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WELCOME FROM THE CO-PRESIDENTS

As Co-Presidents, we both extend to each of you our Board's greetings and best wishes. The Board also wishes to thank the newsletter editorial staff and contributors for again creating a fantastic "magazine," which CRHNet is proud to present.

Sadly, this edition of HazNet presents an end of an era. Its editor, Larry Pearce, has reluctantly decided to retire and leave an extremely hard-to-fill "presence." For CRHNet, Larry's retirement is a double whammy because he is its Executive Director. Not surprisingly, Larry has provided CRHNet extraordinary service. For decades, he has toiled in various positions and roles across Canada to advance emergency management and disaster risk reduction. His dedication, hard work, wisdom, and emergency management 'street savvy' helped to create, facilitate, enhance, and maintain numerous relationships, concepts, strategies and products. He quietly nudged, guided, mediated, mentored and supported the CRHNet Board.

Larry, the Board (and the Association) extends its gratitude and best wishes to you for many enjoyable and healthy years in your new retirement. You are already missed and would be welcome back whenever you get "bored."

As in the previous four years, the CRHNet symposium is again closely linked to the national Roundtable on Disaster Risk Reduction (DRR). This provides continued opportunity for cross-issues dialogue, and advances the discussion on critical and current topics at national or regional level. Like its predecessors, this symposium will provide many

opportunities to explore new facets and firm-up important linkages among the many stakeholders of disaster risk reduction. The success of last year's newly introduced theme - an Aboriginal stream - resulted in its continuation and expansion in this year's symposium. In recognition of the value of this dynamic topic and stakeholders, CRHNet and the Aboriginal community have since established closer ties on related DRR issues and we have welcomed a representative of the Assembly of First Nations to our Board. You are encouraged to attend this event; it is scheduled to be held in Toronto on October 21, 2014, and is coordinated by Public Safety Canada (<http://www.publicsafety.gc.ca/>).

In the year just past, Canada endured many emergencies and observed some unsettling trend lines, including more intense rainfalls and greater forest loss from wildfires. We are for the most part a resilient country, but it is evident that we have challenges ahead and we do need to get out in front of them. I trust that's why we are all here, to learn from each other and to build a more resilient country, one that can act prudently and with agility in the face of increasing risk.

On behalf of the Board, we both again wish to thank all of you who belong and contribute to the Association. We also welcome all others who are interested in enhancing emergency preparedness and disaster risk reduction. Success in this field of practice is based on "Team effort," and we are proud of the inclusiveness of our growing team.

Ron Kuban and Ernie MacGillivray,
CRHNet Co-Presidents

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NOTE FROM EXECUTIVE DIRECTOR

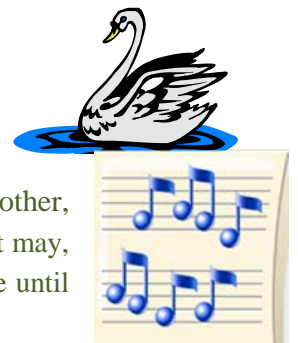
Greetings and a warm welcome to current and new members of the Canadian Risk and Hazards Network to the 11th edition of *HazNet*. It has been a busy time



for CRHNet and a lot has taken place. Now as I pen this message, we are embarking on the 11th CRHNet Symposium to be held in Toronto 22-24th October 2014 under the stewardship of York University, the Ontario Fire Marshall's Office and Ontario Emergency Measures.

I must mention that this last year, CRHNet was involved in partnering with the Aboriginal community leading to strong participation of the Aboriginal community at the 2013 Symposium. As a result a report was created by CRHNet in cooperation with the Justice Institute of British Columbia, and coordinated by CRHNet's Brenda Murphy and her co-Chair David Diabo. This event was so successful that we welcome their participation again this year in Toronto. As well, my time has been spent on a number of items – mostly assisting the Board with moving ahead with its strategic planning initiatives and working with other institutions to enhance the profile of CRHNet, in particular, working with the assistance of Brenda Murphy and Bert Struik, on the development of a new and stronger symposium participation process. This new model will hopefully be used next year in partnering with Alberta.

I am writing my last note to our audience as a famous man said, "If your mind takes on notions your body can't fill, you're over the hill brother, you're over the hill." Be that as it may, I will stay around for a little while until a replacement can be found.



The last seven years have been interesting, challenging and rewarding; in particular getting to know and meet many of our authors and CRHNet members; these have been the best part. I also wish to thank the CRHNet Board of Directors for their hard work and our fearless leaders Ernie MacGillivray and Ron Kuban for their leadership and for putting up with me over all these years. So long for now!

Larry

What's Up in the Research World

FINDINGS FROM A RESEARCH PROJECT EXPLORING FLOOD-PROOF HOUSING AND MITIGATION STRATEGIES IN THE COMOX VALLEY



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Canada's cultural dependency on flood structures has made many communities at greater risk and vulnerable to flooding. Factors like climate change and urbanization are exacerbating flood threats. Flood damages and losses are increasing worldwide and disaster payouts are escalating as flood management performances fail. As flood management is failing to keep pace with a rapidly changing flood hazardscape many researchers (Balmforth, 2010, p. 97; Doughty-Davies, 1976, p. 69; Jeffers, 2013, p. 44; Tong, 2012, pp. 3-4; Williams, 2009, p. 105) are calling for a shift in management strategies. The call is for a more holistic and inclusive flood management paradigm. This shift is vital if Canada is to gain control over ever-increasing disaster payouts and communities are to safeguard their people and property.

A holistic flood management paradigm uses non-structural strategies to augment the traditional flood management structures in place today. Flood proof housing (FPH) is one of many non-structural flood

protection strategies that have helped communities worldwide mitigate damage and loss at the property level. The consideration and implementation of FPH can help communities across Canada improve long-term flood management performance, while also reducing the ever-increasing need for disaster financial assistance.

This article shares the key findings and recommendations based on new FPH research. A copy of the full study is available at the Royal Roads University (RRU) library or from the researcher directly. This research was based using a case study approach of Oyster River on Vancouver Island B.C., a floodplain community. The research was developed to answer the following research question: Given the implementation of FPH in other developed countries, what are the obstacles that interfere with the community of Oyster River, as a representative of the practices set out by the Comox Valley Regional District (CVRD) and the Strathcona Regional District (SRD), to consider and utilize FPH in its flood mitigation practices?

The Oyster River is a border community between the CVRD and the SRD. This riverine community was selected for a case study for three main reasons. Firstly, the Oyster River is subject to recurrent and severe flooding (EC, 2013, Designation section, table. 1). Secondly, a considerable portion of the Oyster River residential community has been constructed on the river's floodways and fringes (B.C. Government, 2013, p 1). Thirdly, it was felt that this research would be more manageable if performed on a relatively small and autonomous deltaic community rather than the much larger flood threatened communities of B.C.'s Fraser Valley in the Lower Mainland B.C.

RESEARCH AIM

The aim of this research was to discover existing themes and patterns regarding the attraction to living in floodplains, attitudes of three key stakeholder groups (i.e., government officials, housing industry professionals, and affected citizenry), and obstacles and barriers (real or perceived) to the consideration and implementation of FPH in flood protection programs.

Secondary questions used to guide the research were:

- (1) Why is it important to identify solutions to reduce flooding social and economic losses?
- (2) What DEM framework does Canada use for flood management and mitigation and is it conducive to the consideration and implementation of FPH in the CVRD?
- (3) What are the existing FPH options available today and what types would be most suited to the Oyster River floodplain in the CVRD and SRD?
- (4) What recommendations can be offered to the CVRD through its Advisory Planning Commission (APC) and to the SRD to strengthen local flood mitigation programs, encourage greater citizen engagement and cooperation, and provide community planners with more sustainable development options?

METHODS

This research was conducted using a two-phased qualitative approach and thematic content analysis (TCA). A qualitative methodology approach was chosen based on its inherent facility to investigate unexplored phenomena and relationships; as well as, its ability to answer the: who, what, when, where, why, and how questions. The first phase consisted of a comprehensive literature review that

helped shape the research design and formed the basis for reviewing and comparing the research findings.

The second phase was dedicated to organizing and completing key informant interviews and focus groups; and developing codes for TCA using QSR NVivo 10 software to “manage, shape and make sense of unstructured information” (NVivo, 2014, para. 3).

Ultimately, data was collected from small groups within local government (i.e., local Chief Administrative Officer, Electoral Area Director, Emergency Coordinator, Senior Manager of Engineering Services, Manager of Planning services, and Assistant Manager of Planning Services); residential professionals (i.e., Hydrologist, Mortgage Specialist, Realtor, Residential Home Designer, and Residential/Commercial Architect); and floodplain property owners of the Oyster River. The subsequent analysis used a combination of inductive and deductive reasoning, which worked very well for developing the expansive codes from the social, legislative, and regulatory aspects of this research (O’Leary, 2009, p. 113).

FINDINGS

Analysis revealed that a lack of knowledge exists throughout all flood stakeholders concerning the impact humans can have on flood risks and vulnerabilities. Key themes that emerged from the research highlighted: (1) misinterpretations as to why floodplains are an attractive place for residential development; (2) issues of governance and the attitudes of officials; (3) little knowledge of FPH options; and (4) miscellaneous issues regarding FPH.

The Attractions to Floodplains. Floodplains throughout the world have always been an attractive place for residential construction, despite the increased risks and vulnerabilities to flooding. To

improve flood management performance decision-makers must gain an understanding of why floodplain development is so popular if escalating flood damages and losses are to be more effectively addressed.

The data indicated that the reasons people were attracted to live in floodplains ranged from psychological (e.g., a sense of being connected to, or spiritually uplifted, by water's presence) to utilitarian (e.g., historical factors based on needs such as food, transportation, water). **The most prevalent reason given by research participants why people may live in, or near, floodplains was quality of life.** Those participants described floodplain living as including the peace of tranquility surrounded by the beauty of nature. One participant, offered that "people are always attracted to water, whether it's beach or beachfront or ocean or river... people will sacrifice other things to be near water... people that live, build on the floodplain is (because) they want to be near water" (VP08).

The second most popular response by participants for living in, or near, floodplains was based on historical precedent. In a participant's own words, "The reasons for living in the floodplain usually, [is because] communities are built there, farms are there originally because the land is usually fertile, good access to water, and the land is usually generally flat and easy to build on." (VP11).

Why do floodplain developments exist? This is an important question to consider because without a clear understanding of the answer, it is difficult or even impossible to effectively make decisions regarding the use of FPH. In general, these findings mirrored the literature (Loe, 2000; Lyle, 2001; Wardekker, et al., 2010), however, with rising flood disaster costs it is questionable as to whether or not the discussions around the benefits of floodplain living are being appropriately interpreted. It seems that participants and researchers alike may be depicting "floodplain living" as being somehow

synonymous with "ocean, lake, or river front living."

The idea that floodplain properties are all picturesque and tranquil waterfront retreats is misleading. Additionally it is also misleading to consider that floodplain living is a choice based on aesthetics. Although, floodplain living can be a choice based on beautiful vistas and tranquil settings, this may seldom be the case. Many researchers (Balmforth, 2010; Doughty-Davies, 1976; Jeffers, 2013; Tong, 2012,) describe floodplain properties as indistinguishable from non-floodplain properties. To see the majority of floodplain living any differently can be extremely problematic and detrimental to flood management decision-making and to the consideration and implementation of FPH.

Unrealistic positive interpretations of floodplain residences are likely to desensitize community decision makers and government officials as to the real reasons people live in floodplains (e.g., affordability, transportation, poverty, rental availability). Current research indicates that residents are often unaware or surprised they live in a floodplain. In these cases it is reasonable to assume residents would be unaware of existing flood risks and vulnerabilities as well. The reality is that floodplain living is more about affordable housing and access to transportation routes than it is about scenic beauty. This is an extremely important distinction to understand, as local government's decisions can be different (i.e., for or against FPH) depending on the perspective used (Balmforth, 2010; Doughty-Davies, 1976; Jeffers, 2013; Tong, 2012,). A more informed understanding of why people are living in floodplains is likely to reshape decision making from a governance perspective and open the door to more innovation towards alternative flood mitigation strategies like FPH.

Governance and Official Attitudes. Complex interdisciplinary communications, legislative and regulatory mechanisms, misunderstandings of why

flood threats exist, and how or who should deal with them emerged as key obstacles to FPH. Without improvements within these areas, strategies like FPH, will never reach the thresholds of consideration. Findings indicated that Canada's governmental and political framework is overly complex, confusing, and not necessarily conducive to achieving long-term goals or a rapidly changing environment.

Government Issues. A key barrier to FPH is Canada's floodplain management legislation itself. This legislation so strongly discourages floodplain development that it functions as a disincentive for community planners to consider options like FPH. Sheaffer, et al., (1967) when addressing the issue of developing in floodplains argued the emphasis should focus on "promoting proper use, rather than on prohibiting use" of floodplains and continue to suggest, "flood proofing can be a useful element in flood plain regulations" (p. 2). While some communities do not have the need to consider FPH, others do, and still more will in the future because of the rising trajectory of flooding.

Legislation that is single-focused tends to have a built in inflexibility to adapt to changing environments. It also impedes the energy needed to motivate new and innovative approaches like FPH. The rigidity of legislation and regulations is an extremely important factor to consider because despite clear language that discourages building in floodplains, many floodplain communities already exist, and more are being developed everyday (Lyle, 2001). Studies show that in the Fraser Valley alone there are in excess of two million people living in floodplains or behind aging and inadequately engineered structures that are under great risk of flooding (Lyle, 2001, p. 6). Legislation that discourages property level flood protection like FPH literally puts residents under greater risk for higher potential flooding losses.

