; whereas 38% through alternative news sources and individual blogs; 15% through discussions on various web forums; and 10% through photo sharing websites such as Flickr or Picasa. More than 36% of the survey respondents reported posting inofrmation or participating in online discussion groups; some 4% broadcast via Twitter; and another 9% posted about the disaster on personal blogs. Note that the usership of social networking sites has increased significantly in five years from 2007 to 2012, thus these figures would be much higher in the case of similar emergencies today.

Sutton et al.'s research also documented some of the most important reasons why people turned to social media which include: broadcast media bias on celebrity homes—pretty much ignoring the rural areas; inaccurate information by the broadcast media in terms of location and severity; the slow response from the government; the official government websites not having the relevant information or having been crashed. People not only used social media to get information or inform others but to relieve stress and support each other during times of crisis. This backchannel of activity described by the researchers also led to the creation of online communities that served the purpose of community convergence areas, or information sources that the news networks could freely rely on (e.g. signinsandiego.com; ramonarelief.com etc.) The site operators collaborated with local officials and firefighters to provide up-to-date information as quickly as possible. In the case of 2007 Southern California fires, both alternative and mainstream organizations capitalized on social media to help alleviate the crisis (Sutton, Palen, & Shklovski, 2008; Palen, 2008).

Red River Floods, North Dakota, 2009

In 2009, the City of Fargo, North Dakota was experiencing severe flooding from the Red River during the middle of the winter and there was a shortage of volunteers. At the suggestion of one local person who was already volunteering, the community implemented a Facebook group (Crowe, 2010). In a short period of time, they were able to generate interest to gather a volunteer group that consisted about 5% of their local population. This mobilizing effort helped improve the local response capabilities significantly (Crowe, 2010).

BP Oil Spill, 2010

Resulting from an explosion on an oil drilling platform owned and operated by British Petroleum (BP), about 4.1 million barrels of oil spilled into the Gulf of Mexico over 87 days, making it the biggest unintentional offshore oil spill in the history of the petroleum industry (The Telegraph, 2010). There were technical hurdles combined with policy issues that significantly delayed the stopping of the spill. The response efforts benefitted from crowdsourcing in this major disaster according to Adam Crowe (2010) who indicated that BP received more than 20,000 suggestions from all around the world that were categorized into "not possible", "already planned" or "feasible". As a result, BP identified nearly 100 "feasible" options that were not thought of before, to stop the oil spill (Crowe, 2010).

Haiti Earthquake, 2010

Another example of the engagement of social media in disaster response efforts concerns the Haiti Earthquake of 2010. Around 640 volunteers around the world used simple web browser tools to scan old atlases and maps to build an online streetmap of Haiti in around two weeks, a project that otherwise would have taken almost a year (Lacey-Hall, 2011). They created the map using OpenStreetMap, a geospatial wiki and helped humanitarian agencies' response operations including UN Office of the Coordination of Humanitarian Affairs (OCHA) (Lacey-Hall, 2011). Also a free crowdsourcing site called Ushahidi was utilized by the public during the response efforts. Ushahidi provided web-based or mobile connectivity to collect geospatial or text-based information from 'the crowd' (Ushahidi). The data gathered from the public was synthesized into web-based maps about real time information about health conditions, infrastructure damage and localized emergencies (Crowe, 2010). It would be impossible for local or governmental response agencies to collect and provide the kind of data in real time to the public (Crowe, 2010).

2011 South East Queensland, Australia floods

Facebook and Twitter played an important role in crisis communication at the height of the 2011 South East Queensland floods crisis. According to Bruns, Burgess, Crawford, & Shaw (2012), at the height of the crisis, Twitter became a source for mainstream media as well as the response agencies. More than 35,000 tweets containing the #qldfloods hashtag were sent between 10-16 January, and more than 15,500 Twitter users participated in #qldfloods (Bruns et al., 2012). About 50 to 60% of #qldfloods messages were retweets (meaning passing along existing messages, and thereby making them more visible) whereas 30 to 40% of the messages contained links to further information on the internet. Users close to the site of disaster shared their firsthand experiences via tweets and by including photographs. About one in five shared links included photos from the disaster site. The Queensland Police Service Media Unit account (@QPSMedia) was key to the dissemination of timely and relevant information to the public including situational information and advice. @QPSMedia played a crucial role in helping affected locals including providing volunteering information. Since then @QPSMedia remains a leading account for crisis communication in Queensland. The unit is reportedly working to build

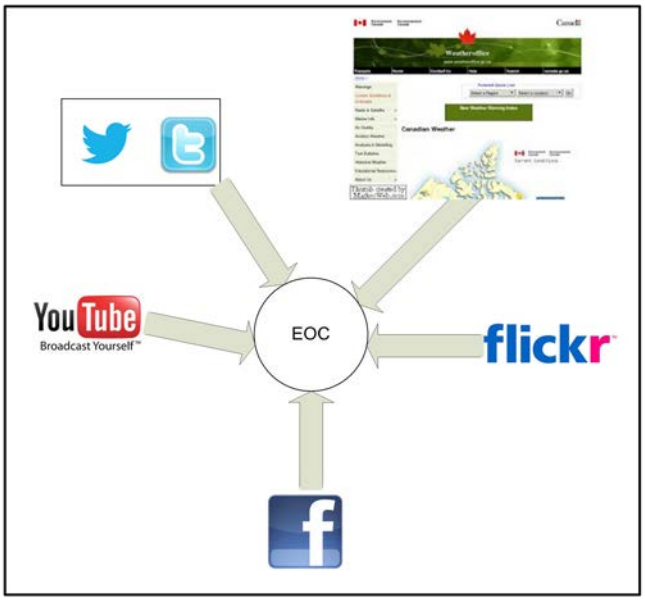
further dedicated links to the Twitter accounts of key media agencies and civic authorities in order to develop a more comprehensive social media crisis communication in Queensland (Bruns et al., 2012).

There are many other examples where social media had some form of impact in terms of creating situational awareness, altering community or individual behavior, or mobilizing resources for better response. Additionally, researchers began studying the mechanics of social media use through microblogging (e.g. Twitter), geocoding, or other human-centered sensing technologies and how they are integrated into crisis and emergency management practices (For practical examples see for example Vieweg, Hughes, Starbird, & Palen, 2010; Heverin & Zach, 2010; Hui, Tyshchuk, Wallace, Magdon-Ismail, & Goldberg, 2012; Pohl, Bouchachia, & Hellwagner, 2012; Gonzalez, Granmo, Munkvold, Li, & Dugdale, 2012; Tyshchuk, Hui, Grabowski, & Wallace, 2012; and Song & Yan, 2012).

Summary and Conclusion

Although the modern global society has adopted social media as its integral part, its utility during crises and emergencies are not fully studied or understood yet. There is no clear understanding of how social media can be effectively utilized to assist the public in its emergency management decisions, nor is there an agreed-upon or a uniform approach to integrating social media into formal emergency management practices (Tyshchuk, et al., 2012).

In recent studies, researchers examined the micro blogging patterns during and after crisis situations using statistical analysis tools and attempted to identify common patterns. Most studies are categorical in nature such as the frequency of tweets, and retweets in relation to how a crisis or emergency unfolds; content classification such as information, opinion, emotion, action, technology (Heverin et al., 2010) or warning response type tweets (e.g. receiving the warning, understanding the contents of the warning message, trusting the credibility of the warning, personalizing the warning, seeking and obtaining the confirmation, and taking action) (Tyshcuk et al., 2012), or outlining a construct about main themes of a crisis (Vieweg et al., 2010; Pohl, Bouchachia, & Hellwagner, 2012; Song & Yan, 2012; Song & Yan, 2012).



The ad hoc nature of social media usage can cause information overload for people who are already under a great deal of stress due to an emergency situation (Pohl et al. 2012). Understanding and interpreting data by looking at certain diffusion patterns and key content in the absence of systematic analysis tools creates a challenge for public response agencies. There is a need for further and better structured engagement among the public to integrate citizen gathering, reporting and dissemination of information through smart phones and computers. Technology availability and infrastructure seem to be the least of the problems. For example, after an earthquake, phone lines and cell systems get totally jammed with people trying to find out whether people are okay. A simple “I’m ok " tweet is much more efficient in terms of bandwidth such that social media could really be the

key mode of communication of choice for people in disaster zones to report their status to their families and friends. Phone calls take longer and consume more resources that should be available for more critical communications.

In official emergency response practices, the main challenges are centered on organizational backing and resource availability for effective adoption and integration into the policies. Information verification and dissemination, managing rumor-mongering and how to codify management of these issues into emergency management policies and procedures is still an unsolved issue. There are a few examples of social media "evangelists" among public officials who have already integrated social media monitoring and usage into their response practices such as the public information officer of the Los Angeles Fire Department (see Latonero & Scholvski, 2011). However, there is no widespread adoption of such practices in the rest of the U.S. or other modern nations. Emergency management organizations are now faced with the challenge of creating new positions or roles to meet the need to monitor and engage in social media through coordinated and coherent approaches that can be seamlessly integrated into response practices.

Acknowledgments:

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COLLABORATING TO ADAPT HAZUS MH RISK ASSESSMENT METHODOLOGY FOR CANADA

By: ***Bert Struik***

The Public Safety Geoscience Program (PSG) of Natural Resources Canada (NRCan) is researching and developing methods and tools to assess risks of geohazard threats. The tools make it easier for professionals responsible for reducing the potential impacts on people and property to rigorously quantify the hazard risk. By adapting the US-based Hazus methodology for use in Canada, emergency planners, such as the Heavy Urban Search and Rescue (HUSAR) teams, can better prepare for disaster response.

Increased emphasis on preventative disaster mitigation has recently been added to emergency response to further reduce disaster risk. Preventative disaster mitigation focuses on assessing disaster impacts to support decision-making. NRCan's

development will assist in providing more comprehensive, new planning tools for disaster response and safe community design. Likewise, it will contribute different approaches to communicating geohazard science to a wider group of decision-makers.

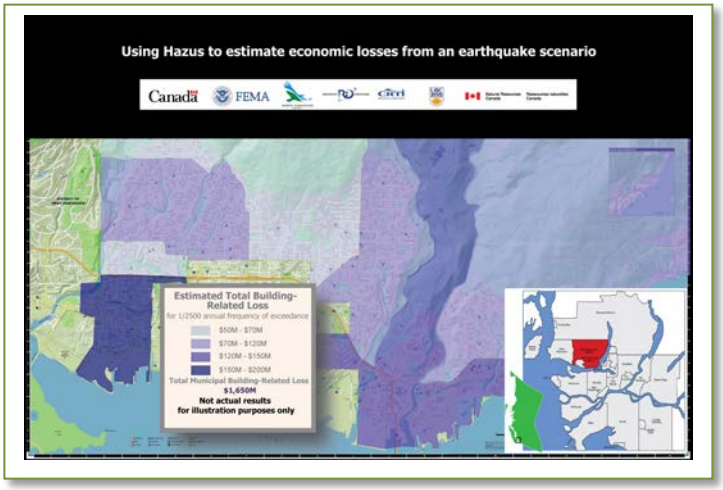

Figure 1: A spatial representation of the economic consequences of an earthquake scenario modelled using Hazus.

Traditionally, information on hazard events and hazard potential has been communicated in terms of location and magnitude of a geohazard event. We are learning that, for the most part, land-use decisions only loosely consider potential geohazard threats, because available geohazard information is not easily understood or practical. For similar reasons, most existing emergency response plans rely primarily on post-event impact reconnaissance information, which sometimes results in consequential delays. The gap between the scientific geohazard information and the practical information needed for planning and decision-making creates difficulty with stewardship over public safety.

To help address this gap, NRCan's PSG Program, through its Quantifying Geohazard Risk (QGR) Project, is developing a computer-aided methodology to quantify the anticipated impacts and consequences of potential geohazards. Through collaboration with Federal Departments and other partners, we are able to gain better understanding of the needs and operational requirements of priority end users. Together, we are able to develop ways to seamlessly integrate that methodology within existing processes. As a result, more actionable information will be accessible to our stakeholders, bringing about a common understanding of what hazard potential might mean.