Political Issues. Politics motivate community growth, economic development, and sustainability

of all communities. The popularity and longevity of a politician's reign relies on a delicate balance between budgets and constituents' interests. Since political decision making is dependent on multiple relationships and community priorities, compromise and timing often determine which issues take priority. In respect to flood management it is often difficult for politicians to justify the allocation of funds and energy toward future risks when immediate social demands are first and foremost in constituents' minds.

It is equally difficult for politicians to have the will to deal with long-term issues that often have little political value because of relatively short terms in office. To effectively deal with emergency and flood management issues (i.e., FPH) requires a deep understanding of community's flood threats; risks, and vulnerabilities; and the political will to act in the present for future protection. Although this is a difficult dilemma, long-term and forward thinking documents like Official Community Plans (OCP), Local Area Plans (LAP), and Sustainability Plans can help politicians validate and defend decisions regarding distant concerns.

Existing Knowledge of FPH. Throughout the world, little knowledge exists concerning FPH as a flood mitigation measure and Canada is no exception. As a result, in regards to FPH, it seemed that opinions often got touted as facts (e.g., the reason why FPH is not often considered is because it is unnecessary, too expensive, aesthetically unappealing or lacks local support). As opinions form worldviews, thinking in this way can have a negative effect on FPH decision making. While general knowledge of FPH, or amphibious type architecture, is lacking in Canada, there are many resources that can explain the archetypes. FPH is well researched and designs are well thought out from an aesthetic and engineered perspective.

One of the predominant users of FPH is the Netherlands (Brouwer & Van Ek, 2004). The U.S. also has examples of FPH being used; recent events

like Hurricane Katrina and Sandy have inspired a greater interest in this type of architecture. Canada has failed to proactively follow suite and has done little to innovate in this area of flood mitigation. However, Emergency Management B.C. (EMBC) in association Delcan (a private company), have taken steps to look more closely at FPH to bolster flood management in the province (Delcan, 2012). FPH subject matter experts from the Netherlands have been sought to enter into dialogue, offer advice, and share experience in the use of amphibious architecture.

RECOMMENDATIONS

The research made five recommendations to the CVRD and SRD see how FPH could improve local flood mitigation programs, encourage greater stakeholder cooperation, and provide community planners with innovative options for future more sustainable development. The recommendations were: to introduce an integrated flood management educational program; improve overall communication; seek more adaptable flood management processes at the local level; consider opening up a dialogue regarding comprehensive flood insurance; and possibly implementing a co-venture FPH pilot project with EMBC. The overall concept was to inspire interdisciplinary collaboration, think beyond status quo flood management, and become more inclusive and informed regarding flood management and flood trends.

Recommendation #1: Integrated Community Education. This research exposed a general misunderstanding of how people see, react, and prepare for floods and a misconstruction of why people are drawn to live in floodplains. Overcoming gaps in knowledge is extremely important as gaps could have a profoundly negative impact on flood management decisions. In the case of the CVRD and SRD, this gap looks to have contributed to a general lack of interest in considering FPH in

community strategies. Improved education can help to eliminate knowledge gaps, which currently serve as a barrier to considering FPH.

Communities are not best served through exclusive education. Therefore to achieve peak flood mitigation performance an inclusive and integrated education program was recommended for all flood stakeholders (UNISDR, 2013). This style of education would raise overall knowledge of human flood culture and climate change, and the compounding affect these phenomena can have on flood risks and vulnerabilities. A side benefit of integrated learning is the potential for greater trust, teamwork, and respect amongst all stakeholders – key factors that can assure short-, medium-, and long-term flood management decisions are more informed and supported.

Recommendation #2: Communication Performance and Policy. The key to success in any social environment is the ability to communicate clearly and positively. It should be no surprise that the second recommendations reiterates the importance of communication as achieving the most from human resources and capacities is a must. This recommendation looked at communications in two distinct areas: (1) general communications; and (2) communications policy.

General communications recognizes that traditional disciplinary boundaries in government and politics have historically formed obstacles to change (Shrubsole, 2000). Disciplinary boundaries have been a major factor in sabotaging Canada's full transition to a holistic flood management (Balmforth, 2010; Doughty-Davies, 1976; Jeffers, 2013; Loe, 2000; Tong, 2012; & Pinter 2005). Shrubsole (2000) argues a culture of conflict and poor communication proliferates within flood management environment. Failure to address this form of failed communication can create insurmountable barriers where none previously existed.

The recommendation therefore is to encourage improved interdisciplinary relationships. Growth here should improve empathy and respect across all disciplines, which can pacify the sometimes harmful emotions and frustrations that can hinder progress. A key aspect on moving forward would be to work on translating complex government and local policy into laypersons' language. Changing the language can help limit intimidation factors often experienced by citizens when dealing with complex government processes especially in stressful times (Dewing et al., 2006; Shrubsole, 2013). Removing feelings of intimidation could open the door to greater communication and improved community engagement.

Communications policy recommendation was the concept of introducing a communication policy specifically for the local government. The Appreciative Inquiry (AI) approach (Hammond, 1998) was suggested but other styles encouraging positivity would also suffice. The AI approach, which Whitney and Trosten-Bloom (2010) contend uses human systems success approach that concentrates on acknowledging what is working rather than what is not. If using the AI approach stakeholders would be afforded certain conditions and freedoms: (1) Freedom to be known in relationship; (2) Freedom to be heard; (3) Freedom to dream in community; (4) Freedom to choose to contribute; (5) Freedom to act with support; and (6) Freedom to be positive (Whitney & Trosten-Bloom, 2010, p. 270). The aim of this recommendation would be to encourage local government to establish a communication strategy at all levels of flood management to best capitalize on community strengths, its processes, and people to achieve optimum results.

Recommendation #3: Adaptable Flood Management. Often in flood management the desire to help and accomplish key activities is foiled by complex and inflexible and non-adaptive policy. A recommendation to simplify and streamline flood

management processes was strongly encouraged. Cashman, et al. (n.d.) sees the government's complex delegation of authority, inter-jurisdictional hurdles, and staged multi-agency approaches as a significant barrier to making communities more resilient to flood threats (pp. 13-14).

Improving jurisdictional collaboration and interoperability (e.g., adopting the same or similar bylaws and flood management frameworks) can have a profoundly positive affect on process efficiency. Pre-event inter-jurisdictional planning and delegation of authorities could streamline processes and optimize flood protection. The ultimate goal would be to ensure jurisdiction aside that flood events are aptly and efficiently dealt with.

Recommendation #4: Consider Flood Insurance. Currently overland flood insurance is not available in Canada, although it is currently being actively debated between industry and government (Beeby, 2013, para. 1). Flood disasters over the past 15 years have become the insurance industry's largest disaster payouts. As stakeholders gain a strong understanding of Canada's flood insurance and the reasons for and against such a move, they would become more informed as to how impactful floods have become to Canadian society and by the escalation of federal and provincial post-disaster payouts (i.e., uninsured losses). Beeby (2013) says "Canada is the only G8 country where this so-called overland flood insurance is simply not available in the private sector" (para. 4). Loski (2012); Lyle (2001); and Sandink (2013) argue a comprehensive flood insurance plan could definitely improve flood mitigation in Canada.

Should the insurance industry consider comprehensive coverage, liability for flood damage would shift from the government to individual property owners. Property owners would have to meet certain insurance requirements in order to get home protection. From a DEM perspective this change could be the innovation stimulus needed to improve property level flood protection initiatives

like FPH (Swiss Re, 2013a). The need for insurance coverage could also be the catalyst to improve the general awareness of flooding and floodplain awareness, and provide property owners and their communities with greater flexibility to achieve sustainable growth (Lyle, 2001; Swiss Re 2013b).

Recommendation #5: Consider FPH as a Component of Flood Management. As floods continue to outperform flood management practice it becomes important to consider alternative means of protection. Sheaffer, et al., (1967) contend that the extent to which floods impact society is proportional to a given community's flood hazard education, experience, and willingness to implement mitigation strategies (p. 3). Although this statement was made close to fifty years ago, it still holds true today and forms the basis of the last recommendation. This last recommendation encourages all flood stakeholders to become more familiar with FPH or amphibious architecture by: (1) improving personal awareness FPH concepts and designs; (2) creating an inventory of existing FPH within the community; and (3) consider the opportunity to build a FPH pilot project in association with EMBC.

Improved awareness of FPH concepts and designs will help individuals, planners, and contractors confidently rule in, or rule out, the use of FPH as a component of local flood management. Existing research indicates that flood management portfolios that include alternative strategies like FPH have proven beneficial to a community's flood resilience (Fenuta, 2010). When considering the option of FPH, stakeholders should not immediately dismiss the use of FPH, as the benefits may not be readily apparent. Hans Venhuizen, a Dutch architect says "'amphibious living [FPH],' is a concept that abandons the need to control water" (Fenuta, 2010, p. 1). This statement reinforces why it is important to understand FPH before dismissing or including it in flood mitigation.

CONCLUSION

This article represented the concept of using FPH as a mitigation strategy in the wake of escalating flood hazards and poor flood management performance. The aim of the research was to determine the role FPH has, or could someday play in improving community flood mitigation. Flood contexts were reviewed along with Canadian flood management frameworks; FPH concepts and designs; and attitudes of flood stakeholders regarding flood management from a FPH perspective. A comprehensive literature review, qualitative case study (i.e., Oyster River), and TCA uncovered sober misunderstandings within flood management, as well as, overly complex frameworks, and a lack of FPH knowledge are key obstacles to holistic flood management and the use of FPH.

Scholars and practitioners argue a shift to a more holistic flood management paradigm (i.e., using both structural and non-structural strategies) is required if mounting flood disaster payouts are to be reduced. Countries like the Netherlands that have made the shift to a holistic flood management paradigm are demonstrating marked reduction in flood impacts (Pinter, 2005, p. 208). Research finding indicated that structural flood management has neutralized innovation and ability for communities to reduce flood risks and vulnerabilities. Unfortunately, until a flood emergency actually happens, issues of DEM, a new flood management paradigm, and FPH will fail to meet the all-important political threshold.

Although this research essentially focused on FPH but more importantly it may have discovered universal obstacles that have kept Canada from successfully transitioning to its longtime goal of holistic flood management. The recommendations made as a result of this research are not necessarily unique to FPH, or flood management, and could apply in many situations

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A CANADIAN RISK-BASED LAND-USE GUIDE: STATUS REPORT



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Abstract

A Canadian risk-based guide to safer land-use decisions is nearing publication. Over the past two years the manuscript has undergone substantive evaluation and revisions to make it accessible and practical for land-use planners and others. It was reviewed by students, municipal staff, academics and professionals in the hazards and risk field. Final revisions are being made, and then Natural Resources Canada, through the Geological Survey of Canada, will publish the guide as part of its commitment to support geohazard risk reduction in Canada, and as a partner in the consortia that have developed the guide. The release version

concentrates on the municipalities of southwest British Columbia and is adaptable to other parts of Canada. The guide presents a new, land-use specific, risk management scheme. It integrates that scheme into the day to day functions of municipal land management operations. The Canada wide adaptation is done through the Resilient Cities Working Group of the Canadian National Platform for Disaster Risk Reduction.

INTRODUCTION

Municipal land-use decisions can build disaster resilient communities, or not. Land-use decisions provide opportunities to minimize the exposure and vulnerability of the city's structural assets and its people to hazards. Large, dense cities are inherently a disaster risk, because they can, so easily and drastically, increase exposure to hazards. For localized hazards, such as river flooding, it is easier to control the exposure of the city's assets and people to that hazard. For distributed hazards, such as earthquake shaking, it is easier to control how vulnerable the structures and people are to that hazard. A risk-based land-use guide is meant to help cities understand their hazard risk (potential, hazard, exposure and vulnerability) and how to use municipal instruments to minimize that risk.

In recognition of the large responsibility that municipal staff carry in building safe communities, a consortium formed in southwest British Columbia to help consolidate informed risk-based land-use practice into a practical guide (Struik 2012; Struik et al. 2013). That ad-hoc consortium was directed by concerns and opportunities in land-use as identified at local risk mitigation workshops and land-use decision simulation exercises.

BACKGROUND

In a pilot begun in 2010, stakeholders in southwestern British Columbia began creating a risk-based land-use guide for the Metro Vancouver

region. The guide was to include practices that could reduce disaster risk and be targeted to the social, economic, political and environmental character of the region. Stakeholders and contributors included land-use planners, city managers, permits and licensing staff, engineers, critical-infrastructure owners and managers, insurers, researchers and practitioners of land-use policy, and emergency managers and disaster reduction policy advocates from all levels of government.

The guide and its creation are based on several principles: it is stakeholder built; it uses existing local instruments ¹ that incorporate informed practice; it balances social, economic and environmental concerns; it insists on transparency of knowledge and decisions; and it engages the community in the evaluation and decision process. The guide integrates risk management principles with the day to day practice of urban land management.

Stakeholders are creating the guide together to ensure it is practical, applicable and usable. Through workshops, focus groups, decision simulation exercises, expert critique and joint writing, the group, including researchers and practitioners identifies the instruments and best practices available locally to manage land-use risk. Struik et al (2013) describe the use of land-use decision simulation exercises to highlight existing local land management instruments, practice and principles, and identify how the guide could facilitate low-risk land-use recommendations.

Once the Metro Vancouver version was finished, it was to be the template for a national guide and the creation of other local guides. The Resilient Cities Working Group of the Canadian National Platform

¹ Instruments in this paper are such things as laws, rules, data, plans, governance and the like that are the operational infrastructure from which a land-use recommendation is made and implemented.

for Disaster Risk Reduction has incorporated that effort into its program.

PROJECT STATUS

The risk-based land-use guide for Metro Vancouver is approved for formal publication with Natural Resources Canada, upon completion of revisions suggested by various reviewers. It will be published and released on-line as a Geological Survey of Canada Open File in the spring of 2015². That publication will be in two parts, the guide proper and a separate extensive appendix of supporting information. Geological Survey of Canada on-line publications are free for download, making the guide easily accessible, locally, nationally, and internationally.

Efforts to further improve the guide continue, both during this phase of publication, and afterwards. Efforts post-publication are mainly by the Resilient Cities Working Group, Natural Resources Canada and the Centre for Natural Hazard Research at Simon Fraser University. The Resilient Cities Working Group and JIBC are:

- Hosting a focus group analysis of this first version of the guide, and the national application and management of the guide (late January 2015). A record of the meeting results will be available.
- Building national awareness of the societal value of making land-use recommendations based on hazard risk management and how a risk-based land-use guide supports that initiative.
- Bringing together national stakeholders in land-use to identify and catalogue current informed practice for risk reduction.

Natural Resources Canada continues its research and support of geohazard risk identification and the use of that information for support of informed land-use decisions. The Centre for Natural Hazard Research continues its support of workshops and research that highlights potential contributions to natural hazard risk reduction. These efforts are supported by many local and national partners.

In addition to pulling together existing concepts and practices the guide introduces a few new concepts. It introduces a new risk management scheme targeted to land-use, and which focuses on terms of hazard risk rather than business risk. That new scheme is a variation of the Canadian and international risk management standard. It incorporates and uses terminology and concepts accepted by current hazard-risk management practitioners, and international and national agencies (e.g. United Nations, Public Safety Canada, Public Works and Government Services Canada, Association of Professional Engineers).

The guide shows how to use existing municipal land-use instruments within that hazard-risk management scheme and demonstrates how those practices can be used to evaluate land-use proposals for their safety. It uses the cyclic nature of hazard and risk identification and management, and emphasizes the significance of establishing the community hazard risk environment as a starting point for strategic planning and land-use permit evaluation.

Over the last two years the guide manuscript has undergone 3 significant transformations. Initial documentation was wiki summations of workshop and conference session contributions from land-use stakeholders. Key points from those documents were abridged to a short description of the intent and elements of land-use risk assessment and management and a detailed table of contents. That material was presented at various decision simulation exercises and conference sessions of professionals and students. Feedback from those

² Access it through the Geological Survey of Canada GEOSCAN Publications Database:
http://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/geoscan_e.web

events provided fodder for a zero draft of a guide. At the same time material from the workshops was re-organized into an internally consistent presentation of wiki pages. That version was brought to further decision simulation student exercises, further edited and brought to the CRHNet 10th annual Symposium for review. That review and the reviews of others prompted a full re-organization, introduction of the new land-use risk management scheme, addition of the legislative context for land-use risk management, complete re-write and zero draft of an extensive appendix of background information. It is anticipated that this initial publication will be one more step on a longer path of having a relevant, accessible and useful guide to reducing hazard risk when making land-use decisions, both locally and nationally.

ACKNOWLEDGEMENTS

The initiative has been resourced with funding of the Centre for Natural Hazard Research, Natural Resources Canada, Public Safety Canada and the Justice Institute of BC with extensive in-kind contributions from Pearces 2 Consulting, the Justice Institute of British Columbia, the District of North Vancouver, Public Safety Canada, and the Integrated Partnership for Regional Emergency Management. We thank, Jessica Shoubridge, Shona van Zijl de Jong, Beth Larcombe and Fiona Dercole for their significant writing contributions to the guide; and Nicky Hastings, Doug Allan, Larry Pearce, Michelle Weston editorial contributions to the guide. Bob Walker, Malaika Ulmi, Fiona Dercole, Nicky Hastings, Murray Journeay, Doug Allan, Larry Pearce, Murray Day, Dave Jones, Beverly Grieve, Wayne Hirlehey, Cindy Jeromin, Jessica Shoubridge, Maggie Wojtarowicz, and John Clague contributed extensively to the design and execution of the various workshops, decision simulation exercises and conference sessions.

Numerous people contributed their energy to the project through their attendance at those events and in the exercise videos. In particular, we thank the generous and committed staff at the District of North Vancouver and the North Shore Emergency Management Office. Anne Kyler provided constructive suggestions to improve the manuscript. And many thanks to Laurie Pearce for her sustained contributions.

REFERENCES

- CNHR 2012: Outputs of the exercises and workshops can be found at the Centre for Natural Hazard Research: <http://www.sfu.ca/cnhr/workshops>
- Struik, B. 2012: A Canadian Risk-based Land-use Guide; HazNet, vol 3, no. 1, p. 6-9.
- Struik, L.C., Grieve, B., and Jones, D.J. 2013: A Canadian Risk-based Land-use Guide: Decision Simulations. HazNet, vol. 4, No. 2. P. 10-16.

Announcement of changes to the Risk Assessment Users Group (RAUG; 2010 - 2014)

No future meetings are planned as I am no longer active in risk assessment research, and won't be leading the RAUG anymore. If you are interested in leading the group, I can help you (web support, communication support). The RAUG website and its content remain available <http://raug.mhrisk.ca> Outputs from the June 2014 meeting are posted (podcast, slide deck, notes). For your risk assessment interests, you may wish to participate in the Canadian Hazus Users Group run by Nicky Hastings of NRCan Vancouver (<http://www.hazuscanada.ca>). It meets by phone on the third Wednesday of each month. Risky Ground, newsletter of the Centre for Natural Hazard Research at Simon Fraser University, accepts short articles on natural hazard risk. (<http://www.sfu.ca/cnhr/newsletters.html>) I hope to see you at the Canadian Risk and Hazards Network Symposium in Toronto, October 22-24 (<http://www.crhnet.ca>).

Thank you very much. It has been a great pleasure connecting with you through the RAUG.

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SEEKING REFUGE BEFORE THE STORM: NEEDS OF COMMERCIAL FISHERS

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THE PROBLEM WITH HURRICANES AND COMMERCIAL FISHING VESSELS

A commercial fishing vessel is defined as a vessel with a commercial fishing license (either state or federal) whose purpose is harvesting a seafood commodity from Louisiana saltwater areas and selling that product in Louisiana. Commercial fishing vessels range in size from smaller crab boats to large, offshore shrimp boats. While Hurricane Rita was heading toward southwest Louisiana in September of 2005, the commercial fishing fleet in Intracoastal City was unsure of where to go (Figure 1).

Some vessels traveled up the Vermilion River, tied to trees along the bank and lashed two or three boats together for stability. A large number of shrimpers stayed on their boats during the event to “ride out the storm” at local shrimp docks. With engines at full throttle, most were able to hold position and keep the vessel in place, even during the height of the storm. Captains who left their vessels and evacuated came back after the storm to find their boats stranded on land (Figure 2). Eighteen shrimp boats were stranded. One vessel still lies on its side more than 30 feet from the water’s edge.

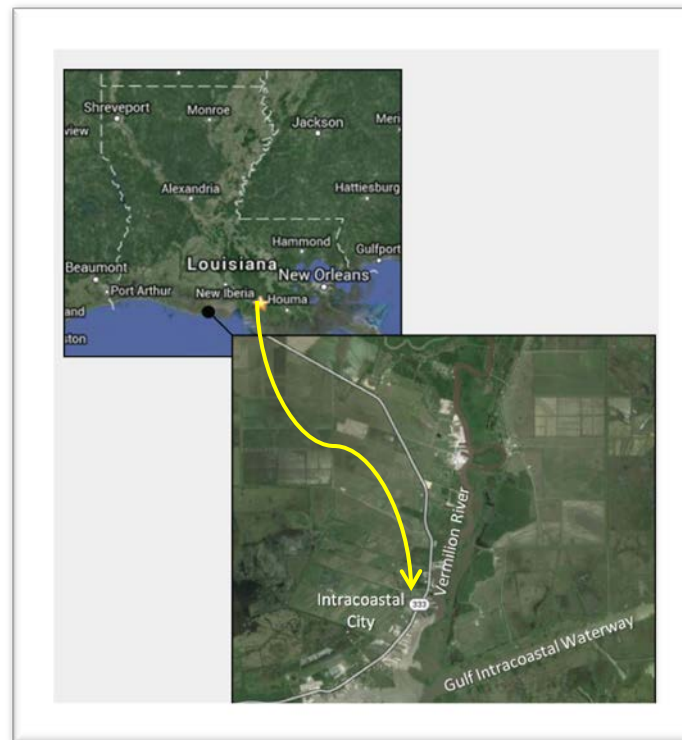


Figure 1. Louisiana borders the northern Gulf of Mexico. Intracoastal City is in the middle of the coastal zone, southwest of New Iberia. The Gulf Intracoastal Waterway (GIWW) runs west to east across coastal Louisiana. The Vermilion River provides navigation from the GIWW to points north of Intracoastal City. (Image Credit: Google Earth)



Figure 2. Vessels grounded on the land after Hurricane Rita. (Image credit: www.ritaimages.com)

In the Vermilion Bay region of coastal Louisiana, no plan exists for commercial fishers to seek protection from storm damage and to prevent their

vessels from becoming water-borne debris during a storm. Methods of tying to old oak trees on the banks of the Vermilion River or tying to other boats creates stress on the lines. As a result, storm tides carry fishing vessels onto private property, and when the tides recede, the boats stay grounded on private property. In the aftermath of Hurricane Rita, the U.S. Federal Emergency Management Agency (FEMA), the U.S. Coast Guard and the U.S. Navy contracted with salvage companies to refloat stranded boats that were still seaworthy or dispose of those that were not. That process took years and millions of dollars to accomplish. The total cost for vessel and debris removal for Katrina and Rita was approximately \$294 million (FEMA Debris Subject Matter Expert, pers. communication). In 2014, the question still remains, where is there a suitable place along the Vermilion River for commercial fishing boats to seek harbor of refuge during storms? Such locations are needed to prevent vessel damage and vessel groundings, which create obstacles for hurricane response and recovery.

SEEKING SOLUTIONS: THE “SAFE HARBOR” MASTER PLAN PROJECT

To begin to address the issue of mooring locations for commercial fishing vessels, the Port of Delcambre, in conjunction with Louisiana Sea Grant, received funding through FEMA’s 2012 Community Resilience Innovation Challenge, which targeted projects intended to increase community resilience around the nation. We proposed to create a safe harbor master plan by quantifying how many vessels need safe harbor spaces, evaluating local waterway capacity to accommodate vessels in the short term, and producing maps of suggested locations to install moorings and pilings in the long term.

We quickly learned that “safe harbor” is a misnomer because no place is ever safe from hazardous events on the water. “Harbor of refuge” is a more appropriate term. The harbor of refuge

project contributes to community resilience because it seeks to organize a plan for vessels to moor during a storm, ensuring that those vessels sustain little damage and remain operational. The advantages of providing storm anchorage to the commercial fishing fleet are obvious. Of primary concern is the safety and wellbeing of the fishers themselves and the protection of their vessels. In addition, a harbor of refuge plan will protect employment and commerce in the region. When fishing vessels sustain damage during a storm, the effect ripples downstream by impacting small businesses through fishers, seafood processors, wholesale distributors, and restaurants. Loose vessels also create destructive barriers on roadways and bridges, disrupting total commerce. A harbor of refuge plan will minimize damage to equipment and disruption to employment, thereby increasing community resilience. The following article presents a brief summary of the project to date, which demonstrates a process to achieve community participation through engagement with local, state, and federal stakeholders to seek solutions to a costly problem.

ESTABLISHING THE PROBLEM: MEETINGS WITH STAKEHOLDERS IN VERMILION BAY

One of the initial steps of any Sea Grant project involves communication with and engagement of communities and their stakeholders (Figure 3). For this project, we held an initial meeting of Sea Grant personnel, directors of local emergency management agencies, port representatives, and several commercial fishers and dock owners in order to understand how ports and fishers have handled previous hurricane forecasts. After this initial meeting, we met with individual ports in the area to discuss more specifically the issues facing commercial fishers on the west side of Vermilion Bay prior to a hurricane.



Figure 3. *The Harbor of Refuge project team talks with state and federal agencies. (Image credit: Paula Ouder, LA Sea Grant)*

Each commercial fishing vessel represents a small business, so shrimp captains hesitate to stop shrimping early. Twenty-four hours before hurricane landfall, shrimp captains scramble to unload their catch, make sure their deckhands evacuate their families, and tie down their vessels. Vessel owners don't leave enough time to travel east or west to seek shelter in a port where there might be slips and moorings for boats to access. Instead, commercial fishers take their boats up the Vermilion River, tie down to trees on the riverbank, and hope for the best. Storm surge carries boats further upriver or over the riverbank onto private property, and vessel owners have a difficult time getting back to their boats when the waters recede. Too often in the past, storm waters have receded before vessel operators return to their boats, which results in grounding the vessels on dry land.