In this research project, we are adapting a spatial (map-based), standardized, state-of-the-art loss estimation methodology and computer model, Hazus, developed by the United States Federal Emergency Management Agency (FEMA). Hazus uses geographic information systems (GIS) technology and currently contains models for analyzing the risk from earthquakes, floods, and hurricanes. The earthquake model has been adapted for Canadian application, and is presently available directly from NRCan. The flood model is being adapted next.

Figure 2: Ken Murphy, FEMA Regional Administrator and Miroslav Nastev, NRCan / QGR Project Manager sign the Canada-US technical agreement on sharing and developing the Hazus-HM loss estimation software and methodology.

NRCan's QGR Project promotes the capability and uptake of Hazus in Canada at the federal, provincial and local government levels as well as by the private sector engineering and geoscience

professionals. Potential users are supported on a case study demonstration-basis to help them apply this tool for their emergency management, land-use planning, and engineering design needs.

One example of our collaborative work is the current interdepartmental and inter-jurisdictional preparation for the upcoming HUSAR planning exercise in Vancouver this October, 2012. This work helps us to better communicate the potential consequences of geohazards from the Hazus model to the public safety decision-makers. User guides planned for next year document the most practical interpretation of the modelled potential impacts and consequences of a hypothetical earthquake scenario. The model estimates casualties and shelter requirements; the extent of structural and environmental damage and amount of debris generated; and the costs of replacement and business interruption.

We expect that land-use planners, emergency managers, and engineering and geoscience professionals, tasked with making decisions about safety and damage mitigation, will be more equipped and able to do their jobs when hazard threat information, such as earthquake magnitude and level of ground shaking, is accompanied by the potential impacts on the built environment and the likely consequences for the people exposed to those hazard threats. Likewise, by having a larger basis for common understanding of the available information and its limitations, various professional groups may be able to better collaborate on pre- and post-event planning and response approaches.

NRCan's work, in collaboration with other Federal Departments, extends the capability of disaster pre-event planning and mitigation in Canada. It is conducted within the context of an international technical agreement with FEMA (August, 2011) to share and co-develop the Hazus methodology.

Contact for more information and copies of Hazus for Canada:

Nicky Hastings, Risk Assessment Activity Lead
604-666-3955 nicky.hastings@nrcan.gc.ca

MITIGATING DAMAGE TO HOUSES IN SEVERE WIND STORMS

By: ***Gregory A. Kopp***

Annual losses due to extreme wind storms have been increasing dramatically around the world due to increased population and infrastructure. This is also true in Canada. According to the Institute for Catastrophic Loss Reduction (ICLR), insurers have paid out a billion dollars due to storm losses for each of 2009, 2010 and 2011, an unprecedented three years in a row, and 2012 is started to look like a costly year, too. Recent estimates by researchers at Environment Canada have shown that the worst gust wind speeds are expected to increase in Canada because of climate change, so this issue only looks to get worse.

Residential, low-rise structures – houses – have been found to be particularly vulnerable to high winds. Post event damage investigations have shown us common failures and help us focus our energies on where the issues actually are. Such investigations have indicated that if we can keep the building envelope intact, the losses with be reduced substantially. There are at least two reasons for this:

First, roofs become particularly vulnerable when there are openings in walls, such as happens when windows or doors break. These openings substantially increase the total force acting on the roof because "internal pressurization" causes the house to blow up like a balloon. Windows most commonly break due to debris flying through the

air; debris as seemingly innocuous as shingles or siding, let alone 2x4s, will break windows if the storm is intense enough for them to get into the wind stream. This causes cascading damage so that as something breaks and flies through the air, it may hit a neighbouring structure, which in turn causes something on that structure to break, which then subsequently flies through the air... and on it goes. We found that debris impacts on garage doors and windows were a primary cause of major roof failures in the 2009 tornado outbreak in Vaughan.

Second, water infiltration dramatically increases losses in storms and can occur with failure of relatively minor elements on a building – the loss of a single sheathing panel from the roof can lead to an insurance write-off of the building contents.

Thus, keeping all building components intact, even those which are not structurally critical, is important to mitigating overall losses. While events like the Barrie Tornado in 1985 taught us that we need to keep the roofs attached to the walls so that the walls

Figure 1: Two side-by-side houses, photographed the day after a tornado in southern Ontario. One lost the roof, the other only lost a handful of shingles. The difference: for the house on the left, the front doors blew in allowing the wind to pressurize the house causing the roof to fail.

don't collapse and kill people, we also need to keep the shingles, siding and sheathing intact to reduce water damage and debris impacts which will, in turn, reduce the very significant economic losses these storms are causingMitigation strategies are needed, but one major issue is that they need to be cost effective in order to be widely implemented. We can deal with the structural issues (for example, nuclear reactors are designed for the most severe tornadoes possible), but not many of us really want to pay to live in a fortress. Houses are actually complex structures because of the many redundant members (all those 2x4s), the use of non-structural materials (such as the dry wall, which actually makes the house stronger, or brick cladding, which doesn't), and material and installation variability. It may be surprising, but it is more difficult to analyze the response of a wood-frame, brick-clad house, than a 40-storey, steel-frame high-rise. Thus, we know relatively little about how failures initiate. Without such knowledge, it becomes difficult to find cost-effective solutions.

So, mitigation has proven to be a challenge even though current technologies would add only a few percent to the construction cost of new houses. The 'Three Little Pigs' (3LP) Project at Western, in partnership with the ICLR, is an attempt to deal directly with such issues. The Project has the goal of finding optimal solutions for mitigating wind and rain damage to homes, and other light frame

structures. The name of the Project refers to the famous children's story, and is a deliberate effort to aid the public in understanding our intent. Our focus has been to work with various stakeholders including builders, manufacturers, and insurers to find solutions for residential construction, with a particular emphasis on finding effective prescriptive solutions which can be easily implemented in building codes, easily adopted by builders, and are inexpensive. To date, two houses have been constructed following the ICLR's "Designed for Safer Living" program, and more are on the way. We are hoping to build more houses this way, and are actively working with the building community… in order to tame that Big, Bad Wolf.

Figure 2: Photograph of the 'Three Little Pigs' first test house, surrounded by the steel reaction frame used to hold the wind loading system (not shown).

The author is Professor of Civil & Environmental Engineering, Director of the Boundary Layer Wind Tunnel Laboratory, and leads the wind engineering research at the "Three Little Pigs" Project at the University of Western Ontario. He can be reached at gakopp@uwo.ca.

DEVELOPMENT OF NASAL SPRAY FORMULATED WITH ANTIVIRAL DRUG AGAINST INLUENZA VIRUS

By: ***Albert F. Kabore, Laurie Schofield, and Jonathan Wong***

Defence R&D Canada (DRDC) aims to advance the development of nasal spray formulated with liposome-encapsulated Poly ICLC (LE Poly ICLC), a potent and broad-spectrum antiviral drug, which has been shown in animal studies to protect against pandemic and seasonal influenza viruses. In a published study, LE Poly ICLC has been shown to provide complete protection to mice when administered 21 days prior to challenge with multiple lethal doses of influenza A (H1N1) virus (Wong *et al.*, Vaccine 19:2001). To meet regulatory requirements for clinical development of LE Poly ICLC, efficacy testing of nasal spray delivered LE Poly ICLC against influenza A virus was conducted using a ferret infection model, which is widely accepted as "gold standard" animal model for influenza infection. Ferrets pre-treated with nasal sprayed LE Poly ICLC showed significantly lower virus titers in nasal washings compared to control untreated ferrets. Furthermore, this study also suggests that nasal spray does not disrupt the integrity of the liposomes nor the Poly ICLC. Together, these results affirmed the effectiveness of nasal spray delivered LE Poly ICLC in protection of ferrets against influenza A virus infection.

Introduction

Influenza pandemics including the1917 – 18 Spanish flu pandemic have historically killed millions of people worldwide. Despite advances in vaccinology and antiviral drug development, the world is ill equipped to defend against future pandemics. This is largely due to the fact that influenza viruses causing these pandemics are highly unpredictable, constantly mutating, and rapidly developing drug resistance. Currently, commercial antiviral drugs against influenza target

virus structures and proteins, which make them ineffective when the virus undergoes mutations in these sites. To circumvent the problem of drug resistance, novel approaches, which specifically stimulate the host's innate immunity to provide broad antiviral responses, are becoming hot areas in antiviral drug development.

Toward this end, Defence R&D Canada (DRDC) has pioneered the preclinical development of LE Poly ICLC, a potent antiviral agent that activates the toll-like receptor-3 (TLR-3) signaling pathway, which in turn results in the induction of protective antiviral immunity in the host.

DRDC aims to champion the advance development of a nasal spray formulated with LE Poly ICLC, potentially able to protect Canadian Forces, first responders and civilians against a variety of deadly viruses. This nasal spray represents a safe, effective and needle free means for delivering a potent and broad-spectrum LE Poly ICLC. When fully developed, it will enhance our ability to defend against deadly viruses, regardless of whether they are natural in origin, bioengineered, or resistant to conventional antiviral drugs.

Overview of Mechanism of Drug Action and Efficacy Testing

Poly ICLC is a synthetic double-stranded RNA (dsRNA) polyriboinosinic-polyribocytidilic acid stabilized with poly-L-lysine and carboxymethylcellulose. Poly ICLC and LE Poly ICLC induced a broad antiviral immune response in the host by activating the toll-like receptor-3 signaling pathway, enabling the host to respond to viral threats. The distinct advantage of this approach over conventional antiviral drugs is that LE Poly ICLC elicits a broad-spectrum antiviral effect against a wide range of viral pathogens regardless of their genetic makeup, zoonotic origin, or drug resistance status (Wong, Nagata *et al*. 2005; Christopher and Wong 2008; Wong, Christopher *et al*. 2009). Furthermore, Poly ICLC can also work effectively either as a stand-alone immune-modulating agent or as a potent adjuvant to influenza vaccine candidates. Li *et al* have recently demonstrated that intranasal administration of LE Poly ICLC, either before or shortly after influenza infection, was effective as a prophylactic and therapeutic agent , and also as a vaccine adjuvant against highly pathogenic avian influenza A/H5N1 virus (Li, Hu *et al*. 2011). According the authors, nasal vaccination using Poly ICLC or LE Poly ICLC as an adjuvant is perceived as advantageous because it is less invasive and elicits both local and systemic immune responses, and the mucosal immune response is known to be faster compared with that from systemic routes of vaccination.

Existing drugs against influenza viruses have limitations in terms of toxicity, drug resistance, and virus mutations, leaving first responders, defense personnel, and civilians vulnerable to influenza outbreaks. The prototype nasal spray formulated with LE Poly ICLC will provide a needle free and safe delivery with ease and convenience of self-administration. When fully developed, this nasal spray has the potential to confer rapid protection to human against a wide range of deadly viruses including Ebola, western equine encephalitis, and influenza infections. One of the most significant milestone achievements for this project is the successful completion of the "proof of concept" efficacy study demonstrating the effectiveness of nasally sprayed LE Poly ICLC for the protection of experimental animals against respiratory influenza A virus (H1N1) infection. In collaboration with University of Saskatchewan, a study was conducted in ferrets that mimic more of natural influenza virus infection in humans. Seventy five percent of animals pre-treated with nasally delivered LE Poly ICLC against influenza A/PR/8/34 virus showed below detectable levels of virus in nasal washes in comparison of control ferrets that showed high levels of virus (Figure 1 and 2).