We also met with state and federal agencies, including the U.S. Coast Guard, to discuss the problem of harbor of refuge as a huge issue that costs the state a lot of money in post-hurricane debris cleanup and as a challenge for communication and coordination between ports, commercial fishers, and emergency management agencies. No state agency has jurisdiction or authority over the issue of providing harbor of refuge locations for commercial fishers. In addition, FEMA mitigation money and public assistance

funds cannot be applied directly to privately owned land or businesses. In an environment where most of the land and docks are privately owned, there is no easy way to use federal or state grant dollars to update infrastructure for docks and pilings.

Fishers carry full responsibility for heeding storm warnings from the Coast Guard and for seeking safe places to tie down their vessels. One challenge that became clear after these meetings is that no "one size fits all" approach exists for creating a harbor of refuge plan for the Vermilion Bay region. Each canal coming off the Gulf Intracoastal Waterway (GIWW) is unique in its environmental makeup, its shoreline stabilization, and its bank land ownership status. Fishers will take their boats to the closest and safest spot available; therefore, each fisherman needs to have a hurricane plan and needs to be able to find out which locations have space available for docking. The harbor of refuge project team seeks to identify waterways where fishers can legally dock or to talk with private landowners about setting up agreements for fishers to tie down their vessels.

SURVEY RESULTS: COMMERCIAL FISHERS IN THE WESTERN VERMILION BAY

One of the needs identified in stakeholder meetings involved understanding historical storm evacuation practices for commercial fishing vessel operators and needs for harbor of refuge. Sea Grant distributed surveys to commercial fishers in the western portion of Vermilion Bay to gather information on recommended heights for safe moorings and historical evacuation practices for storms including Hurricane Rita (2005) and Hurricane Ike (2008). Thirty-six fishers responded to questions regarding storm evacuation practices for Hurricanes Rita and Ike. The majority of fishers (73%) took action to evacuate their boats before hurricane landfall: 4-6 days before Rita and 3-4 days before Ike. Even though fishers reported a variety of locations in which to take their boats, the

majority chose to dock in Intracoastal City, which is where most of their seafood business transactions take place (Figure 4). In general, the majority of respondents indicated that there is no “safe” location to offer protection for fishing vessels when a storm is in the forecast. Taller moorings will prevent the storm tide from carrying vessels onto land and grounding them after the tide recedes. Recommended height for safe moorings ranged from 10-15 feet. If a public dock or safe harbor location existed specifically to offer safety to commercial fishing vessels, then fishers would take their boats to that location in advance of a storm making landfall. One factor to consider is how fishers will return to their boats after a storm. Road access or a ferry system between vessels and the shore is critical for fishers to be able to return as soon as possible after the storm.



Figure 4. Dockside pilings in their current state are not tall enough to accommodate storm surge. (Image credit: Lauren Land, LA Sea Grant)

The following comments and suggestions were often repeated:

- Mooring fishing vessels up the Vermilion River is safer than staying in Intracoastal City during a storm.
- Storms tracking to the south and west of Intracoastal City will result in a tidal surge of 3 to 10 feet and possibly more.

- Storms that track to the east of Vermilion will cause only slightly higher tides or even low tides.
- Vessels of similar length will lash together side by side to gain stability for all.
- Several mooring points on land are needed to maintain position as winds shift during a storm.
- Large trees have been used in the past but are subject to being **damaged or uprooted either by the storm or by the boats tied to them** (Figure 5).
- Fishers would prefer to have mooring points on land as well as tall pilings in the water spaced far enough to allow several boats to tie abreast and also tie to the tall pilings.
- Storm anchorage in the Vermilion River is preferable to other locations to the east or west along the Gulf Intracoastal Waterway.
- Large shrimp vessels can draw as much as 10 feet if their hold is full of shrimp or if they have a full tank of fuel.



Figure 5. A large Live Oak tree has been uprooted because several vessels have tied to it. (Image credit: Lauren Land, LA Sea Grant)

It is recommended that the appropriate state and federal agencies develop a suitable site along the Vermilion River for commercial fishing vessels to seek shelter from storm events. The site would be utilized only during declared emergency situations.

Agencies interested in developing a safe anchorage site should seek the input of a committee of fishers to address the location, design, use, maintenance and other factors. Information about the property owners of proposed sites is needed for future planning and potential solutions, such as lease agreements with private landowners for vessel tie-down.

THE NUMBERS: COMMERCIAL FISHING VESSELS IN THE VERMILION RIVER AND DELCAMBRE CANAL

Another need identified from the stakeholder meetings was to identify the number and size of commercial fishing vessels needing harbor of refuge.

For the Vermilion River, the project team created and analyzed various datasets to quantify the number of commercial fishing vessels that travel the waterways. Data was collected from the National Oceanic and Atmospheric Administration National Marine Fisheries Service as well as the Louisiana Department of Wildlife and Fisheries Social Research Division. Based on these datasets, it is reasonable to plan for a maximum number of 220 commercial fishing vessels needing harbor of refuge in the western Vermilion Bay region. For the most part, these vessels are evenly split among the 20', 40', 50', 60', 70', and 80' length classes, with some exceptions. The average draft of the larger vessels is ten feet. This information helps determine the number of pilings needed and the spacing required between pilings to accommodate a large number of vessels.

COST FOR DEBRIS CLEANUP AND VESSEL REMOVAL AFTER HURRICANES

The Coast Guard estimates that the cost to remove debris was \$65 to \$75 per cubic yard after Hurricanes Katrina and Rita (pers. communication).

The cost varies greatly for vessels – from \$35,000 for a submerged small fishing vessel to \$8 million for a large barge. Vessel removal depends on the size and type of vessel (wood, metal, or fiberglass), how much fuel is needed to retrieve the vessel, the location of the vessel and access to remove the vessel, and the presence of hazardous substances on that vessel. Sometimes it can take 50-60 days to remove a vessel, if hazardous substances are present.

ESTIMATED COST FOR HARBOR OF REFUGE MOORING INFRASTRUCTURE

What might the estimated cost be to install additional mooring infrastructure to provide harbor of refuge to commercial fishing vessels to avoid almost \$300 million in vessel cleanup and debris removal? Many variables feed into the answer. Mooring design requirements depend on vessel size (i.e., length and weight) and the location of the piles. Locations further inland and out of the waterway provide a more stable soil bearing, therefore requiring shorter piles and lower cost. Other factors to consider include the mobilization cost per project per location (i.e., cost to get equipment, material and labor to the site). In general, more remote sites mean higher cost for mobilization. The mobilization cost is normally applied across the entire project, so economies of scale are important to consider. In order to develop accurate cost estimates, specific parameters need to be identified, including the number and size of boats, the spacing required between clusters, and the location of the piles. Next Steps for Harbor of Refuge

The Community Resilience Innovation Challenge helped identify the next steps to achieve harbor of refuge for the commercial fishing fleet, including:

- Identify private landowners to approach to discuss lease agreements for additional mooring infrastructure

- Identify funding streams for infrastructure improvements
- Conduct a feasibility study of the cost to construct and install additional mooring infrastructure
- Produce architectural and engineering designs of additional mooring infrastructure
- Include harbor of refuge as an update to local hazard mitigation plans
- Install waterway signs to communicate harbor of refuge information to commercial fishers
- Develop materials for fishers on safe storm practices and preparedness procedures (i.e., hurricane evacuation plan, vessel tie-down methods)
- Increase communication between commercial fishers and federal, state and local government agencies for hurricane preparedness

CONCLUSIONS



Figure 6. Shrimp vessels docked in Intracoastal City during calm weather conditions. (Image Credit: Lauren Land, LA Sea Grant)

Overall, solutions to the harbor of refuge problem do exist for the commercial fishing fleet. Increased communication between private landowners, commercial fishers, local governments and the state is necessary to identify alternative strategies to

providing harbor of refuge. In addition, developing a hurricane readiness and evacuation plan that offers alternative locations for vessel tie-down with each fisherman will help change years of learned behavior. All of this work is in the effort to build community resilience and enhance disaster recovery so that fishers can resume business as quickly as possible and sustain their families and communities in the Vermilion Bay region of Louisiana (Figure 6).

Lauren Land is Sustainability Coordinator for the Louisiana Sea Grant College Program, where she's been since March 2012. Her research focuses on community resilience to hazards as it relates to ports, waterways, and waterfront communities. Lauren is based at Louisiana State University in Baton Rouge and is working towards her PhD in the Department of Geography and Anthropology.

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AMPHIBIOUS ARCHITECTURE: AN INNOVATIVE STRATEGY FOR FLOOD RESILIENT HOUSING



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As global climate change causes sea levels to rise and weather events to become more extreme, the

occurrence of severe floods will become more common around the world. The large populations living in deltaic or riverine floodplain regions will be particularly severely affected, especially those living at the lowest levels of income.

There is increasing awareness worldwide that traditional flood mitigation strategies that alter the environment and create concentrations of risk, such as levee- and dike-building, only increase the likelihood of catastrophic consequences when eventual failure inevitably occurs. The greater the degree of artificial protection, and the confidence that builds in the communities living behind it, the more disastrous are the consequence when an unexpected failure occurs. New Orleans learned this lesson the hard way in 2005, when 80% of the city flooded due to numerous failures of the levee system in the aftermath of Hurricane Katrina.

Can we protect ourselves in other ways? Under certain circumstances, the answer is yes. Amphibious construction is an innovative, alternative, low-cost, low environmental impact flood mitigation strategy that can reduce the hazard vulnerability of housing in flood-prone regions and increase a community's long-term disaster resilience. Amphibious foundations retain a home's relationship to the ground by resting on the earth most of the time, but floating the house as high as necessary when flooding occurs. They can provide temporary elevation as needed, when needed, and do so with a sustainable solution that works in synchrony with floodwater instead of resisting it. Fully engineered and code-compliant modern amphibious foundations can be an appropriate and cost-effective flood mitigation solution for areas where rising flood waters are not accompanied by waves or high-velocity currents.

Successful amphibious foundation systems have been functioning for over thirty years in Raccourci Old River, Louisiana, where they provide more reliable and more convenient flood protection than can be obtained from permanent static elevation. In

the last decade, the Netherlands has built amphibious housing in the Maasbommel region along the Maas River, which has a long history of severe flooding. In New Orleans' Lower 9th Ward, the Make It Right Foundation completed the FLOAT House in 2009. Amphibious housing projects are also under development in the UK, France and Canada.

In a severe event where flooding may reach unanticipated depths, the fixed height of permanent static elevation (putting a house on “stilts”) may prove to be inadequate. The variable elevation provided by amphibious foundations accommodates not only short-term extreme flood levels but long-term land subsidence and sea level rise as well, by lifting the house to whatever elevation is necessary to keep it safely above water. Maasbommel in the Netherlands and Raccourci Old River in Louisiana both experienced extreme flood conditions in 2011, and the amphibious houses in both of these locations successfully demonstrated the reliability of this emerging technology.

As an alternative to permanent static elevation, a retrofitted amphibious foundation neither disrupts the appearance of a neighborhood nor necessitates the inconvenience of climbing long flights of stairs on a daily basis. How does such a retrofitted amphibious foundation work? It basically works like a floating dock. A steel frame that holds the flotation blocks is attached to the underside of the house. Four vertical guidance posts are installed not far from the corners of the house. Utility lines have either self-sealing ‘breakaway’ connections or long, coiled ‘umbilical’ lines. When flooding occurs, the flotation blocks lift the house and the vertical guidance posts resist any lateral forces from wind and/or flowing water. The house cannot go anywhere except straight up and down on top of the water. The entire system works completely passively, requiring no further preparations or interventions to perform safely in a case of catastrophic flooding.

RESEARCH IN THE NEWS

The following are two links to help you to stay on top of what's what and where!

The **Recovery Diva** is a great place to go to for all of the newest happenings. The webmaster is Claire B. Rubin and she has 36 years of experience in the fields of emergency management and homeland security. Ms. Rubin is responsible for the content and the mechanics of the blog. She blogs to call attention to the long-term recovery process after disasters. The blog is intended to provide informal educational resources for both researchers and practitioners. The postings contain information about current disaster events, news (such as newly-released reports from government agencies), comments, opinions, and an occasional burst of outrage.

<http://recoverydiva.com/>

The **Natural Hazards Center** at the University of Colorado at Boulder was created to advance and communicate knowledge on hazards mitigation and disaster preparedness, response, and recovery.

<http://www.colorado.edu/hazards/>

The **Natural Hazards Observer** is the bimonthly periodical of the Natural Hazards Center. It covers current disaster issues; new international, national, and local disaster management, mitigation, and education programs; hazards research; political and policy developments; new information sources and Web sites; upcoming conferences; and recent publications.

Disaster Research is a biweekly e-newsletter that includes timely articles about new developments, policies, conference announcements, job vacancies, Web resources, and information sources in the field of hazards management.

The examples of amphibious construction cited above are all applications that serve moderate- to high-income populations in industrialized countries. However, amphibious technology has much to offer to rural and low-income populations in developing countries as well, either by inclusion in new low-cost housing projects or as a retrofit solution for existing communities. Amphibious construction can provide flood mitigation that is both more effective and considerably less expensive than other currently available options. It can dramatically reduce a community's vulnerability both to regular, relatively mild, seasonal flooding, and to severe, otherwise-catastrophic flooding. Experimental amphibious homes have been constructed and are undergoing testing in Bangladesh, Thailand and Vietnam.