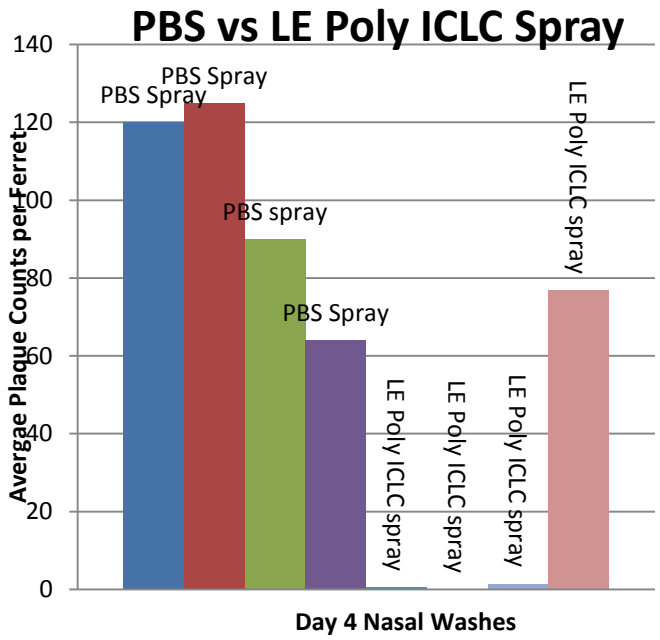

Figure 1. Efficacy of nasal sprayed LE Poly ICLC against influenza A/PR/8/34 virus in ferrets. Groups of ferret were treated with two nasal spray of LE Poly ICLC or PBS, administered at day -3 and -1 at day 0; ferrets were intranasally challenged with 1X10^7 plaque forming units of influenza A/PR/8/34. At day 4 post infection, nasal washes were collected from each animal, and were assayed for influenza virus using a standard plaque assay

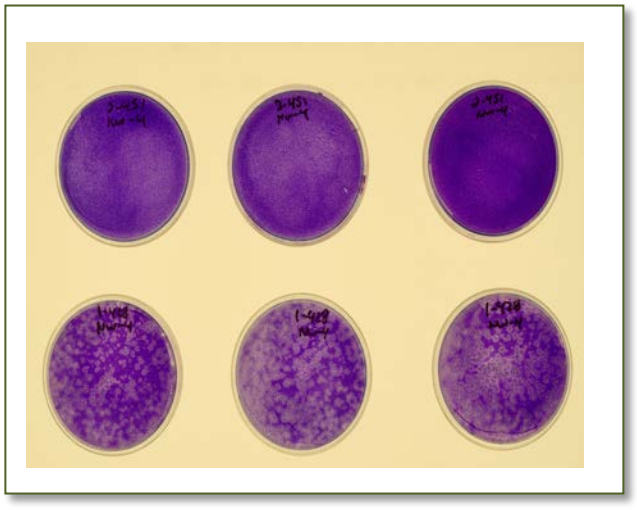

Figure 2. Plaque assay of nasal washing from ferrets treated with nasally sprayed LE Poly ICLC (top panel) compared to ferrets treated with nasally sprayed PBS (control, bottom panel)

group. Plaques are areas of clearing in the cell monolayer whose numbers are indicative of the number of infectious virus particles.

This study represents an important breakthrough as it clearly indicated that LE Poly ICLC is not disrupted by nasal spray delivery, and that it provides efficacy data from second animal species in addition to current mouse data as required for regulatory approval. These results are promising in demonstrating potency of LE Poly ICLC against influenza A virus.

Conclusion

Influenza pandemic preparedness is necessary to control bioterrorism-related or natural outbreaks of the virus. LE Poly ICLC is a broad-spectrum antiviral agent shown to be effective in animals for prophylactic therapy of deadly viral diseases involving H5N1, Ebola, and alphavirus infections. LE poly ICLC-formulated nasal spray will protect first responders, medical and security personnel, and the public against these viruses. Therefore, developing this novel prophylactic approach will significantly improve existing chemical, biological, radiological, nuclear and explosive (CBRNE) preparedness and prevention capabilities.

Acknowledgements

The authors wish to acknowledge the financial assistance from Chemical Biological and Nuclear Research and Technologies Initiatives for project (CRTI 06-0301TD) on the development of liposome encapsulated Poly ICLC. Thanks are also due to Major Van Loon, and Captain Godbout, formerly program manager and deputy program manager respectively.

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Photo: Captain Kabore and Jonathan Wong

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"The British Columbia Association of Emergency Managers supports its diverse membership in their efforts to enhance emergency management initiatives in British Columbia. The Association will accomplish this by providing and maintaining resources that support emergency management professionals to build comprehensive, integrated and effective emergency management programs."

Peer support is particularly important to local emergency program managers during EOC activations. Most of us work in relative isolation with varying degrees of support from management. When major events occur we are often our own worst enemy and find ourselves working far too many hours with limited resources. We usually eat poorly, become sleep deprived and forget about the importance of exercise and relaxation. All this is happening while having to make critical decisions.

My advice to EOC management staff is to ask for outside assistance from your peers early on during an event rather than waiting until performance levels decrease. Always be on the lookout for signs and symptoms of critical incident stress among staff and provide the appropriate interventions.

BCAEM.CA contains tools and resources to assist you with worker care, training and exercises. For more information on this program and resources that BCAEM provides, and for membership rates please visit our web site **www.bcaem.ca**

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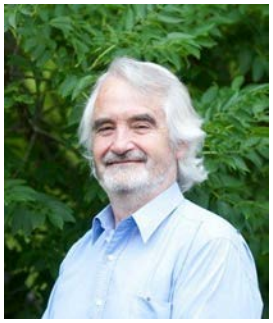

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Learning to live with geohazards: Reducing risk, protecting people

Suzanne Lacasse

Technical Director, Norwegian Geotechnical Institute, Oslo, Norway

Opening Remarks

Mark Fortin

Assistant Deputy Minister (Science and Technology), Department of National Defence and Chief Executive Office, Defence Research and Development Canada

The Value of Participation: ShakeOut BC 2012, Exercises and the Engagement of the Private Sector

Mike Andrews
Emergency Planning Officer, North Shore Emergency Management Office

Heather Lyle,
Director,
Integrated Public Safety
Emergency Management BC
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3rd Annual National Roundtable on Disaster Risk Reduction

The third Annual National Roundtable for Disaster Risk Reduction will be taking place on October 23, 2012, in Vancouver, British Columbia, co-located with the 9th Canadian Risks and Hazards Network Symposium. The Roundtable serves as a multi-sectoral consultative mechanism for all sectors to advance areas of common concern related to disaster risk reduction. This full day event is open to any interested participants, including those not registered for the CRHNet Annual Symposium. In order to facilitate participation, there is no registration fee for the event; however, we require participants to register in advance for planning purposes.

The purpose of the Annual National Roundtable on Disaster Risk Reduction (the Roundtable) is to bring together the general membership of Canada's Platform on Disaster Risk Reduction in an open, inclusive, equitable forum. The Roundtable serves as a venue for Canada's ongoing national dialogue on DRR, the administrative annual general meeting for the Platform, and an opportunity for deliberative dialogue among DRR stakeholders.

Participation in the Roundtable is open to any interested parties, departments, organizations or individuals. There is no fee for participation.

Register starting April 01 2012!

Via the CRHNet Website

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Read the article by Public Safety Canada on page 31!

The Great British Columbia ShakeOut!

October 18th 2012

On Thursday, October 18th at 10:18 a.m.*, thousands of people will participate in the *2012 Great British Columbia ShakeOut* earthquake drill!

In 2011, more than 500,000 British Columbians participated by practicing "**Drop, Cover, and Hold On"** and improving their overall preparedness. Everyone is asked to “Drop, Cover and Hold On”. That is what you are to do during a real earthquake. The drill on October 20 is a chance to practice, so that in the event of a real earthquake, you know what to do. Go to **www.ShakeOutBC.ca** for more details about the drill and register your family, your business or your school. Out of province participation is welcomed!

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November 6st to November 8th 2012

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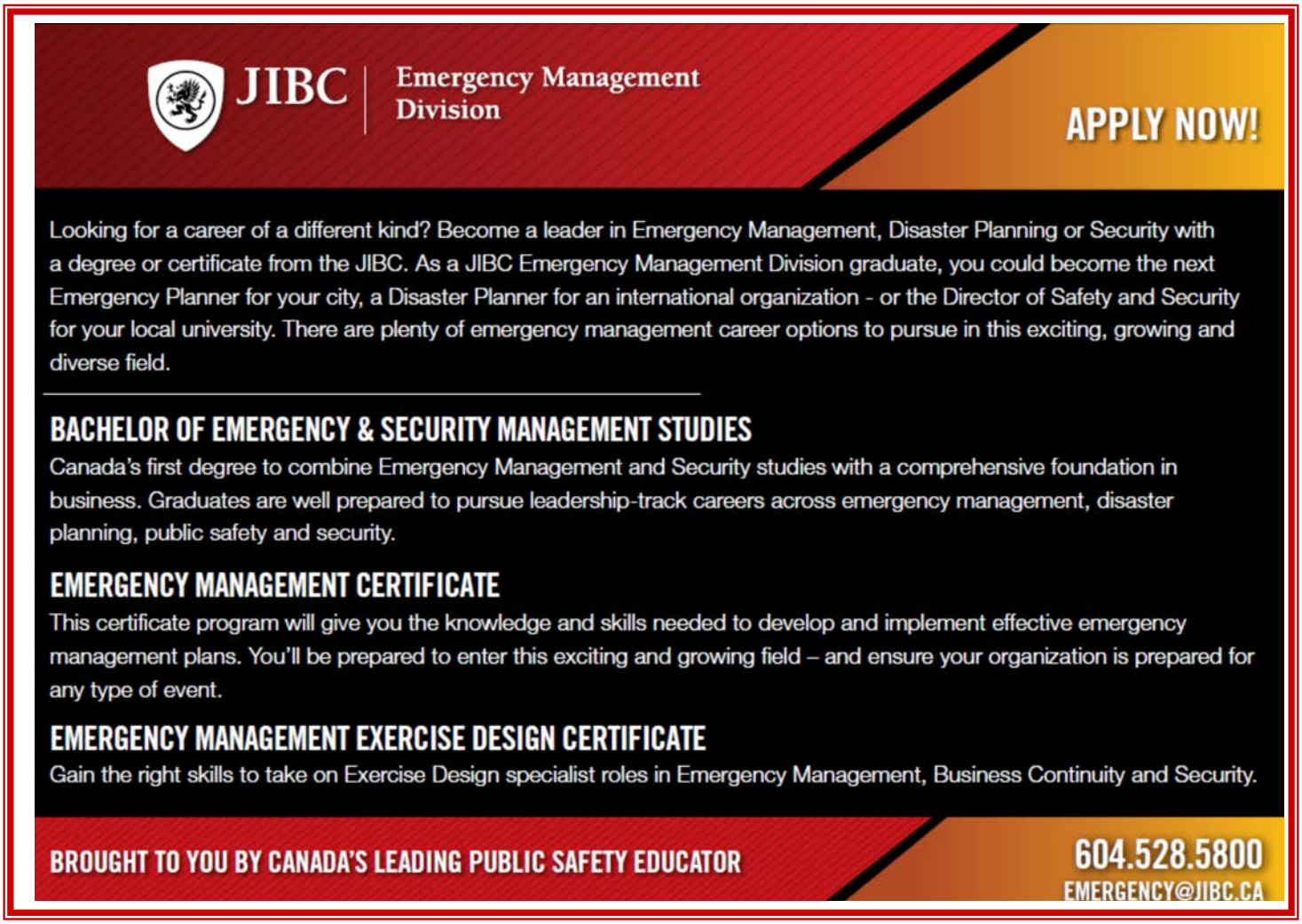

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- **John Lindsay** MCP – Mr. Lindsay received the degree of Master of City Planning from the University of Manitoba in 1993 with a research focus on urban planning and emergency management. He now combines research with 20 years of experience in the field.
- **Etsuko Yasui** PhD – Dr Yasui completed her Ph.D. at the University of British Columbia, School of Community and Regional Planning, in December 2007. Her doctoral research investigated the recovery processes in two small Japanese neighbourhoods in the aftermath of the 1995 Kobe Earthquake.
- **Brian Kayes** BA, MRD – Mr. Kayes is the director of Emergency Management for the City of Brandon and is currently on secondment in the ADES Department.

For more information please go to http://www.brandonu.ca/ades/ or send an e-mail to ades@braudonu.ca.

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- 90 credits for the 3-year degree
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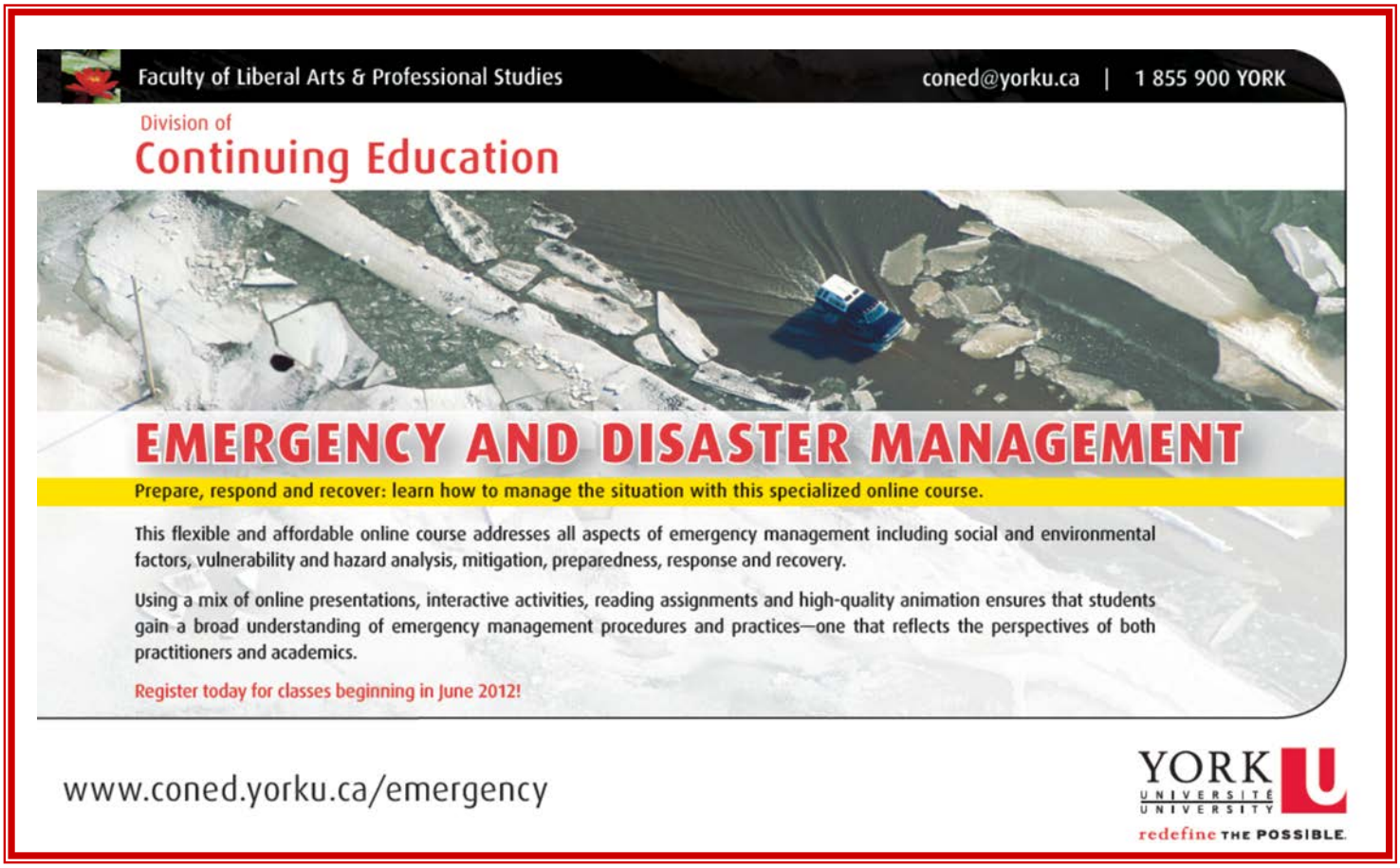
For more information please go to **http://www.yorku.ca/akevents/academic/SAS/EM/index.html** or send an email to **eminfo@yorku.ca**.



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The stated objective of the CRHNet is to *"Initiate the development of a Canadian inter-disciplinary and cross-sectoral network of researchers, academics and practitioners to enhance understanding of emergency management in all dimensions and help build Canadian capacity to deal effectively with threats and consequences from all hazards"*.

To this end, DRI CANADA has recently introduced a college and university affiliation program that provides DRI International's 10 professional practices as a basis for business continuity training. This Canada-wide program provides an opportunity to realize CRHNet's objective. In this way, practical, widely accepted, business continuity management practices can be introduced into an academic education curriculum; thus bridging the practical/academic training gap. All successful students may challenge the DRI CANADA certification examination without additional charge as part of the affiliation agreement.

DRI CANADA also welcomes the opportunity to distribute papers, theses and innovative research material to our network of professional practitioners, members and to the public in general in order to promote the benefits and achievements of academic research.

Please contact Grant Whittaker, Executive Director, DRI CANADA 1-613 258-2271 or grant@dri.ca

CANADA'S PLATFORM FOR DISASTER RISK REDUCTION

Public Safety Canada

Disaster risk reduction is among the most complex interdisciplinary fields implicating stakeholders from all levels of government, academia, the private sector, community partners, non-governmental organizations, Aboriginal communities and individual citizens.

In 2005, Canada, along with 167 other governments, adopted the Hyogo Framework for Action, under the United Nations International Strategy for Disaster Reduction. This non-binding international tool seeks to reduce human, social, economic and environmental costs of disasters, moving from reaction to resilience. There are many components under the Framework, but one of the most powerful is that countries are encouraged to develop National Platforms for Disaster Risk Reduction. These Platforms are nationally led multi-stakeholder fora, to permit consultation on addressing the root causes of disaster vulnerability and building collaborative disaster resilience.

In June 2009, Canada announced the establishment of Canada's Platform for Disaster Risk Reduction. To build a participatory Platform that reflected the diversity of activities undertaken in Canada, Public Safety Canada researched and engaged stakeholders in order to learn from domestic and international best practices in disaster risk reduction. The design and implementation of Canada's Platform is unique as it acknowledges and builds on existing networks within the community and, while providing opportunities for new players to self-identify and contribute. By building on existing emergency management consultation mechanisms, relationships and networks, Canada's Platform is efficient and effective. Partners include other federal departments, provinces and territories, first responders, the private sector, academia and the not-for-profit sector. The Platform also creates opportunities for interested parties outside of existing consultative structures by having open and free membership to any Canadian.

Canada's Platform endeavors to build a safer and more resilient Canada through the reduction of risks and leveraging the capacities and opportunities across all sectors and the public by raising awareness and providing strategic advice to policy makers through inter-disciplinary collaboration. Canada's Platform is unique in that it:

- Advances the field of emergency management to promote a safer and more resilient Canada by bringing together any Canadian or organization that is interested in disaster risk reduction;
- Fosters collaboration and cooperation by providing a space through which interested members can participate in disaster risk reduction initiatives, including leading working groups;
- Builds on existing networks, providing an umbrella forum through which to work, share ideas across silos; and
- Governs itself through an Advisory Committee, the structure of which was approved by the members themselves.

A key component in providing spaces for people to come together to discuss disaster risk reduction is the Annual Roundtable, which facilitates implementation of Canada's Platform activities, and serves as an open multi-stakeholder mechanism for dialogue on national disaster risk reduction issues.

The first Roundtable was held in Fredericton, New Brunswick in 2010. A year later at the Ottawa Roundtable, participation had doubled from 70 participants to close to 150.

The theme for the 2012 Roundtable is *From Reaction to Resilience.* Canada has the capacity to react to emergencies and provide support to communities across the country, but moving from reaction to resilience requires an increased focus on disaster risk reduction and engagement of all sectors of the economy and communities. The Roundtable is an opportunity for all stakeholders across society to share their experiences and insights on building national and community resilience and to contribute to reducing disaster risks in Canada.

The Roundtable is not the only success of Canada's Platform. Four working groups have emerged, each as a response to an identified need by the community; Resilient Communities, Volunteer Sector, Science and Technology, and Private Sector Partnerships. It is the membership itself that develops the Terms of Reference for each working group, identifies Chairs, and participates in activities. The working groups build on existing partnerships within emergency management, encourage the ongoing participation of collaborators from various fora, and provide an opportunity to continue integrating regional and operational perspectives into related emergency management policy research, analysis, development and implementation.

An example of a working group initiative is an information poster designed, produced and distributed by the Resilient Communities Working Group. The poster has a simple ten-point check-list outlining how to become a "resilient community" and how to participate in the United Nations' Making Cities Resilient campaign.

Canada's model and innovative activities in disaster risk reduction are unique and there has been interest expressed from other countries and from the United Nations in learning from the Canadian experience.

For further information on Canada's Platform, including how to become a member, please see our website

http://www.publicsafety.gc.ca/prg/em/ndms/drr-eng.aspx

or email the Secretariat (drr-rcc@ps.gc.ca). For copies of the poster, please email the Secretariat.

DISASTER MITIGATION OPPORTUNITIES FOR VILLAGE OF PERTH-ANDOVER AND TOBIQUE FIRST NATION

By: ***Ernest MacGillivray***
Alignment Champion / Championne de l'harmonisation
Public Safety / Sécurité Publique
Tel. 506-453-4469 Cel. 506-444-1311
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Description of the 2012 Ice Jam Flood

The onset of the spring freshet this year was a month earlier than usual, due to abnormally high temperatures and rapid snow melt. Temperatures reached an extraordinary 24c above normal. Flows peaked in late March rather than early May, which is the norm. The warm temperatures and rapid melting raised and broke ice covers and ice ran throughout the St John Basin before ice had opportunity to weaken in place. This created favorable conditions for the creation of ice movement and ice jams and associated flooding.

An ice jam formed on March 22nd on the St John River below Perth-Andover, resulting in what is believed to be a record high flood, one and a half metres (five feet) higher than the previous high water mark reached in 1987. The Village declared a state of local emergency on March 23rd and ordered

a mandatory evacuation of areas adjacent to the river. Some 300 properties were affected to various degrees and some 500 people evacuated. The nearby Tobique First Nation evacuated approximately 50 residents, but the greater challenge was that the community was cut off for several days due to flooded local roads. While similar events occurred in 1987 and 1993, the magnitude of this event in both extent and impacts places it above all previous floods in Western New Brunswick.

The extent of damage and disruption and the unusual circumstances prompted government to not only help with recovery, but to look at all of the contributing factors and unique circumstances with a view to reducing the risk and impacts of similar events in the future. The recovery effort includes a $25 Million disaster financial assistance program, which will help with some modest post disaster recovery projects but there is wide recognition that more substantial mitigation efforts may be necessary to ensure the future long-term safety and viability of the community.

The Study

In April, Government committed to examine everything that could possibly be done to prevent or mitigate the risk, or reduce the impacts, of similar floods in the future. This study is looking into the nature of the river, known and anticipated flood risks, possible structural and non-structural mitigation measures, what the priorities should be and what practical and affordable options may be available. The work is being led by the Departments of Environment, Local Government, Public Safety and the Aboriginal Affairs Secretariat. The steering group also includes representatives from the Band and Municipal Councils, Village Manager and the Perth-Andover Flood Victims Committee.

The work itself is very broad, and involves officials from various disciplines across government and private sector contractors with specific technical expertise. The specific areas of investigation are:

- The known and anticipated risks of ice jam flooding, both generally, and as can be determined for the Perth-Andover area.
- The extent to which the St John River itself is a factor contributing to ice jam flooding, and possible measures that if implemented would reduce the risk of ice jam formation.
- Possible measures for managing ice and river flows that if implemented would reduce the risk of ice jam formation.
- Possible structural and non-structural mitigation measures that if implemented would reduce flood risk in the community as a whole.
- Possible structural and non-structural mitigation measures that if implemented would reduce flood risk to individual properties.