Amphibious foundations are a sustainable, low-impact flood proofing strategy that is rapidly gaining acceptance for applications around the globe. Our team is currently developing amphibious housing projects for flood-prone regions in Nicaragua and Bangladesh, for several Native American communities facing catastrophic land loss in south Louisiana, and for First Nations communities subject to severe seasonal flooding in northern Ontario and in Manitoba.



What's New? What's Happening?

CRHNet Student Program

The Canadian Risk and Hazards Network Student Committee is delighted to announce the student program for this year's Symposium. The student mentoring session will be held on Wednesday Oct. 22nd at 5:30pm. This will be an opportunity for students and young professionals to receive mentoring from professionals in the field of emergency management in an informal setting.

The expert career panel will be held on **Friday, Oct. 24th at 10:30am**. Attendance to this panel session is open to everyone and is focused on discussing opportunities and common questions about careers in emergency management. Each panelist was selected based on their contributions to emergency management, their championship of student opportunities, and each brings with them their knowledge of different career paths in emergency management. There is a special registration rate for students. Registration for students who are CRHNET members is \$150 while students who are not members can register for \$195. We hope to see you there!

FEMA Unveils National Strategy to Strengthen Youth Preparedness

AD COUNCIL, FEMA and DISNEY launch "*BIG HERO 6*" PSAS to encourage emergency preparedness for kids.

More information about emergency preparedness is available at www.ready.gov.

Congratulations to CRHNet 2014 Student Bursary Recipients!

- *Stephanie Sodero*, Memorial University
- *Heather McGrath*, University of New Brunswick
- *Alessandra (Alex) Valoroso*, Royal Roads University
- *Maher El Hares*, Northern Alberta Institute of Technology
- *Shaun Koopman*, Royal Roads University



2015 WCDM Call for Papers



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Adrian Gordon
Education Chair Email: agordon@wcdm.org

11th Annual Canadian Risk and Hazards Network Symposium

Circular Number 3, Sept 12, 2014



Canadian Risk
Hazards Network
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and Réseau canadien d'étude
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Registration

Registration for the 11th annual CRHNet
Symposium is open and available at;
<https://dce.yorku.ca/CRHN/>

The Symposium includes plenary, special, and
general sessions and a field trip.

Call for Papers and Special Sessions is Closed

Please view the Draft Program at;
<http://www.crhnet.ca/symposium-2014>

11th Annual Canadian Risk and Hazards Network Symposium

Circular Number 3, Sept 12, 2014



Canadian Risk
Hazards Network
(Knowledge and Practice)

Réseau canadien d'étude
des risques et dangers
(connaissances et pratiques)



Synopsis of Program of the 2014 Annual CRHNet Symposium

The program of the 11th Symposium, including a field trip and discussion groups as well as plenary and targeted sessions, will appeal to people from all disciplines and sectors (private, academia, government, community, and voluntary agencies) whether they are working at local, national or international levels. CRHNet brings together everyone who has an interest in the cross-sectoral, multiple dimensions of risk management and disaster reduction.

CRHNet and the 11th Symposium emphasize an interdisciplinary approach that will reach out to everyone with interests in risk mitigation and management. Abstracts and special sessions on a broad range of topics related to risk and hazards are now evaluated and the draft program is in place. Themes to be addressed include:

- Evolving theories of risks
- Hazard and risk policy and regulations
- Emergency management
- Public health risks and emergencies
- Technological risks and engineering
- Critical infrastructure risks and protection
- Risk management models, standards, and tools
- Risk reduction and adaptation to climate and severe weather
- Cyber security risks and emergencies
- Risk and insurance of catastrophic events
- Managing coastal hazards, risks, and emergencies
- Managing North/Arctic hazards and risks
- Risks and demographic changes
- Managing risks and emergencies in mass gathering events
- Canada and post Hyogo Framework of Action
- Information and knowledge management for disaster risk reduction
- International perspectives on risk management and disaster risk reduction
- Aboriginal disaster resilience in Canadian and international contexts

Important Dates

Full paper submission for journal publication: September 15, 2014
Symposium: October 22-24, 2014

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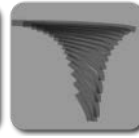
11th Annual Canadian Risk and Hazards Network Symposium

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Position Information

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Discipline/Field: Disaster and Emergency Management

Home Faculty: Liberal Arts & Professional Studies

Home Department/Area/Division: Administrative Studies

Affiliation/Union: YUFA

Position Start Date: July 1, 2015

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The School of Administrative Studies, Faculty of Liberal Arts & Professional Studies, York University invites applications for a tenure-stream position at the rank of Assistant Professor in Disaster and Emergency Management (DEM). Salary will be commensurate with qualifications and experience. A PhD in DEM or a related field, in hand or near completion is required, as is evidence of excellence, or the promise of excellence, in both teaching and scholarly research. Preference will be given to those with a related professional designation and those who have evidence of successful university teaching at both undergraduate and graduate levels. The successful candidate will be expected to teach at both the undergraduate and graduate level and be eligible for prompt appointment to the Faculty of Graduate Studies.

The start date for this position is July 1, 2015. All York University positions are subject to budgetary approval. The deadline for applications is October 31, 2014.

York University is an Affirmative Action (AA) employer and strongly values diversity, including gender and sexual diversity, within its community. The AA program, which applies to Aboriginal people, visible minorities, people with disabilities, and women, can be found at www.yorku.ca/acadjobs or by calling the AA office at 416-736-5713/416-736-5713. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority.

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**Title: A New Frontier: Four Pillar
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Academic Corner

JUSTICE INSTITUTE OF BRITISH COLUMBIA

JIBC wins prestigious interactive media awards

JIBC has won six Horizon Interactive Awards for a number of its innovative new training websites and mobile apps for industry professionals and students in JIBC's public safety programs.

Included in these awards was a Bronze Award for the ESS2go iOS App. Developed by a group that included staff from Technology Enhanced Learning and Teaching Centre (TELT) and the Emergency Management Division (EMD), the app eliminates the need to use some paper-based planning and operational materials. It was created for use as a support tool in training scenarios and as a tool for use during a disaster with nearly all the functions available without the need for Internet access. In September, accessibility of ESS2go was expanded with the launch of the app for Android devices.

JIBC also received Bronze Awards for the Introduction to Reception Centres and the Introduction to Group Lodging Open E-Learning courses offered by EMD. Developed in partnership with Emergency Management BC, the websites were created primarily to support training for people who live in rural and remote communities. In addition to these awards, the Introduction to Intelligence Analysis course, part of the Bachelor of Emergency and Security Management Studies, was named a 2014 winner of a Blackboard Catalyst Award for Exemplary Course.

"JIBC has made it a strategic priority to improve public safety education and training by developing innovative new e-learning tools and simulations based on the latest applied research," said Dr. Michel Tarko, President and CEO of JIBC. "These awards recognize the ground-breaking work that is being done at JIBC and is a testament to our focus on educational excellence and student success."

Last year, JIBC won three Horizon Interactive Awards for its Rural Disaster Resiliency Planning Community Toolkit.

For more information, visit www.jibc.ca/emergency.



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ROYAL ROADS UNIVERSITY

Disaster is never far away in the Arctic. As commanding officer of Canadian Forces Station Alert for six months, Major Rick Dunning knows this from experience. The Master of Arts in Disaster and Emergency Management alumnus recently returned from a deployment at the most northerly and permanently inhabited place in the world. And he has some stories to tell. When we speak to him, Dunning is barbecuing in his sunny backyard. The distance from CFB Trenton, where Dunning is based, to the northern tip of Ellesmere Island, is some 4,200 kilometres. But it's clear Dunning is still enamoured with the North. "It's such a unique part of our country but so few Canadians have much of an appreciation of what a phenomenal part of the world it is," he says. "Every Canadian, given the chance, should go to our Arctic."

For his master's major research project, Dunning evaluated disaster and emergency management preparedness at the Alert station. The project, he says, helped him earn the commanding officer role, which started in late January.

"For example, what would we do if we lost our power? That's a life threatening situation up there. If you broke a leg in Alert, you would have to be evacuated," Dunning says. "Factor in 36 hours before a Hercules (airplane) showed up and 10 hours for a flight to Trenton, and it would be two days before you got help."

Dunning's research found emergency preparedness at the

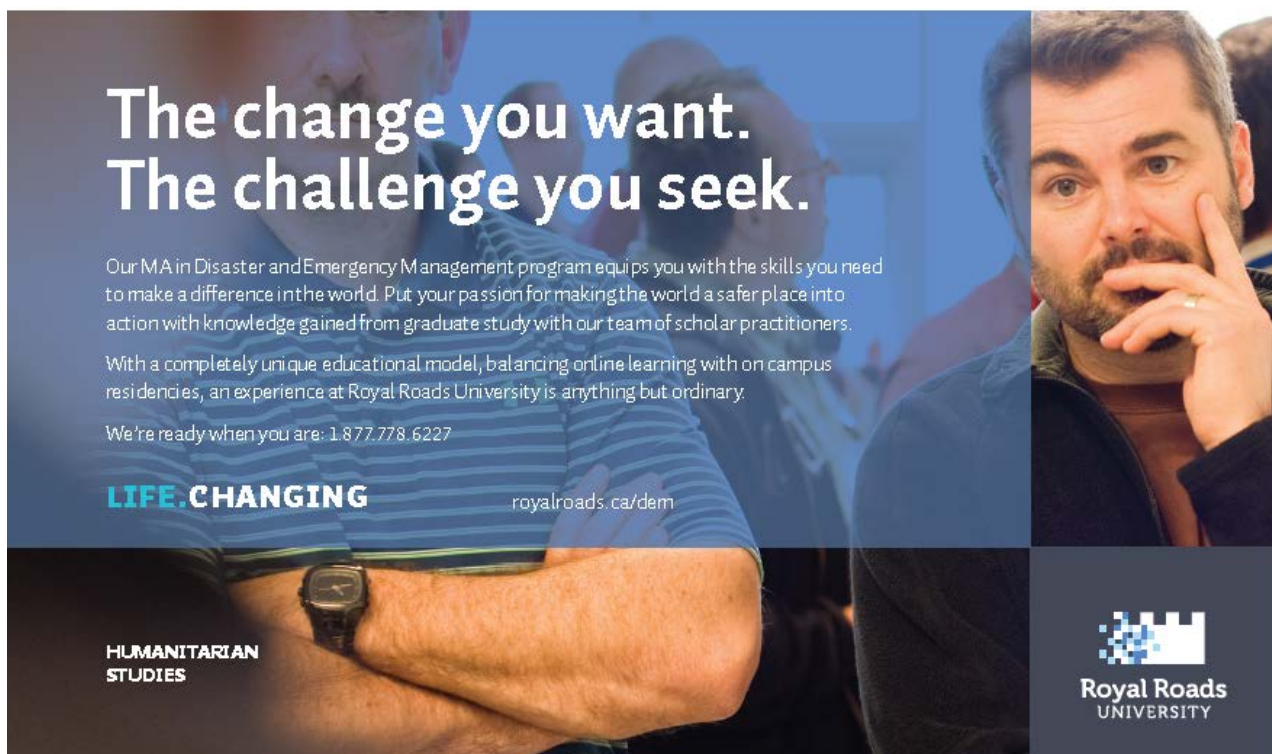
Canadian Forces Station was "not perfect but doing well." There were plenty of occasions for him to put his disaster emergency management skills to the test over six months. The most challenging incident was when two of three water pumps, which continuously supply water from a lake two kilometres away to the station, failed in February. A dive team had to free a stuck pump in the middle of an Arctic winter. "We would have been in serious trouble if the third pump failed," Dunning says.

"There were always emergencies. What's a problem here can be utterly magnified up there."

As commanding officer, Dunning oversaw the primary mission of the Canadian Forces Station – signals intelligence. The station also hosts numerous scientists and Arctic researchers, and as Dunning says, Alert plays a key role in maintaining Canada's sovereignty in the Arctic. Dunning documented his deployment with frequent letters and photographs, giving insight into military life 817 kilometres from the North Pole. The letters include stories about encounters with polar bears, wolves and Arctic hares, the Canadian Rangers, life in 24-hour darkness, and, most unusually, becoming licensed to marry a couple at Alert. Dunning called the latter Operation Northern Hitch.

After 33 years with the Canadian Forces, Dunning says Alert was one of his favourite deployments.

"It makes you appreciate what we've got here. I tried to emphasize to Canadians coming up, this is our territory. It doesn't look like Canada but it has its own majestic beauty."



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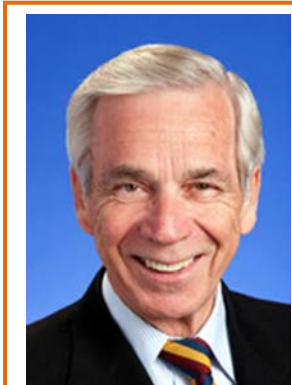


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From the Practitioner's Desk

How Would Your Organization Stand Up to a Cyber-Attack?



By: **Jim Stanton**

President, Stanton Associates, Consultants in Emergency Planning and Training, Vancouver and St. John's

Many organizations and governments have fallen victim to having their websites and internal communications networks hacked.