The study will make findings concerning each of the above areas of investigation, and where possible, identify viable options for mitigation investments, as well as any areas requiring further investigation. Each option offered is required to have a scientific or technical foundation to substantiate its feasibility. The report will be delivered to government at the end of August and some decisions may emerge soon after. This approach has helped to bring some stability and a sense of hope to what has been a fairly desperate situation. One substantial and positive outcome already achieved is good will and close collaboration among provincial officials, local officials and community residents, whose views and knowledge have become an integral part of the process that will ultimately inform decisions, decisions supported by science and local consensus.

Books!

REVISING THE HUMAN SIDE OF DISASTER

*By **Thomas E. Drabek, Emeritus Professor and John Evans Professor,** University of Denver* (zted@dd-do.com)

The second edition of *The Human Side of Disaster* is scheduled for publication in 2013. Responses (and sales) have been gratifying and I appreciate the opportunity to briefly describe: 1) some of my experiences since the first edition was released, 2) what is new in the second edition, and 3) a multiple use pattern.

1. Post-Publication Experiences: Because I learned a great deal from so many, I want to thank those responsible for helping me continue to grow. Most significant were a series of conferences and web-based seminars that began in November, 2009, when the book was hot off the press. I made a presentation at a plenary session at the annual meeting of the International Emergency Managers Association (IAEM) (Orlando, FL) and enjoyed my first formal book signing. Later that month, I addressed those attending the annual meeting of the Canadian Risk and Hazards Network in Edmonton, Alberta. Subsequent presentations were made at the annual meetings of the Utah Emergency Management Association (Salt Lake City, Jan., 2010); Regional Interagency Steering Committee, FEMA Region VIII, (Denver, March, 2010); the Western Colorado Regional Conference of Emergency Managers (Montrose, CO, September, 2010) and the Western Social Science Association (Reno, NV, Salt Lake City, UT, and Houston, TX, 2010, 2011, and 2012 respectively). Representatives from American Military University invited me to participate in one of their web-based seminars within their "Masters of Disaster Series" (February, 2010) as did the President of the Emergency Management Forum (August, 2010).

In June, 2010, I chaired a session at the annual Emergency Management Higher Education Conference (Emmitsburg, MD). Here four seasoned faculty members explained their reactions to "the human side" and classroom experiences. I was gratified by their reports and the insights derived from their experiences and those of their students. Subsequently, I revised my introductory remarks for publication (see, Thomas E. Drabek, "Expanding Our Vision of Emergency Management through Discussions of New Teaching Resources: *The Human Side of Disaster."* Pp. 59-79 in *Challenges of Emergency Management In Higher Education*, Jessica A. Hubbard [ed.] Fairfax, VA: Public Entity Risk Institute, 2011). In this essay I described: 1) the course I offered at the University of Denver for three decades titled "Community Response to Natural Disaster"; 2) the goals I had in writing this book which guided the use of fictional short stories, highly conversational style, etc.; 3) student and professional responses; and 4) the publishing process.

In October, 2010, I gave the closing keynote address at the Tourism Crisis Management Leadership Workshop sponsored by the Department of Tourism, Recreation and Sport Management, University of Florida in Gainesville. I learned a great deal during this conference especially regarding the complex and varied impacts of disaster on tourism—customers, businesses, and communities. And I also learned of new program initiatives by the Tourism Crisis Management Institute both here and abroad. A year later—October, 2011—I made plenary session presentations at the annual meetings of the state

emergency management associations in Indiana and Michigan. The Indiana conference was very special for many reasons, including a rather elaborate book signing arrangement for which I am most grateful. And it gave me a somewhat emotional opportunity to return to the site of my first disaster field study after nearly fifty years. There I was humbled to observe and photograph the memorial tablet that was placed there in 2002 for those who died in the Indianapolis Coliseum explosion (October 31, 1963). It is but one of the hundreds of examples that Henry Quarantelli, Ian Davis, Gary Webb and others have alerted us to recently, what they call "the Popular Culture of Disaster" (PCD). Their work, like that of Joe Scanlon and his team who have analyzed the folk songs from mine disasters in Nova Scotia, reflect new insights into dimensions of "the human side" that I have included in a new section titled "Reaching Closure" (see E. L. Quarantelli and Ian Davis, *An Exploratory Research Agenda for Studying the Popular Culture of Disasters (PCD): Its Characteristics, Conditions, and Consequences*, Newark, DE: Disaster Research Center, University of Delaware, 2011 and Joseph Scanlon, Nick Johnson, Allison Vandervalk, with Heather Sparling, "101 Years of Mine Disasters and 101 Years of Song: Truth or Myth in Nova Scotia Mining Songs," *International Journal of Mass Emergencies and Disasters* (30, no. 1, 2012, pp. 34-60).

2. What is New? In addition to new research studies and directions, the second edition includes two new fictional stories in the first chapter. The major characters in both are local emergency managers. As was the case in the first edition, these two individuals—one an African-American and the other a female Hispanic—reappear throughout the text to highlight key points that tie the fictional accounts into the research conclusions. This is especially true in the last two chapters which are mostly new material. In these (titled: "What Must Be Done?" and "Community Change Agents"), I have included more analysis of mitigation, risk communication, and the implications that derive from viewing disasters as nonroutine social problems.

The most important implication of this approach is an understanding of an expanded vision for the emergency management profession—community change agents. And this means that the concept of "crossfire" must be understood thoroughly by any who wish to be effective emergency managers. For, as Laurie Pearce pointed out nearly a decade ago, sustainable hazard mitigation inherently involves community conflict given alternative mixes of priorities and perceptions of the public good (see Laurie Pearce, "Disaster Management and Community Planning, and Public Participation: How to Achieve Sustainable Hazard Mitigation," *Natural Hazards* 28, nos. 2-3, 2003, pp. 211-228).

Finally, the second edition reflects my disaster "clipping file." And during the three years since we finished drafting the first edition, a lot of pain has been incurred by millions of people throughout the world. Most obvious, of course, is the devastating earthquake that hit the highly vulnerable nation of Haiti (January, 2010). And I suppose only a very few could have ever envisioned the environmental impacts of the *Deep Water Horizon* catastrophe. Uncertain risks remain with the Fukushima nuclear power plant following damages from the earthquake and tsunami that hit the northern coast of Japan in March, 2011. Closer to my home, of course, are the numerous wildfires which caused hundreds to loose homes during the summer months of 2012.

Additionally, the many faces of disaster were illustrated by deadly tornado outbreaks, dozens of highly destructive wildfires and floods, and all too many "Lone Wolf" shooters. While most of us in the states applauded the killing of Osama bin Laden, the January (2011) rampage in Tucson that left among the dead and injured, former Congresswoman Gabrielle Giffords, provided lessons in "reaching closure" that are as intense as they are saddening. And now we as a community

are just starting the process anew because of the lone shooter massacre that left 12 dead and 58 injured at a theater just a few miles from our home in Denver (just after midnight early on Friday morning, July 20, 2012). The parallels in response and initial recovery actions placed the Tucson incident in new context for me since I had examined it in detail, especially through the eyes of former Congresswoman Gabrielle Giffords and Mark Kelly (with Jeffrey Zaslow) (*Gabby: A Story of Courage and Hope*, New York: Scribner, 2011). So too, our community healing will move forward in the coming months.

But these clusters of pain continue to be blunted by remarkable stories of courage, resilience, and renewal. Many I have summarized are at the individual, family, or community level. Big picture analyses of worldwide transformations by Tom Friedman, Fareed Zakaria and Anthony Giddens, however, set the stage for interpreting the "whole community approach" being introduced by FEMA officials who were appointed by President Barak Obama. It is a dramatic shift from the drift toward the terrorism focus of the Bush administration. And while it is only a first step, in my opinion, it clearly resonates well with the vision of community change agents that I posit for the profession. As I conclude in the final two chapters, it is this vision that offers hope despite the trend lines postulated by these and other "big picture" analysts. It is this vision that can help press the emergency management profession toward the more strategic approaches required to address the forms of disaster that are coming in the decades ahead.

3. Multiple Use Patterns: Part of the success of the first edition reflects multiple patterns of use. I am most gratified that this has happened and hope it will continue once the new edition is available. Let me note ever so briefly four of these observed within college and university settings: 1) classroom use as core text with instructor's booklet (available free from CRC Press with adoption) used for guidance in classroom discussions and activities; 2) classroom use as core text with student determined additional readings such as integration with one or two instructor approved case studies; 3) classroom use as core text along with one or two additional core texts, e.g., sociology course on "disaster victims" or geography course on "natural hazards," 4) classroom use as core text with instructor created collection of supplemental readings in booklet form or on library reserve.

In contrast, emergency managers, especially those employed within local or state governments have reflected three patterns of use: 1) personal resource, e.g., "This is my key reference book"; 2) training resource, e.g., "In many of my training sessions with personnel in other agencies and community groups, I use your book all the time."; and 3) resource for others, e.g., "I want you to sign this one to this name—he is my mayor and I really think he will read it and then pass it along to some of our other elected officials." And finally I would be remiss if I didn't note my own humility and personal satisfaction on those occasions when the book was given as a "door prize" for some of those attending one conference or another.

My sincere thanks to all those who have used the book in one of these ways or others. I'm confident that the second edition will not disappoint. We have worked really hard on it—both to keep the text conversational and flowing and, especially through the footnotes, to bring the analysis to a new level of depth reflecting what I continue to learn from others.

CANADIAN DISASTER MANAGEMENT TEXTBOOK

Overview by: ***Brenda L. Murphy***

Available at: http://www.crhnet.ca/

Brenda L. Murphy (bmurphy@wlu.ca) and David Etkin (etkin@yorku.ca) have recently released an edited, on-line textbook about disaster and emergency management designed for Canadian post-secondary students.

The textbook, hosted by CRHNet, is a collection of chapters by Canadian disaster academics and practitioners on such topics as an overview of important risks facing Canadians (Introduction), legislation and policy, vulnerability, the disaster management cycle and case studies. It meets a gap in teaching materials that are Canadian focused. The book avoids generic topics in the field that are well covered by many other textbooks; instead it pays more attention to issues of particular Canadian interest or specialized topics. The editors want to thank all the contributors for their diligence – the quality of the submissions is superb! As a "living document" on the internet, the textbook is freely available to all who are interested in the field of Canadian disaster and emergency management. Another advantage of the online environment is that existing chapters can be easily updated and new chapters added.

At the moment there are several topics listed for which we do not yet have a chapter. Ideas for new topics are also welcome. We would like to invite anyone interested in contributing, including students finishing graduate research projects and practitioners, to contact us. All papers are peer reviewed prior to being uploaded to the website. We would also be interested in any feedback or questions you might have.

WOMEN CONFRONTING NATURAL DISASTER: FROM VULNERABILITY TO RESILIENCE

By: ***Elaine Enarson***

"Outstanding.... Compelling and insightful. This book will become a classic in the disaster literature." —Lori Peek, Colorado State University

Natural disasters push ordinary gender disparities to the extreme—leaving women not only to deal with a catastrophe's aftermath, but also at risk for greater levels of domestic violence, displacement, and other threats to their security and well-being.

Elaine Enarson presents a comprehensive assessment, encompassing both theory and practice, of how gender shapes disaster vulnerability and resilience. Elaine Enarson is a cofounder of the Gender and Disaster Network.

CONTENTS:

- Women and Disasters.
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- How Gender Changes Disaster Studies.
- Measuring Vulnerability and Capacity.
- Health and Well-Being.
- Violence Against Women.
- Intimacy and Family Life.
- Houses and Homes
- Work and Workplaces.
- Grassroots Groups and Recovery.
- Building Disaster Resilience.
- Fighting for the Future.
- Appendix: A Guide to Resources

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THE BELGIAN FIRST AID & SUPPORT TEAM (B-FAST)

In this article, ***Lieutenant-Colonel Hans De Smet*** and

Professor Dr. Ir. Jan Leysen (Belgian Royal Military Academy), briefly introduce the Belgian First Aid & Support Team (B-FAST).

Background

As a nation, Belgium has the obligation to extend help to countries that are hit by a disaster and ask for international relief. In this context, when major earthquakes struck north-western Turkey in 1999 (the Izmit earthquake of August 17 causing death to more than 17,000 people, and the Düzce earthquake of November 12 causing nearly 1,000 fatalities), Belgium was on both occasions among the first countries to provide assistance.

Although both operations, which were very much appreciated by Turkey and the international community, can be considered as very successful, the Belgian Government found it necessary to set up a permanent framework for international aid and support, allowing to mobilize emergency teams very quickly at any time, and to send them abroad to countries hit by a disaster. On November 10, 2000, the Belgian Federal Council of Ministers approved the creation of such a rapid response structure which has been legalized by the Royal Decree of February 28, 2003, regarding the creation of a coordination board with regard to emergency relief in foreign countries, and of B-FAST as a supporting permanent service.

B-FAST is a federal interdepartmental structure under the authority of the Coordination Board, presided by the Minister of Foreign Affairs (MFA). An organization chart is given in the figure below.

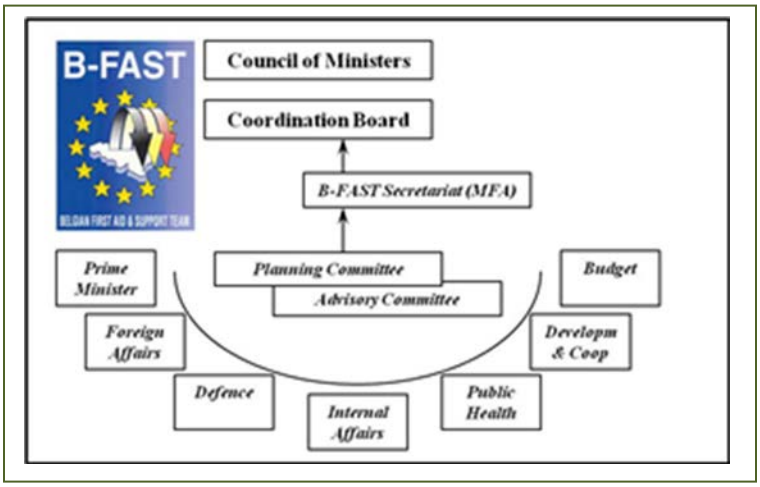

Figure 1: Organizational Chart

Procedure to start a mission

When a country asks for relief, the president of the B-FAST Secretariat (the permanent body of the organization) convenes the Planning Committee (responsible for strategic support) and the Advisory Committee (experts and representatives from NGOs) in order to prepare a proposal for a B-FAST mission. The proposal will be presented to the Coordination Board and when there is a consensus, the Council of Ministers has to take the final decision to start the mission.

A B-FAST mission is possible if the three following conditions are met:

- A major disaster has stricken a foreign country in a way that its own emergency management organizations are not able to manage the situation and, the security or well-being of the population is jeopardized.
- The country must not be the scene of any armed conflict.
- The authorities of the foreign country have to ask for assistance from Belgium, either by bilateral diplomatic means, or by means of the international community (i.e. when the authorities of the stricken country indicate that they accept international relief).

Each B-FAST mission is a priori limited to a period of 10 days. This limitation has been consciously introduced in the Royal Decree to indicate that a B-FAST mission is about providing initial emergency relief. If necessary, the Coordination Board can decide to extend the duration of the operation.

Since speed is very important in the event of an emergency situation, the participating teams must be mobilized within 12 hours of the decision to intervene.

A modular approach

Regardless of the type of disaster, initial emergency relief operations are very much alike, which permits the establishment of a standardized approach. Besides, several different partners are involved in a B-FAST mission. For that reason, the Belgian authorities decided in favor of a modular approach consisting of one basic module providing several generic and multidisciplinary functions (e.g., mission leadership, logistical support, medical support, communication, security and administration &budget), which will be completed by one or more specific modules (e.g., Airdrop, CBRN, inundations, storms, field hospital, etc.). The advantage of such a modular approach is that all tasks and functions can be properly planned and trained in advance.

B-FAST administers an annual budget which is approved by the Coordination Board. Approximately 65% of the budget covers costs related to operations, including the training of B-FAST personnel and maintenance of the vehicles used during training and operations. The remaining 35% are used for investments is resources and consumable resources.

The staff engaged in the B-BAST operations comes from different public services (Foreign and Internal Affairs, Public Health and Defense) sometimes complemented by personnel coming from international organizations and NGOs.

B-FAST operations

The following table gives an overview of the B-FAST operations from 2003 until 2010.

Year	***Operation***
2003	• March: Algeria (landslide) • December: France (floods) • December: the Philippines (landslides) • December: Iran (landslide)
2004	• January: Iran (Bam earthquake) • February: Morocco (earthquake) • August: Paraguay (forest fire in Asunción) • December: the Philippines (hurricanes) • December: South-East Asia (Tsunami)
2005	• July: Rumania (floods) • August: Niger (famine) • August: Bulgaria (floods) • August: United States of America (Hurricane Katrina) • October: Pakistan (Kashmir earthquake)
2006	• April: Bulgaria and Rumania (floods) • May: Suriname (floods) • August: Ethiopia (floods)
2007	• August: Peru (earthquake) • July: Pakistan (floods) • October: Ghana (floods) • November: Mexico (floods)

Table 1: Overview of B-FAST Operations (part one)

Year	*Operation*
2008	• May: Myanmar (Nargis Cyclone) • May: China (earthquake)
2009	• January: Gaza (humanitarian relief) • September: Sumatra (Padang earthquake)
2010	• January: Albania (floods) • January: Haiti (earthquake) • July: Romania (floods) • December: Haiti (cholera) • December: Montenegro (floods)

Table 2: Overview of B-FAST Operations (part two)

SUPPORTING LGBTQ RESILIENCE IN DISASTER AND EMERGENCY MANAGEMENT: A LITERATURE REVIEW

By: ***Marcilyn Cianfarani***
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Individuals and communities marginalized by social, economic, and political processes are often further marginalized during and in the aftermath of disasters (Enarson & Walsh, 2007). International disaster research shows that lesbian, gay, bisexual, transgendered, and queer (LGBTQ) people are discriminated against during disaster response and recovery based on their sexual orientation or gender identity and that their specific vulnerabilities and capacities are often overlooked (Gaillard, 2011). This research also shows that little is being done to sensitize policies and practices for this particular population.

Vulnerability is the interaction of social, political, cultural, and physical processes that put people in harm's way (Enarson & Walsh, 2007). Inequalities and differences based on sex and gender may lead to the denial of the fundamental human rights for certain individuals. (Enarson, Fothergill, & Peek, 2007). While social vulnerability, capacity, and resilience in Canadian disasters have not been well-documented, evidence from previous incidents in Canada such as SARS, and the 1998 Ice Storm reinforce the need to recognize marginalized populations in order to create better mitigation, response, and recovery capabilities and to lessen the economic and social impact of disasters (Enarson & Walsh, 2007).

The social determinants of health are the primary factors that shape the health and well-being of Canadians and are indicators of social vulnerability (Enarson & Walsh, 2007). Examples of determinants include income, education, housing, gender, race, and disability and enable people to resist and recover from the shocks of everyday life (Mulé et al., 2009). These factors relate closely to those that promote disaster resilience. Challenges in emergency management, then, pose the same challenges as promoting health equity in sustainable communities (Enarson & Walsh, 2007). Canadian action on improving health equity by addressing the social determinants of health has been profoundly lacking and evidence suggests Canadian public policy in recent years has served to increase social inequities among Canadians (Raphael, 2010).

Health policy literature indicates a greater emphasis needs to be placed on including gender and sexually diverse populations in policy development. Minority communities invisible to policymakers are not included or considered in policy or planning processes, and are over-looked during critical incidents and other emergency situations (Colvin, 2010). Health policy challenges faced by same sex couples in the United States include the refusal to recognize same sex partners as next of kin, and the denial of rights for hospital visitation and end of life decisions (Labella & Singh, 2008). "Despite the changing legal landscapes in Canada over the past decade LGBTQ people continue to face discrimination and abuse, and improving safety continues to be a key touchstone for policy makers and practitioners engaging with LGBTQ lives" (Browne, Bakshi, & Lim, 2011, p. 739).

The unique health and social needs of LGBTQ people are not recognized and often ignored by mainstream disaster relief and recovery efforts. Following 9/11, LGBT organizations in New York worked to fill gaps left from mainstream efforts demonstrating the importance of these groups and agencies to engage local leadership and build on community capacity (Eads, 2002).

In the aftermath of the 2004 South Asian tsunami, the Aravanis, a sexual minority, were denied access to shelters, housing, and livelihood support, often eating leftovers thrown away by others living in the temporary shelters (Pincha & Krishna, 2008). Although shelter and disaster relief providers are subject to universal declarations and principles that prohibit discrimination based on gender stereotypes and gender identity, LGBTQ people remain unsafe in emergency shelters (NTCE, 2009). Following Hurricane Katrina, Sharlie, a transgendered woman, was arrested, detained in jail, and separated from her family for using the women's shower in an emergency shelter (Carter, 2007).

Research findings on the safety needs of LGBTQ people in the city of Toronto illustrate experiences of harassment, vandalism, damage to private property, and assault that have occurred in neighborhoods, and workplaces (Cameron, 2009). Although crime rates have been shown to decrease in disasters, those at risk of violence remain so during and after a disaster (Philips, Jenkins, & Enarson, 2010). Following the 2010 Earthquake in Haiti, lesbian and bisexually-identified women reported that sexual violence and corrective rape were problems in the internally displaced person (IDP) camps (IGLHRC & SEROVie, 2011). Violence often remains unreported by LGBTQ people for fear of further victimization and it remains one of the least examined behaviours in disaster contexts (Philips, Jenkins, & Enarson, 2009).

Despite documents such as the United Nations Universal Declaration of Human Rights, the Yogyakarta Principles: An Application of International Human Rights Law in Relation to Sexual Orientation and Gender Identity *Canadian Charter of Rights and Freedoms*, and the *Canadian Human Rights Act*, LGBTQ people in Canada continue to face discrimination. While international research suggests LGBTQ people face further discrimination in the wake and aftermath of disasters, little is known about LGBTQ people, their needs, vulnerabilities, and capacities and disaster and emergency management in Canada. An inclusive disaster risk reduction should include disaster preparedness initiatives that contribute to the resilience of LGBTQ people, households, and communities.

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Marcilyn Cianfarani works as a Paramedic in the City of Toronto and is completing a graduate degree at Royal Roads University. She is currently conducting a research study with participants from the LGBTQ community in the City of Toronto in partial fulfillment of the Master of Arts in Disaster and Emergency Management. She hopes this research study will promote awareness to the emergency management community while contributing to the health and well-being of LGBTQ people, households, and communities during or in the aftermath of a disaster or mass emergency

DEVELOPING A COLLABORATIVE ENVIRONMENTAL DECISION MAKING MODEL TO SITE A NUCLEAR FUEL WASTE REPOSITORY IN CANADA

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Executive Summary

Like many other countries with nuclear power programs, Canada is beginning to decide how used nuclear fuel waste should be managed and disposed of over the long term. Canada has committed to developing an underground disposal facility (known as a deep geologic repository or DGR) as the preferred method to store and isolate used nuclear fuel waste. The DGR is designed to safely isolate used nuclear fuel waste 500-1000m underground for many thousands of years (NWMO, 2010a). The Nuclear Waste Management Organization (NWMO) is currently undergoing the first stages of an open site-selection process to site a DGR (see NWMO, 2010b). The inevitable uncertainties associated with storing nuclear fuel waste has polarized stakeholders, resulting in a highly conflictive decision-making environment (Leiss, 2008; Murphy, 2009). Developing decision-making processes that bridge polarized viewpoints, while actively engaging both local and regional stakeholders remains a challenge.