Last December retail giant, Target, fell victim to a data breach in which hackers broke into their point-of-sale system and obtained personal information and credit card numbers impacting 110 million customers. This was one of the largest data breaches in history and it exposed major shortcomings in Target's crisis response readiness, which led to the recent departure of their Chief Executive Officer.



Business leaders should look closely at Target's handling of this crisis and review

their own readiness to handle a similar breach. There are several key learnings that are relevant to all organizations dealing with personal information.

Make a Plan

Businesses handle large amounts of personal data and need to be prepared for a data breach that could happen at any time. This means that



organizations need a well-documented, pre-planned citizen response strategy before the crisis occurs. Once news of a breach gets out, response time for accurate communication is critical. Pre-planned scripts for all frontline personnel, social media strategies, PR and digital communications need to be in place, ready to be adapted to the specifics of the situation.

Have Emergency Notification Systems Established

Internal and external communications need to be deployed quickly and accurately across multiple media to alert individuals to the situation and provide detailed information on required actions. Standard email systems are insufficient to deliver this volume of information in a timely manner and



ensure all citizens are informed. The senior official in the business must assume a high profile role in communications.

Appoint an Experienced Crisis Management Team

Organizations need crisis management leadership that has extensive data security expertise coupled with strong communications and public relations skills. A crisis of this scale is likely to impact every department within a municipality and the team composition needs to reflect that impact. Leadership includes the need for scripting and documentation to explain the situation to the public. The CEO or President needs to be seen as being in front of the event.



Manage Uncertainty

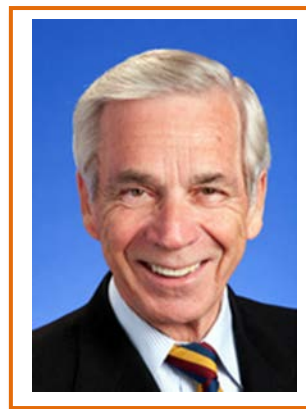
In cases of data breach, the true facts often take weeks or months to uncover. The exact number of impacted records and nature of the attack can take time to pin point. In Target's case, early release of inaccurate information increased negative public response and significantly impacted the company's reputation. Businesses must inform citizens when a breach has been identified, but they need to delay releasing exact numbers until the facts are clear. Communications should focus on what actions potentially impacted individuals need to take; once identified immediate notification to all customers must occur.

Follow Data Protection Best Practices

The vast majority of cyber-attacks exploit common vulnerabilities and can be avoided by employing basic network protection practices. In February, the

National Institute of Standards and Technology issued a cyber-security framework that it developed jointly with representatives from 16 different industries providing a common template for corporate data security. Release of this framework, coming on the heels of the massive data breach at Target has captured significant industry attention. While there is no way to guarantee that your organization will be immune to a cyber-attack, the reputation damage will be far greater if news gets out that you hadn't taken the proper precautions to protect your business.

SO YOUR COMMUNITY DOESN'T HAVE AN EMERGENCY PLAN ...



By: **Jim Stanton**,
President, Stanton Associates, Consultants in Emergency Planning and Training, Vancouver and St. John's

My crisis definition is:

"A turning point, a decisive, critical time which threatens great danger *if not handled properly.*"



The Chinese symbol for crisis is a combination of two symbols: "danger" and "opportunity." It is called Wei-ji.

What this tells us is we must learn from the past - from breakdown comes breakthrough.

It is important to recognize that when things go wrong, you get one chance to get it right. Surviving

the first 48 hours of a crisis means you need to be first, be right and be credible.

However, most elected officials and senior administration are too preoccupied with the day-to-day running of the community to worry about the possibility of needing an emergency plan.

As a result, and in spite of provincial and territorial legislation, many Canadian communities do not have up-to-date emergency plans or have no plans at all.

If there is a plan it is often outdated and no one has responsibility for maintenance. At best it is handed over to the Fire Chief for him or her to “manage.”

This is a direct reflection of the public’s perception about the need to plan for emergencies. Citizens would sooner have their tax dollars spent on new roads, parks, athletic facilities, retirement homes, etc., than on an emergency plan.

The problem is described by John Clague, National Hazard Research Center, Simon Fraser University, as rare event syndrome: “The potential for catastrophe is real but the frequency is low; therefore, people do not take the threat seriously.”

This changes when things do go wrong, as will inevitably happen. Then citizens demand to know what is occurring, but because the organization does not have a strategic, proactive, timely plan, information vital to helping the public cope with the situation is withheld.

People want to be told what is happening. Without a plan, public officials fear the release of information, because they don’t think the public will understand. We need to have more faith in the public. As U.S. President Abraham Lincoln said:

“I am a firm believer in the people. If given the truth, they can be depended upon to meet any crisis. The important point is to bring them the real facts.”

How does this play out in real life? Well, British Columbians know they are living on a major earthquake zone, with Vancouver itself straddling a significant fault line. Because there has not been a major quake in living memory, people are complacent.

CTV BC News recently conducted a poll to determine public readiness in the event of a catastrophic event, asking: “Do you have an emergency plan in place?”

The answers were as follows:

Completely ready at any time	8%
Sort of but need warning time	11%
No plan in place	81%

Until recently, there was little incentive for public officials to change this situation. Now, however, a new sense of urgency has now been introduced on the scene.

According to the Canadian Press, a multimillion-dollar lawsuit has been filed against the town of L’Isle-Verte near Lac Mégantic, Quebec, in which 32 people died in a fire at a seniors’ home last January.

The owners of the residence and their insurer allege in their \$3.8-million lawsuit that numerous mistakes “resulted in a human catastrophe that could have been avoided or at least been of lesser magnitude.”

The lawsuit alleges the town failed to implement emergency plans to cope with such a disaster. It says the failure of town officials to prepare for such a catastrophe showed a “reckless disregard for the lives of others, particularly the elderly in the Residence du Havre.”

They argue they had been asking the town to devise contingency plans for five years: “This lack of planning ... meant that municipal employees improvised ... and made serious mistakes,” the

lawsuit says.



(Ryan Remiorz / THE CANADIAN PRESS)

The lawsuit also alleges that one fire truck arrived at the scene of the blaze within 15 minutes and that several additional minutes passed before another arrived. It argues the numbers were insufficient, that the fire trucks were not equipped with appropriate ladders to rescue people in the seniors' home and that the town's volunteer firefighters did not have the proper equipment to provide emergency care.

The document also alleges that tensions between the fire departments in L'Isle-Verte and nearby Riviere-du-Loup, which was better equipped for the situation, contributed to the lack of planning.

You can bet that municipalities across Canada will be watching this trial with great interest.

Another motivating factor is the speed with which information about a disaster now spreads. Look at the chaos caused by the recent bus roll over near Merritt, BC. This happened 25 miles from a small community in the BC interior. Within minutes it was a worldwide story and every action of the first responders was under the microscope.

The lessons we need to take away from these examples are simple: have an emergency plan, test the plan and update it regularly. Catastrophe can strike at any time.

UPDATE ON THE SIMTEC PROJECT

The Simulation Training and Exercise Collaboratory (SIMTEC)³ research team has now posted on the website the analysis of the CBRNE Workshop held at the Justice Institute of British Columbia in January 2014⁴. Along with a training and awareness video, following the review of the subject matter experts, the revised protocols for Self-Care Decontamination have been posted to the website. These include a number of training videos on the protocols as well as written material. **Exercise Green Cloud**, a functional table-top exercise is now also available on the web site and can be downloaded and run by any community which has access to high-speed internet.

The SIMTEC research team developed and ran **Exercise Target Red** in June of 2014, an exercise which focused on a mass casualty incident involving an active shooter. Three communities participated in the exercise, which focused on the psychosocial considerations of the casualties, their families and friends, and those of the responders who attended the scene. The training and awareness video is now available on the web site and once the findings from the exercise have been analyzed the exercise will be made available for communities to use.

The latest exercise, **Exercise Outbreak Orange**, was run in September 2014 and involved a pandemic or disease outbreak. Two community-based Emergency Operations Centres participated along with members of three Health Authorities. Check the web site for further updates and the training and awareness video.

<http://simtec.jibc.ca/>

³ Funded by the Canadian Safety and Security Program, DRDC and Project Champion is Health Canada.

⁴ Funded by the Canadian Safety and Security Program, DRDC in partnership with Emergency Management British Columbia.

WHAT IS YOUR DANGEROUS IDEA?

By: *Dave Etkin*
York University

John Brockman edited a fascinating book called “*What is your dangerous idea?: Today’s Leading Thinkers on the Unthinkable*”. In it, many creative thinkers tried to answer that question from the perspective of their own disciplines.

Here is how I would answer that question, and it began with a discussion I had with the eminent Professor Ian Burton, who asked me (perhaps rhetorically)

“Why are the forces that create exposure and vulnerability so strong? And why are the efforts to reduce risk not strong enough? And when we know the answers to those two questions.... what do we do about it?”

I think the answers are very complex, but can be thought of within two general sets of factors. The first set of factors is connected to how those forces that create exposure and vulnerability differentially benefit the people and organizations that construct risk. The second set of factors relate to sets of adaptive strategies (both cultural and hardwired) that historically evolved in a different kind of environment where they worked well, but that have now become dysfunctional. The dysfunction occurs when solutions that are rational and effective at small scales are ramped up to large scales, where they become increasingly irrational and dysfunction as they accumulate. Examples of this are the accumulation of weapons of mass destruction and the Tragedy of the Commons.

This perspective suggests that in spite of all the good work that is going on to reduce risk, exposure

and vulnerability to extreme hazardous events are increasing as a result of very powerful forces in society. These forces are embedded in the most fundamental aspects of our social structures and are not amenable to change except under extraordinary circumstances. I suspect that in this globalized, technological and highly populated world we are becoming increasingly dysfunctional as a species, plummeting headlong towards a catastrophic future.

To support this argument I present two figures. *Figure 1*(see next page) shows how in recent decades, our planet has shifted into a zero sum game, where economic and social benefits to people can only accrue from environmental degradation. From a systems perspective, the long term exceedance of carrying capacity can only result in some form of system crash.

Figure 2 (see next page) illustrates how changes in atmospheric carbon dioxide are moving the state of the atmosphere into a region not occupied over the last 420,000 years. The result of such a system shift are very difficult to predict, but carry a high risk (eventually) of moving into what theorists of complexity call a different strange attractor, which means that the earth would have a very different climate system than the one it now has.

My dangerous idea is that, like the proverbial lemming, *Homo sapiens* is rushing headlong towards annihilation. Like a moth drawn to a flame, we can see the light of destruction growing ever closer but are biologically and culturally trapped in a ruinous pathway.

Ian Burton asks what we can do about it. Given that the human response to hazard is dominated by the two strategies of being reactive and incremental, I fear that there is little we can do to prevent it. An alternative view requires a major cultural shift of

environmental and social ethics. Such shifts have happened and are possible, but would probably only result in response to catastrophic stresses. Given the large inertia that exists in climate and ecological systems, it would then be a case of too little, too late.

I sincerely hope I am wrong.

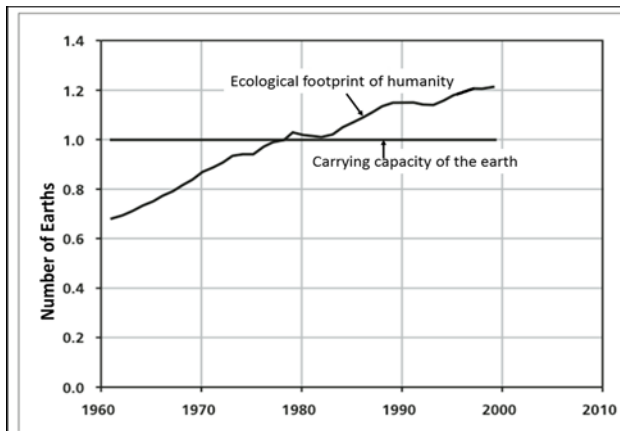


Figure 1: This graph shows the number of Earths required to provide the resources used by humanity and to absorb their emissions for each year since 1960. This human demand is compared with the available supply: our one planet Earth. Human demand exceeds nature's supply from the 1980s onward, over-shooting it by some 20 percent in 1999.

Source: Wackernagel, M., Schulz, N. B., Deumling, D., Linares, A. C., Jenkins, M., Kapos, V., Monfreda, C., Loh, J., Myers, N., Norgaard, R. & Randers, J. (2002). Tracking the ecological overshoot of the human economy. *Proceedings of the national Academy of Sciences*, 99(14). 9266-9271.

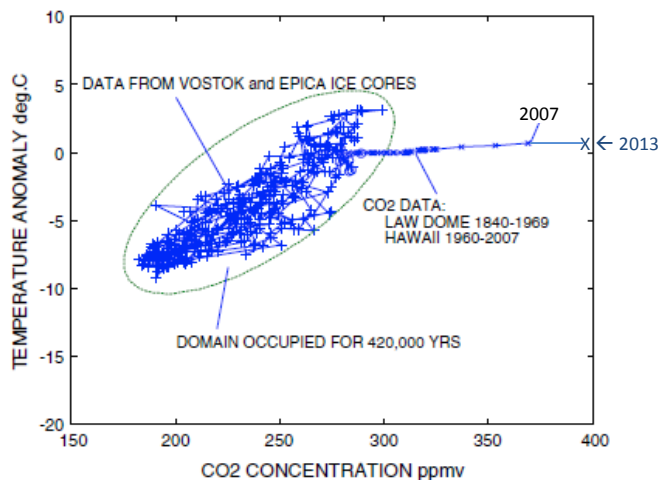


Figure 2. State space view of Antarctic ice-age cycles. Modified from Etkin, B. (2010). A state space view of the ice ages—a new look at familiar data. *Climatic change*, 100(3), 403-406. 2013 data has been added, for global mean temperature and atmospheric CO₂ concentration.

WHY USE STANDARDS OF PROCEDURES?



By: Nic Meunier

*Nicolas Meunier
has a Master
Degree of Arts in
Disaster and
Emergency
Management with
Royal Roads
University*

One of the most convoluted and misunderstood parts affecting technical operation in the disaster and emergency (DEM) field is legal mandates and standards. So many standards and guidelines have been written to reach different kinds of operations in DEM. These protocols are important to responders for safety purposes and to management members overlooking these teams. When initiating a rescue, the team leaders commit to follow laws and regulations in place that will or could affect the team and resources (human, material and financial). Major consequences could result from failure to comply during an operation.

Clear and constant training is essential when preparing a DEM and rescue team. Mandatory and minimum training requirements diverge between countries and even communities. Each community wants to evaluate its training needs and at the same time develop its own standard of operation procedures (SOPs).

The majority of these organisations prefer to work with SOPs. These SOPs are not only essential during operations but also must serve as the basis within the administrative, training and development components. SOPs will answer the technical, commandment, coordination, engagement and many

other questions. But they would also dictate the structure of the operations during a response.

TYPE OF SOPS

Professional organisations and teams should consider establishing two types of SOPs: administrative and operational. Administrative SOPs provide the structure of the personnel and resources and would include: the chain of command, qualifications, equipment, staffing. And the operational SOPs could describe in detail the techniques and responsibilities of each element during operation. These would include protocols, operations procedures, regulations, requirements, management, tactics and management requirements. The guidelines must be integrated into one common document or manual.

Each of these aspects should be reviewed and revised regularly. All operational levels should be in communication with each other and all members should be empowered within the full process of the review.

SOPS OVERRIDING OPERATIONS

It is important to understand that SOPs should be developed to consider all local, national and international agreements. The SOPs are then oversight document for the operations of the organisation. The national level includes the most significant laws and regulations including health and safety considerations. National regulations often protect the employees from risks and hazards that the places of employment are responsible for. Often the organisations will include standards from national authorities in their manuals to make certain they are legally incorporated within the procedures.

The organisations must consider the impacts of the National laws and regulations on their SOPs. The teams may be liable for the negligent performance of their duties. No team could count on any immunity against negligent actions. This is why the

failure to follow any of the SOPs could result in serious negative impacts. Organisations should consider having their standards review done by lawyers to mitigate any gaps within their practices.

To conclude, the more your organisation is specialized and provides specific skills, the more your organisation needs strong and robust SOPs to protect the casualties, its members and the organisation itself. Many more organisations should consider using international and globally recognized standards and guidelines to be resilient in the face of negative situations. One of the best examples is probably the International Search and Rescue Advisory Group (INSARAG) Secretariat of the Office for the Coordination of Humanitarian Affairs section of the United Nation that develops prominent international standards for Urban Search and Rescue teams and methodologies for international coordination. They facilitate exchanges between international teams from around the world and present information on their Virtual On-Site Operations Coordination Centre (<http://vosocc.unocha.org>) and within the United Nations INSARAG Guidelines.

Nic is a PhD candidate at Cappella University. In the spring of 2014 he worked at the Headquarters of the United Nations in Geneva with the International Search and Rescue Advisory Group.

He was also active in the military for two decades and left as Sergeant Team Leader Search and Rescue. The Search and Rescue Technician (SAR Tech) is part of a group of elite, highly trained rescue specialists who provide on-scene, medical aid and extraction from some of the harshest and most remote areas of Canada, deploying from rotary or fixed wing aircraft in various environmental and climactic conditions. SAR operations may require parachuting, mountaineering, hiking, swimming and scuba diving in adverse conditions.

ARE FOLK SONGS A TRUE REFLECTION OF DISASTERS?



By: **Joe Scanlon**

Joe Scanlon is professor emeritus and director of the Emergency Communications Research Unit at Carleton University in Ottawa, Canada.

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When Tricia Wachtendorf compared folk songs to other forms of literature, she found they tended to be accurate. “Most of the songs,” she reported, “concentrated on people coming to help - the disaster myths of panic and disorganization were not prevalent” (Wachtendorf, 1999). When Rogers examined a single ballad on the loss of a sealing ship, Southern Cross, he found it was historically accurate (Rogers 1982).

When Joe Scanlon and Heather Sparling and their researchers studied 101 years of folk songs about mine disasters in Nova Scotia and 47 songs in seven languages about Titanic they found much the same thing.

Apparently while the media, movies and novels distort what happens in emergency incidents and disasters, folk songs get it right.

Why? That’s the question.

None of those who have looked at folk songs have explained why they get it right.

I have come up with one theory that might explain this phenomenon – it has not been tested -- but instead of tossing it out (I will save it for Larry’s successor) I thought it worth posing the question to the well-informed and astute readers of HazNet.

Can anyone suggest why folk songs might get it right when the media, novels and movies distort what actually happens?

By the way if anyone knows some literature on this subject, please pass it along. Maybe we have missed something.

THE FUTURE EMERGENCY COMMAND CENTRE (ECC): WILL IT WORK?



*By: Prof Avi Kirschenbaum
Kirschenbaum Consulting
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TECHNOLOGY AND TRAINING

A consensus has emerged that rule and protocol compliance training, especially in routine and repetitive type of situations, should bring about better work performance. This axiom has been the holy grail of most organizations that deal in 'risk' where safety and security are paramount. For this reason we see nuclear generating plants, petrochemical facilities, airports and even financial institutions employees obligated to go through such training programs. In these cases, safety and security are mainly dealt with through sophisticated technology with the aim of reducing human intervention in the decision making process. Alarms are set off by machines and not by people. Training is designed to educate employees to perform their tasks efficiently by actions that are rule and protocol compliant. Simply follow the rules, regulations and guidelines and all will be fine.

Compliance training has also become the gold standard for improving disaster and crises management. We prepare for the next incident by drills, table top exercises and even computerized scenario demonstrations. But such types of preparation are still a far cry from taking advantage

of sophisticated technology to assist in decision making during an ongoing disaster or emergency. This may be one reason why the scant research on the effectiveness of ECC's in its present bureaucratic form is that overall they are doing a poor job. And most plans never work in reality.

Yet, ECC's are slowly going through a change following a trend toward using technology either as a replacement, or in assisting, personnel in the decision making process. Control and command centers are awash in large LED screens, displaying animated software using GPS technology, scenario simulations, automated mass warning and logistics systems; all that have become an integral part of the ECC's SOP. If this trend continues, as it has in other high risk type service and production organizations, to what extent can we feel comfortable with compliance training that will deprive us of making sense out of all the information and output delivered by the technology we have invested in? Will the future of emergency and disaster managers be captive in the hands of software programmers that dictate decisions and a training program that emphasizes rule/protocol compliance that is technology driven?

BENDING RULES

All is not lost! A recent study on the impact of rule and protocol compliance training on security related decisions among employees in a large number of airports across Europe sheds a great deal of light on what can be expected in organizations where decisions have a direct impact on managing or containing a potential crises. Again, a cardinal belief in airport security is that workers' training has a direct impact on actual rule compliance behavior; thereby assuring optimal security through correct decisions. Given the complex social and organizational nature of airports, however, it is not surprising that substantial proportions of security employees (actually about 40%), including screeners, security guards, ground personnel

actually bend, break or ignore rules and protocols, bringing into question the effectiveness of training and the ability to deal and manage a threatening situation.

Apparently, as employees gain actual experience in dealing with threats, they tend to break, bend or ignore the rules. From an administrative perspective, such non-compliance with rules and protocols have direct negative consequences on the level of "security" of the airport leading to potential loss of lives and property. But as the employees state themselves, "if we followed all the rules and protocols, not only would the airport stop functioning (congestion) but we would be making lots of mistakes that would embarrass us and annoy the passengers."

IMPLICATIONS FOR ECC OPERATIONAL EFFECTIVENESS

It does not take a great deal of imagination to recognize that a "technology oriented" Emergency Command Center would bring about a revolutionary transformation of those involved in its operation. Being the police or fire chief simply won't be enough. To deal with the new sets of rules and protocols that decision making technology will impose means everyone would have to upgrade their technology skills including learning a new set of "rules and protocols". How else would it be possible to understand the technology output and utilize it to make a critical decision? This would likely make the ECC into an even more bureaucratic organization than it is at present! The 'upside' would be the use of cutting-edge technology and "big data" sources to help in the decision making process but the 'downside' would be the technology driven decisions would not always be followed. Here is where being an experienced fire or police chief counts in sometimes ignoring what the computer spills out! Just recall that 40% of the airport employee's break, bend or disregard the rules and protocols in order to keep the airport functioning!

Let's make this even more complicated by introducing the human factor into the technology-training transformation that ECC's will likely undergo. For example, these can include the personal conflicts that arise, professional rivalries and territorial prerogatives. And, of course, there are different interpretations of the technology's output. Will rank or technology skill level be given precedence in decision making? While the ECC will have its formal structure that might determine internal power relationships there exists a much more powerful informal set of social networks that extend beyond the physical premises. These informal social networks have been repeatedly shown to disproportionately influence decisions as well as act as conduits for communication outside the formal administrative guidelines. And, it is here, in the informal social networks that decisions will be made to abide by or ignore rules and protocols. Rank might count on paper but less so in reality of human interrelationships.

THE TRANSFORMATION

With the gradual transformation of ECCs into a format reflecting a technology driven decision making organization, we should expect pressure by public policy makers to redesign the ECC structurally so as to reflect an overwhelming presence of technology and a shrinking number of traditional experienced crisis and emergency personnel. This change follows the logical path of marginalizing human-made decisions and increasing reliance on "IT" decisions. Toward this end, rule and protocol compliance training will gain momentum to fit the need of the technology – and not entirely the resolution of the emergency or crisis! It may simply be a case where the 'means' replaced the 'goals'. Taking this approach to its logical end, I would suspect that somewhere along the road will be an initiative toward an automated ECC; just as we are moving along the same path toward "Smart Cities" based on the utilization of

technology and IT in all areas of urban living with a minimum of human interference!

ECC: THE REALITY

Going back to the airport example and the empirical evidence how security decisions are made by employees should put these dire predictions of the automated ECC in proportion. One of the key discriminators and predictors that affected rule/protocol compliance was the "trust" put in the technology being employed to mitigate a threat. The fact that security technology manufacturers will readily admit is that even the most sophisticated technology is not flawless. False positives occur; inaccurate output appears; system glitches occur. In addition, the scope of decision assisted technology is rather narrow and falls under the "garbage in-garbage out" euphemism that tends to be inflexible when non-routine situations occur. All these issues are picked up by those who utilize technology to assist in making a decision and here is where "trust" enters the picture. How far are we willing to trust the technology, to trust the information inputs, the types of software analysis generated and the often simplistic decisions that are provided? Over 80% of the airport employees said they did not trust the technology as the sole and only source for making a security decision. This gives us hope that despite the drive to increase technology based decisions in ECC's, there will always be trained and experienced professionals in crisis and emergency management to oversee – and even break, bend or ignore the technology driven decisions – by utilizing their collective wisdom.

CANADA'S PUBLIC ALERTING REVOLUTION



By **Ernie MacGillivray**
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This article is intended to share the highlights of the recent game changing decision by the Canadian Radio-Television and Telecommunications Commission (CRTC), concerning public alerting, and to providing some commentary on the implications. This revolutionary decision leverages the capabilities of the private sector to warn the public at risk and integrates those capabilities into the existing National Public Alerting System (NPAS). This decision follows one in 2013 requiring CBC Radio to carry urgent alerts and applies similarly to private sector service providers. The CRTC is also encouraging the development of a Canadian wireless alerting solution, to complement existing and anticipated over the air, cable and Internet-based services. Taken together, these decisions will facilitate the dissemination of urgent alerts across the entire spectrum of information channels.

The Commission is now requiring broadcasters to participate fully in Canada's National Public Alerting System. By 31 March 2015, broadcasters in Canada will be required to alert Canadians of imminent threats to life. Campus, community and Native radio and television broadcasters, as well as radio communication distribution undertakings, will be required to do so by 31 March 2016. As a result of these changes, Canadians across the country who are listening to radio or watching television will receive notification of imminent emergencies issued by public officials so that they can take appropriate action. Alert messages include messages relating to events such as tornadoes, floods, forest fires, industrial disasters and tsunamis.

While this decision addresses the broadcasting industry, the Commission is also encouraging the use of digital media and mobile platforms to alert Canadians to imminent or unfolding dangers, particularly given the increase since 2011 in the use of mobile devices by Canadians. Alberta has just deployed their mobile alerting application, which is linked to their provincial system. The Canadian Centre for Security Science is continuing work to develop a wireless alerting solution that would deliver alerts to all mobile devices in a target area. The future looks bright.