Collaborative Environmental Decision-Making (CEDM) has emerged as a decision-making process specifically oriented at overcoming entrenched positions, and including stakeholders from beyond the local community (Randolph & Bauer, 1999; Conley & Moote, 2003). The focus is on resolving disputes before they become entrenched, solving problems through dialogue, encouraging team building, and (sometimes) sharing power to formulate creative solutions (Daniels & Walker, 1996). The CEDM process shares some key principles with the open siting approach, particularly the ideas of active participation, access to resources, and information sharing. The difference between the two processes is related to scale and orientation. The open siting approach focuses on providing a voice and decision-making power to the local geographic community, but seems relatively silent on specific methods to bridge entrenched stakeholder positions or involve stakeholders beyond the local scale. In contrast, the CEDM approach is specifically oriented towards processes that are useful for developing stakeholder relationships. Although CEDM has not been applied at a national scale, it has been utilized beyond the confines of geographic community-level stakeholders and local-level siting to include much broader spaces and communities of interest (see e.g. Dreelin & Rose, 2008; Selin & Chavez 1995).

Although the ideas of collaboration have permeated the NWMO's policies, plans and documents since 2002, the term has remained poorly defined. This research assesses how collaboration has been framed by the NWMO and to what extent these ideas about collaboration embrace the tenants of CEDM. It argues that while some aspects of CEDM already exist within the NWMO's current approaches, as it moves through the site selection process, there is an opportunity to further expand collaboration throughout the decision making process. In particular, a CEDM-informed process would give voice and power to stakeholders outside the municipal boundaries, while actively bringing dialogue and two-way communication aimed at bridging polarized stakeholder positions that have typified nuclear siting activities to date. This research also identifies how the NWMO open siting model could be improved to better embrace and realize the ideas of collaboration.

Purpose & Objectives

The overall purpose of this research is to develop a modified CEDM-informed site selection model. The model highlights the idealized principles of CEDM used for this study: power sharing, open dialogue and discussion, information sharing, representation and access to resources.

The three objectives of the research study are:

1) Describe and evaluate how the NWMO frames and operationalizes the idea of 'collaboration'.
2) Assess the potential of incorporating the five ideal components of the CEDM process into the NWMO's siting and decision-making approaches.
3) Develop a modified site selection process informed by the principles of CEDM.

Objective one was achieved via a document analysis of twenty-six official NWMO published reports. Objective two utilized semi-structured interviews with eleven key informants currently engaged and experienced with NWMO's siting process. Together these insights led to the development of the modified CEDM-informed site selection model (objective three).

Results

The NWMO site selection process could benefit from the ideas of CEDM to better define and realize 'collaboration'. The study highlighted a need for open forums where interested, engaged, and knowledgeable stakeholders can regularly meet and engage directly with each other. This process could work to resolve differences early on, rather than deferring problems to the Canadian environmental assessment agency (CEAA) environmental assessment process, or the Canadian nuclear safety commission (CNSC) licensing hearings. Both these processes occur after the decision to site has been made. The current site selection process also lacks sufficient resources to facilitate the participation of both local and broader stakeholders. Currently the NWMO provides some funding to the municipality to distribute (as they see fit) to local groups with a demonstrated need, however no financial resources are provided for groups outside the municipal boundary.

A central finding of the study is that there remains significant differences of opinion regarding who should be allowed to participate in the decision-making process. Representatives from the nuclear industry, along with municipal and federal government representatives, believe the process should remain focused on the local community. Interest group and NGO respondents however believed that people from beyond the local community should be allowed to participate. NGO respondents were concerned that the use of the municipal border as the boundary of the 'community' is problematic, and could be used to exclude people.

There is also great uncertainty as to how communities along transportation routes will be incorporated, and what method(s) will be used (rail, water, road) to ship the waste. Transportation discussions don't take place until late in the siting process (see NWMO, 2010b). Several respondents were critical of this, believing transportation issues should be front and centre as siting and transportation are intrinsically linked. NGO and interest group respondents also expressed concerns that the current site selection process (although clear on paper) lacks sufficient details regarding key decision-points, who the participants are, how they will participate, and so forth. This uncertainty has discouraged many interested organizations from investing in the process so far.

Respondents from NGO and interest groups felt that so long as it is 'business as usual' and waste is created each day that no groups would be willing to enter into a collaborative process until a decision was made to phase-out nuclear energy. Many of the respondents felt that Canada needed to take a step-back, address the fundamental problems of the NWMO, their mandate, and Canada's nuclear future before the siting process should proceed. The deep tension between NGO and interest group respondents with the NWMO is still perhaps the biggest barrier to collaboration.

Recommendations

The recommendations of the research study are based on the research findings.

- *CEDM forums at each stage of the site selection process in each interested community*

The site selection process should provide open forums where all interested, engaged and knowledgeable stakeholders can engage directly with each other. Since the use of economic regions have previously been mandated by the Nuclear Fuel Waste Act (2002), CEDM discussions could involve discussions with all communities in the affected economic regions (see Kuhn & Murphy, 2003). This unit of scale would help incorporate broader stakeholder views, and could bring dialogue between local community members and broader stakeholders. Although there is still the need to have national-level dialogue, utilizing this existing legislation is an immediately implementable opportunity that nudges the process towards CEDM. Furthermore, CEDM has a proven track record at the regional scale (e.g. Randolph and Bauer, 1999; Conley & Moote, 2003; Moote, McClaren, & Chickering, 1997). The insights from these successes could be harnessed to facilitate the implementation of the CEDM approach for the siting of a Canadian DGR.

- *Transportation should become an intrinsic part of the siting process*

Transportation was a recurring theme that arose from the interview process. Respondents were uncertain how the issue would be incorporated into the site selection process, who the participants would be (each community along the transportation route) and what influence they would have. Respondents felt that transportation must be discussed early and throughout the entire siting process, as siting and transportation are intrinsically linked.

- *The establishment of an independent funding organization*

Stakeholder groups (with a demonstrated need for funding) who are engaged and knowledgeable about the process must be able to access a sufficient and sustained amount of intervener funding to facilitate the kind of participation required for the CEDM process. Funding allows for third-party verifications, independent oversight, and generally results in a greater acceptance in the final decision.

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RISK COMMUNICATION PREFERENCES AMONG GODERICH RESIDENTS FOLLOWING THE AUGUST 21ST, 2011 TORNADO

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Introduction

At approximately 4:00 p.m. on Sunday, August 21st, 2011 a tornado moved through the small town of Goderich, Ontario (Figure 1). Subsequent damage surveys conducted by Environment Canada determined that the tornado was an F3 on the Fujita Scale of Tornado Intensity, with maximum wind speeds of 280 km/hr (Environment Canada, 2011).

Figure 1: Goderich, Ontario. (Harris, 2012)

As a result of this storm, one individual was killed and at least 39 others were injured, five of whom required urgent medical assistance. The town of Goderich was significantly affected by this disaster, which has resulted in at least $75 million in insured damages (IBC, 2011).

Three days later on August 24th, 2011 a second storm system affected the Great Lakes region. As a result of antecedent atmospheric conditions, Environment Canada issued a tornado watch for much of southern Ontario early that morning. Later that afternoon, Environment Canada upgraded the tornado watch to a tornado warning for the town of Goderich. Although there was no tornadic activity in the Goderich area, the severe thunderstorm did bring heavy rain and strong winds to the region. This subsequent storm system also caused substantial damage to many buildings that had been structurally compromised during the tornado.

Methodology

The August 21st, 2011 tornado and the subsequent storm system on August 24th represented a rare opportunity to examine how Canadians respond during high-risk weather events. A research project was initiated immediately after the Goderich tornado with the goal of better understanding how individuals in Goderich obtained, interpreted, and disseminated important risk information during these two events. A secondary objective was to determine whether and how such information motivated protective behaviours. To do so, 35 semi-structured interviews were conducted between September and November, 2011. Following the completion of the interviews, a questionnaire was developed to determine the generalizability of some of the interview results. A total of 268 completed questionnaires were entered into data analysis. The interviews were transcribed and then analyzed using thematic coding to reveal response patterns, while the questionnaires were analyzed using IBM SPSS software.

Results

Participants were asked a series of questions regarding their usage of weather products, including which products they preferred and how often they accessed weather information. Half of the respondents indicated that they checked the weather at least once per day, while 38% of questionnaire respondents indicated that they only checked the weather if there was a special reason for them to do so (such as planning a trip or an outdoor event). Most participants agreed that they were more likely to check the weather if severe weather had been forecasted for their area. Over half (67%) of questionnaire respondents indicated that they tried to avoid traveling during a weather warning.

Most respondents agreed that they trusted forecasts issued by Environment Canada, the local news (either radio or television), and the Weather Network. When asked how often they accessed specific weather sources, the local radio station was the most commonly cited medium, with 47% of questionnaire respondents accessing radio weather reports at least once per day. Internet sources, including the Environment Canada website and the Weather Network website were accessed less often, with only 25% of participants using these services once per day. Cell phone "apps" were the least accessed medium, with 50% of respondents rarely or never using this service. A large portion of respondents (30-35%) indicated that they rarely or never checked the weather sources cited in the questionnaire.

Participants were also asked to identify the most effective way to disseminate weather warning information to individual end users (Figure 2). The majority of questionnaire respondents (33%) indicated than an outdoor warning siren would be the most effective warning medium. Other respondents indicated that an automated text message (19%) or telephone call (15%) would be their most preferred method. Only five respondents indicated that an Environment Canada weather radio would be their preferred method of warning communication. Seven respondents indicated that there was no one "best" method for communicating a warning, and that multiple methods should be used whenever communicating severe weather information to the public.

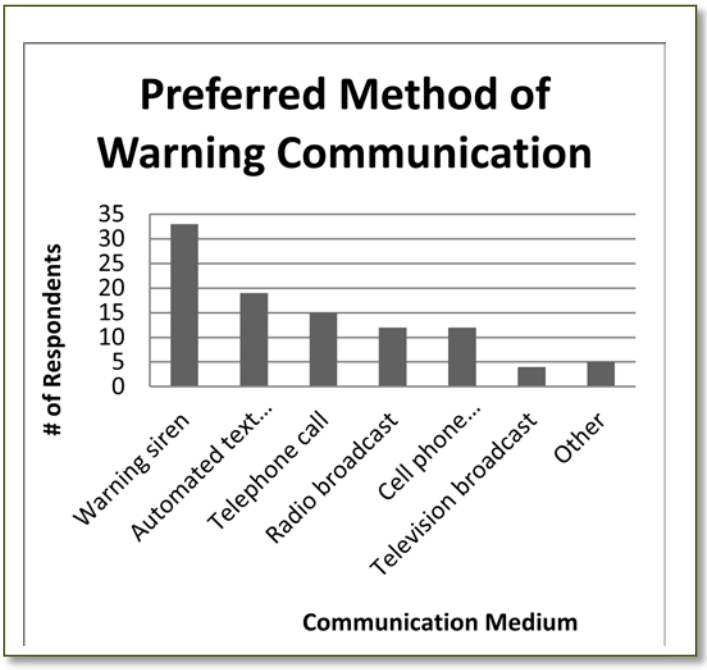

Figure 2: Preferred methods of communicating a severe weather warning to the public.

Conclusion

The August 21st, 2011 Goderich tornado provided the opportunity to examine risk communication preferences of Canadian residents following a significant disaster. Both the interview participants and the questionnaire respondents clearly expressed the desire for a weather warning siren to be installed in the town of Goderich. Others indicated that an automated notification system (either by telephone, text message, or cell phone "app") would be greatly beneficial during severe weather.

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Amber Silver is a doctoral student in the Department of Geography at the University of Waterloo. She is particularly interested in hazards and disasters from within a Canadian context.

For additional information about this research project, including forthcoming publications on risk perception and decision-making during the Goderich tornado, please contact the author.