This journey hasn't been easy. Officials have been working actively since 2003 to build a national public alerting system, one similar to the existing Alberta model. The CRTC has long been an advocate for public alerting and has through a series of decisions (see references) provided guidance and policy direction that has created an environment conducive to solutions. In 2007 the CRTC authorized the backbone system, known as the National Alert Aggregation and Dissemination System (NAADS), to be provided by Pelmorex (The Weather Network). Broadcasters resisted at first, citing concerns about liability, technology and cost. Since then the CRTC and government officials have worked to remove obstacles and encouraged private sector broadcasters to get on board. This recent decision then isn't a complete surprise, indeed it is most welcome, but the scope and timing of the requirements is unprecedented. Governments need to be agile. Each jurisdiction will need to work with local radio stations and regional broadcasters to enable alerts over NAADS. The *timelines are very ambitious*, with an expectation that most players will work to a deadline of 31 March 2015.

In each jurisdiction the scope of work should include deploying and testing the technology and educating the public on how they can expect to be alerted. This will also provide opportunity to remind citizens of their responsibility to maintain awareness of risks and hazards, to have an

emergency plan and to pay attention to instructions from officials. Subsequently, each jurisdiction will need to engage municipal authorities to discuss how they can make use of the system. There are different approaches. Alberta is fully decentralized, while Ontario does not enable use by municipalities at all. Officials will need to decide how best to manage expectations and new capabilities, such that local authorities can alert their residents concerning matters within their jurisdiction.

We now have all of the pieces in place: We have content providers, the issuers of emergency alerts, such as emergency management organizations (EMOs) and Environment Canada; we have NAADS, a robust backbone system ready to collect alerts from issuers and deliver them to broadcasters and other content distributors; we have a regulatory framework that makes clear the responsibilities of provincial and territorial emergency officials, broadcasters and other distributors; we have broadcasters now enabling alerts over their services; we have mobile capabilities rolling out with new capabilities in development. In short, we have the ability to warn people at risk wherever they are. We just need people now to pay attention.

References

CRTC Broadcasting Decision 2007-72, Emergency Alert Services

CRTC Broadcasting Order 2009-340, Mandatory Distribution Order for Pelmorex

CRTC Broadcasting Decision 2011-438, Licence Renewal and Mandatory Distribution Order for Pelmorex

CRTC [Broadcasting Decision CRTC 2013-263](#), CBC Emergency Alert Services

CRTC Broadcasting Regulatory Policy 2014-444, Mandatory Distribution of Emergency Alert Messages

Student Papers

A SUCCESSFUL MITIGATION PROCESS



By **Rob Evans**

Fire Chief for Redwood Meadows Emergency Services, located 25 kilometres west of Calgary.

This paper was prepared by Rob

Evans during completion of the Mitigation course as a requirement for his Emergency Management Diploma. Students were asked to complete a case study about a successful mitigation project. In the study, students consider the amount of resources invested, reflect on the support or opposition the project may have encountered and discuss the success of the project in terms of spared disaster costs or the impact on people in the area. Students also provide recommendations for other activities in and around their case study area to enhance existing protections.

BACKGROUND

The communities of Bragg Creek and Redwood Meadows are close neighbours. This paper concentrates on Redwood Meadows.

In the early morning hours of June 20, 2013 emergency managers and responders in southern Alberta received calls of substantial rainfall amounts in the Rocky Mountains west of Calgary. It was not unexpected, as earlier in the week forecasters said a major rain event would take place.

Little did emergency managers know that with the deluge, they were about to be involved in the worst natural disaster in Canadian history.

Just before midnight on June 19 the hamlet of Exshaw in the Municipal District of Big Horn started to wash down the mountainside. Canmore was well on its way to becoming isolated with washouts of the TransCanada Highway while many homes in the town were washed into Cougar Creek.

Bragg Creek and Redwood Meadows both lay alongside the Elbow River, about 25 km west of Calgary. Water levels in the two small towns were high and running fast at midnight. This was nothing out of the ordinary for the communities, which had last seen substantial flooding in 2005. Bragg Creek and Redwood Meadows are separated by a golf course and forest, and are about seven km. apart along Highway 22. Redwood Meadows is a small residential-only town site situated on First Nation's land, while the Hamlet of Bragg Creek, with residential and commercial properties, is located in the southwest corner of the County of Rocky View. Although not partnered for emergency management, Redwood Meadows Emergency Services (RMES) provides fire and rescue services to this area on a service contract basis.

PREVIOUS FLOODING AND MITIGATION PROJECTS

Etkin et al. (2004) comment about the increase of weather-related disasters: "Since World War II, there has been an increase in the incidence of weather related disasters – notably flooding – compared with geophysical disasters such as earthquakes." (Etkin et al., 2004, ii). The 2013 event would not prove Etkin et al. wrong, becoming the

fourth flooding event to hit the area in the past 20 years. Flooding in 1995, 1998 and 2005 became incrementally worse. In 2005, Redwood Meadows saw the river rise to levels that threatened the earth berm erected years earlier to protect residents. The berm runs between the Elbow River and the town site along the entire 4-km stretch of residential community. Building in the town site began in the mid-seventies, and there are no records that indicate costs or when the berm was constructed.

In 2005 the rise in the river levels caused damage to the berm for the first time in Redwood Meadows. The flows slowly ate away at the built-up earth and if it was not for the use of rip rap from a local quarry and a track hoe owned by a resident, there could have been significant damage to many of the 350 homes. Unfortunately, close to one-third of the homes suffered serious damage due to sewer back-ups caused by an inadequate sanitary sewer system and infiltration of the system by groundwater.

POST-2005 FLOODING MITIGATION

Following the 2005 event, a stockpile of rip rap was brought in and strategically placed along the berm for use in future incidents. As the town has no records of the costs associated with this action it is difficult to compare costs spent during this mitigation phase and the 2013 disaster. I recall the associated costs being close to \$700,000 for the material and work done to bring the rip rap to town. It is also difficult, if not impossible, to find average home prices for Redwood Meadows. It is fair to say, based on my “average” home, that in 2005 an average home in Redwood Meadows was valued at \$300,000. Multiply that figure by 350 homes and you come up with a figure of \$105 million. That means that for just 0.7 per cent of the costs of homes in Redwood Meadows, mitigation efforts in 2005 saved the town in 2013. Looking at the current home average of \$420,000, that \$700,000 equals 0.5 per cent.

Other minor projects, including improving sewer lines and the lift station, buying additional pumps and adding a backup generator for town buildings including public work, town office and the fire hall have also been completed since 2005. There was no real opposition to any of the projects. Many residents felt that if it needs to get done, ‘just do it... and don’t bug me about it.’

Sadly, the emergency management framework was improved or updated and was, therefore, unusable during last year’s event. Although many people voiced their thoughts about being involved, nobody stepped forward.

THE 2013 INCIDENT

The Redwood Meadows Emergency Services Fire Chief Rob Evans (me), who was near Edmonton for meetings, received the first page for a rescue from Bragg Creek at 7am on June 20. Based on the location of the incident and history from previous flooding from the Elbow River, I knew that overland flooding would be an issue.

By the time I arrived in town around 10:30 am flows in the Elbow River were threatening to overtake the berm in a couple of areas. The first area, where people were frantically filling sandbags and placing them along the top of the berm to stop water from lapping over, was about 100 metres long and the sandbagging was working. A third trouble spot ran behind the town’s water treatment building where significant water was spilling over and filling low spots around the building. Volunteers manning portable pumps kept up with this trouble spot and sandbagging eventually stopped the flow of water. A third spot would threaten to take out the entire town site for the next day and a half. The water flow at this location along the southern end of the berm continued to erode the existing structure until water levels dropped sufficient enough for heavy equipment and dump trucks to get ahead of Mother Nature. This location would have eroded to the point of breaching had it not been for the luck of

having two pieces of heavy equipment close by and the vice-president of a trucking company living in town who was able to get 20 trucks with a single phone call. Without this, Redwood Meadows would not have come through this event successfully. Everyone thought the town had come through the event unscathed when in the early morning of Saturday, June 22, fire crews conducting hourly patrols of the berm came across an area that had washed away and was in danger of flooding the north end of town. Crews worked hard for the entire day trucking in material to this location and by Sunday, June 23 all points that were in danger of being washed away were repaired.

POST-DISASTER RECOVERY AND MITIGATION

In the end, after two weeks of response to the flooding and the use of heavy equipment, dump trucks and the material used, Redwood Meadows spent \$2.1 million. This amount was fully reimbursed by the Government of Alberta Disaster Recovery Plan. This brought the berm to 2005 levels, repaired all damages and replaced material stockpiles.

Redwood Meadows is awaiting funding for improvements to the berm that include making it taller and wider as well as reinforcing along critical spots where water flow will be a problem in future events. The berm will also be extended south along the Redwood Meadows G&CC, owned and operated by Tsuu T'ina Nation. This welcomed partnership will help protect both the course and the town site. This expansion as well as the improvements will be finished with Alberta's FREC funding, available to communities throughout the province.

Redwood Meadows has also applied for funding for emergency berm trailers that will carry enough supplies and equipment to erect temporary berm structures on top of the existing earth berm. The intent is to set the equipment up at recognized low

spots that needed to be sandbagged in 2013, during our flood/runoff season. This will keep volunteers away from the water's edge and provide an extra two feet of berm height. Emergency Warning Sirens are being purchased and placed at strategic points in town for complete coverage if needed for alerting residents.



EMERGENCY MANAGEMENT AGENCY

Lacking - here is no better description of our efforts in emergency management prior to 2013. The town had an old province of Alberta template without dated telephone numbers. The plan was never exercised and had been updated infrequently.

Prior to and during the flooding our Director of Emergency Management (DEM) was a town councillor who was appointed by council because his father had previous experience. With the municipal elections and new council sworn in in October 2013, I attended first meeting of the new council and was appointed the new DEM. I have been working closely with Alberta Emergency Management Agency and while still in its infancy the town has an improved emergency plan. Our town emergency management agency has a committee with four residents. Together, we are taking steps to have a disaster-prepared community.

IMPROVEMENTS OUTSIDE OF REDWOOD MEADOWS

The Government of Alberta is taking steps to provide mitigation efforts to protect those

downstream along the Elbow River. A dry dam and absolutely huge water storage facility is in the planning stages and Redwood Meadows will be at the table for these projects as will many other stakeholders.

CONCLUSION

The flooding of 2013 can be seen as a success for years to come but there were still some lessons learned that must be taken forward. Previous mitigation helped keep the community ahead of the flow and even when the situation looked like the river would win, the old earth berm allowed heavy equipment to eventually start making progress. During the event volunteers in the community and their engagement was an important factor in the success. Moving forward, involvement of volunteers has to be included in the emergency plan and coordination has to be better for safety and accountability.



Good government relations leading up to the flooding and following is allowing Redwood Meadows access to disaster recovery money from the province that was previously not accessible due to our status as a municipality. Being situated on Tsuu T'ina First Nation's leased land had left our town in a no-man's land in the past. Now, with the inclusion of Redwood Meadows in the Municipal Government Act, the interaction with government and different departments is much easier.

Redwood Meadows has a long way to go but if the current track continues to be followed, future events like the flooding of 2013 should have the same successful outcome.

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Evans attended the Southern Alberta Institute of Technology in 1989 and studied photojournalism. In 1992, he joined RMES after taking pictures of an interface fire and making prints for the department. He has his NFPA 1001 level II certification, NFPA 472 Operations and Awareness (Hazmat), NFPA 1041 level I (Fire Service Instructor), Dalhousie University Certificate in Fire Service Leadership and Certificate in Fire Service Administration and is a registered Emergency Medical Responder with the Alberta College of Paramedics. Evans' fulltime job is with the city of Calgary where he is a senior Emergency Communications Officer, answering 9-1-1 and dispatching fire and EMS units. In September 2012 he received his Chief Fire Officer designation from the Canadian Association of Fire Chiefs at Fire-Rescue Canada in St. John's, NL. In November 2013 he was appointed the Director of Emergency Management for Redwood Meadows. He lives in Redwood Meadows with his wife, a Captain/EMT with RMES, and three children. Follow him on Twitter at @redwoodwoof.

USEFUL Links



**BCMIX - Business
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**Council on
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**EOC: Emergency
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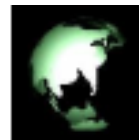
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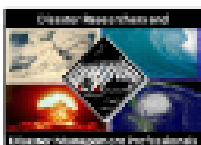
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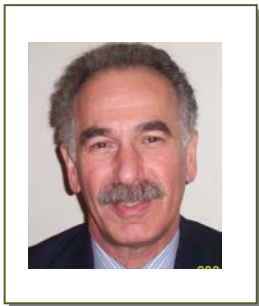
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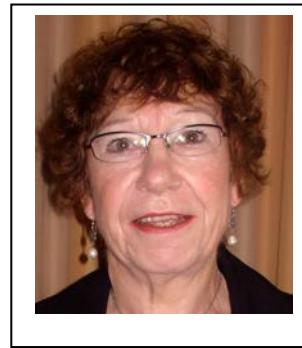
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What is “CRHNet?”

Founding members of CRHNet had a vision to develop a Canadian inter-disciplinary and cross sectoral **network** of researchers, academics, practitioners and business and local community members to enhance an understanding of risk, hazards and emergency management. The mission of CRHNet is to create **a safer and more resilient nation** by identifying risk and hazards and to improve emergency and disaster management.

The Network creates an environment in which the hazards research, education and emergency management practitioner and business community can effectively **share knowledge and innovative approaches** that reduce disaster vulnerability. CRHNet can help to:

- (1) fill the information and research gaps that exist in Canada;
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