THE EFFECTS OF THE SEMIPALATINSK TEST SITE ON THE KAZAKH POPULATION

By: ***Leo Pukhovich,*** *York University DEM student*

In 1996, Francis Coppola, a well-known American film maker produced a movie about a boy with a unique aging disorder who looked like an old man. But the hero of the film played by Robin Williams has a real prototype - Nurzhan Urkeshbayev, a young Kazakh man with a rare genetic disease that causes premature aging of the human body. He was born in 1991 in a small village near Semipalatinsk, which was the Soviet Nuclear Test Site akin to one in Nevada, U.S.

In 1991, the year when Nurzhan was born and when Kazakhstan got independence, the polygon in Kazakh steppe was closed down. But for those people who lived in vicinity of Semipalatinsk it was cold comfort because the number of the nuclear tests that had been conducted in the region for 42 years were comparable with a nuclear war. According to Nazarbayev (1999), "The USSR has conducted a total of 527 nuclear tests at the Semipalatinsk test site of which more than 100 were above ground tests. The effected population counts approximately half a million".

Despite the fact that people in nearby cities felt an earth tremor during the nuclear tests, the truth about the polygon and its secret command center, Kurchatov, was not known to general public. The Semipalatinsk Test Site (STS) was built as a result of cold war in response to American nuclear program, but it turned out that the Soviet government unleashed a clandestine war against its own people. Those who succumbed to thyroid disease and cancer due to exposure to radiation, and those who were born with genetic diseases became innocent casualties of that war, which cannot be justified or forgotten.

Many critics of the Soviet state in contemporary Kazakhstan, including the incumbent president Nazarbayev, blame Stalin and his cohort for harming human's health of thousands of people who lived near the Semipalatinsk test site. They claim that health is the most important factor of human's life, and nobody else but only a person himself/herself can endanger his /her physical wellness. So the argument goes, the Soviet political and military regime for more than 40 years neglected the human's rights of its own people by testing nuclear weapons in vicinity of populated areas. As a result, they state, it caused different medical problems including cancer, thyroid, premature aging, and birth defects.

Indeed, like in Hiroshima and Nagasaki, leukemia is the one of the most common forms of cancer in Semipalatinsk. After Kazakhstan got independence in 1991, different foreign scientific studies have been conducted on the territory of STS. One of them, held by Kazakh and Japanese scientists "noted that the rate of cancer in those living in eastern Kazakhstan, the area most exposed to radiation, remains 25-30 percent higher than elsewhere in the country." Kassenova (2009).

Some analysts in Kazakhstan claim that STS was needed for the Kazakh leaders to shift the blame of social ills on their predecessors, the USSR government - a ruse to get the Kazakhs believe their problems are caused not by corruption and inefficient governance but by Semipalatinsk Test Site. So the polygon was and is still playing the role of the lightning rod.

On the other hand, no one can put under question statistics which states that people in the area have a high level of ontological diseases. According to Lernager (1992) "at least 60,000 people in the region have died from radiation-induced cancers".

Those who claim that STS caused different genetic diseases give support to their argument by presenting statistics of Organic Defects of Developments in Semipalatinsk (2010) which says that "About half of the Semipalatinsk Pediatrical Surgical Hospital's Organic Defects of Development patience originated from Kurchatov and nearby villages". As a shocking example, the Kazakh mass media demonstrate a sick boy, who was born near the polygon with a rare genetic disease that causes premature aging. His tragic life became the symbol of anti-nuclear movement in Kazakhstan, and was one of the factors that made the USSR close down the polygon in 1991. Although even such a strong argument in support of the statement that STS caused organic defects can also be attributed to the fallacy of statistics of small numbers. Moreover, in Canada where there were never nuclear tests, a case of similar genetic disease occurred in 1992 in North Alberta. According to CBC(2009), "Ashley Hregi, 17 was one of 53 people in the world – and three in Canada – with Hutchinson – Gilford Progeria Syndrome. There is no known cure, and most children with the condition usually die around 13".

In can be concluded that the STS did cause the increase of diseases in the region, but the polygon is not the only culprit. As in a case of any disaster, which without any doubt was the STS, the government's indifference played no less detrimental role than the nuclear tests themselves.

For more than four decades, people in Semipalatinsk oblast had been living unaware of the harm to their health inflicted by the STS. For people who lived in Kurchatov, the Polygon was their working place, which they opted voluntarily. Many of them considered their work as a patriotic mission to defend the country from American invasion. Financial benefits and comfortable life in the scientific center made Kurchatov with population of 30,000 people one of the artificial islands of communism in the Kazakh steppe. Indigenous people of the country, the Kazakhs, constituted the majority of the population of the Semipalatinsk and neighbouring oblasts. As nomadic people, the Kazakhs considered the land near the STS as their natural habitat and didn't worry about their health conditions. The Soviet state clamped down on any attempt of nonconformity, and it was in people's blood.

But Gorbachev's politics of openness (glasnost) broke the shackles of the totalitarian state and let Soviet people speak out. As a result, in a short period of time, people of 1/6 of the world's territory, which was the USSR at that time, were overwhelmed by influx of negative information. The STS suddenly became a cursed place, and people who lived there turned into outcast. It was done in such a cruel way, that even young men and women from Semipalatinsk oblast tried to hide their origin from their peers out of fear to be rejected.

Therefore, while discussing the increase of psychiatric diseases in the area of STS, the nuclear tests cannot be singled out as the only cause of the problem. However, it would be wrong to deny the fact that the nuclear tests exacerbated the other reasons, which all together affected the psychiatric health of the population of the big region.

Since the Christ times, human beings have always blamed the victims. The STS has not become an

exception. The Kazakh official propaganda has been stoking the fire of STS since its closure in 1992. But instead of sympathising the STS people, public opinion in Kazakhstan turned against them. For many people of the other regions, the additional funding and benefits the population of Semipalatinsk oblast receive triggered jealousy and animosity towards the STS population because they accept the victims of radiation as people who look for privileges they don't deserve. Moreover, people who were born and lived in the inflicted region suddenly became singled out and outcast by society. Middle-aged people are discriminated while applying for a job due to the ingrained stereotype that their health problems might cause low productivity. Young people have problems in private life due to the fear that their future children might be born with genetic diseases. Even in Japan, a country with long working democratic institutions, "there has been an organized effort to trivialize the nuclear disaster including a few supposed experts asking for evacuation zone to be lifted and claiming the evacuations were more damaging than the nuclear fallout. This rather bizarre concept plays heavily on the claim of radiophobia, which states that people's fear of radiation is the real problem, not the damaging effects of radiation". (Radiophobia, 2011)

Such negative attitude towards victims is deeply rooted in human psychology. For example, many people blame victims of rape but not criminals. The exploitations of the topic of STS by Media, non-stop forums and conferences, pledges of aid and hypocrisy reached the level where the problem of the inflicted people was thrown with a soup from the bath tub.

The horrible thunder and a big mushroom shape cloud made by the first nuclear bomb blown up in Semipalatinsk in 1949 were heard and seen only in the Kazakh steppe. But the event didn't go unnoticed in Washington and Brussels. The world realised that the new war may destroy this planet and from now on, all the global problems will have to be solved only by means of negotiations.

However, a Kazakh herdsman who lived with his big family in a yurt near the polygon didn't care it. For him and thousands of his countrymen, the STS restricted the freedom of movement and caused many other problems which they didn't realise then.

While historians and politicians argue about the STS, common people continue suffering from its consequences. Life cannot be reverted, and what has been done is all but history. In some time the stories about the polygon might go into oblivion as well as people who still remember the tremor of nuclear explosion in early morning hours.

There are no people among the living who conceived the nuclear polygon in Kazakhstan. Neither there is a state that the nuclear polygon was intended to defend. But there are people on the land for whom the STS is still a cross they have to bear.

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STRENGTHENING PUBLIC HEALTH AND DISASTER RESILIENCE IN AMERICAN SAMOA: THE USE OF THE PRECEDE-PROCEED MODEL

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American Samoa is a U.S. island territory located in the South Pacific Ocean. The group of islands is rich with breathtaking coastlines and culture filled with great tradition; however, local officials are actively working to combat one of the world's worst obesity-related syndemics. Like many islands in the Samoa Archipelago, the livelihood of many American Samoans is being threatened by high rates of obesity (World Health Organization, 2007). High prevalence of diabetes, sedentary behavior,

movement away from traditional food practices and heavy reliance on imported goods, are just a few factors that exacerbate health outcomes in this resource poor island (Davison, Fanolua, Roaine, & Vargo, 2007; World Health Organization, 2007). Obesity related health problems can have negative consequences on individual and community health; it can also hinder peoples' ability to respond to natural hazards.

The group of American Samoa islands is geographically located in a very seismically active region—the Tonga trench, which has the potential to produce large earthquakes. This U.S. territory's vulnerability to earthquakes and tsunamis was realized on September 29, 2009, when a M8.1 earthquake created a destructive tsunami, which damaged local infrastructure and locally claimed 34 human lives (United States Geological Survey, 2009). Given American Samoa's geographical positioning, in an area where earthquakes and tsunamis are a real threat, ensuring that individuals can physically reach safety areas (i.e. high ground) by foot is imperative given that road networks can become unusable due to earthquake damage and traffic congestion (Wood & Schmidtlein, 2012).

The intersection of natural disaster resilience and public health is an important interface for health program planning. With the building of the new American Samoa Community College (ASCC) Nutrition, Exercise, Health & Wellness Community Research Center and the existence of the local Territorial Emergency Management Coordinating Office (TEMCO), public health practitioners, medical personnel, nutritionists, and emergency managers are in an exciting position to develop system approaches to improving health outcomes and disaster resilience in American Samoa. Interdisciplinary teamwork aimed to improve population health and safety is of paramount importance in order to maximize resources and to save lives.

In July 2011, East Tennessee State University's Tsunami Preparedness Program conducted a study with TEMCO and the Office of Samoan Affairs to understand associations between individual determinants (i.e. demographic, health related and household characteristics) with protective response (i.e. evacuation) to the 2009 earthquake and tsunami. The main goal of the project was to test the Protective Action Decision Model (PADM) created by Lindell and Perry for tsunamis and in a non-US-based culture. Ten local interviewers conducted 300 interviews of adult householders in twelve American Samoa villages.

Findings from the PADM study were analyzed (and will be reported in forthcoming reports). In general it was found that among study participants individual and household response to the 2009 earthquake and tsunami was good where a minority of the population reported health related barriers to evacuation during the event. Respondents expressed the need for village safety zones and better evacuation routes to help facilitate household evacuation response to future earthquakes and tsunamis. Obesity related issues did indeed hamper a minority (13.8%) of the respondents' ability to evacuate. Of the 13.8 % that reported health problems that hindered evacuation obesity related health problems such as diabetes, high blood pressure and foot problems were mentioned. The abovementioned tsunami evacuation and obesity related data was plugged into an adapted health promotion planning framework called the Precede-Proceed Model, to inform the visualization of an integrative plan for obesity prevention and tsunami preparedness.

Application of this data from the study interviews into an adapted Precede-Proceed Model showed that integrated approaches to tsunami preparedness and obesity prevention can be undertaken by developing foot paths that are surrounded by community gardens. Additionally, these footpaths could serve as fitness trails that support healthy lifestyles and

function as paths that lead to high ground safety zones that function as emergency centers that could aid displaced survivors during a disaster.

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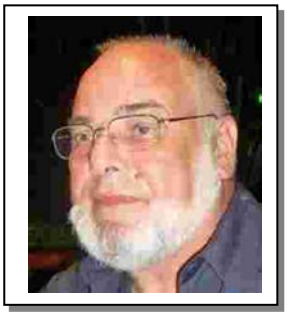

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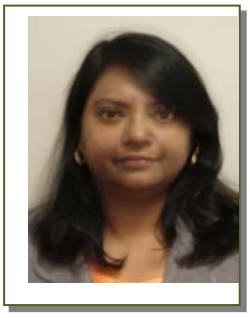

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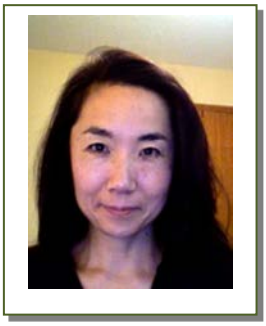

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